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Preface

Director’s Message

We are delighted to introduce the first volume of “Grants Catalog” of Özyeğin University (ÖzÜ). This catalog provides a summary of the national and international grants carried out by ÖzÜ faculty members for the period 2009-2013. We also have section for the backlog of 2014 grants, which include the projects accepted for funding, but their grant agreements are still in the process. Awards received by our faculty members and academy-industry collaboration projects are not included within the content of the catalog.

The catalog includes 27 national and 24 international grants from different funding agencies. The main source of funding for the national grants is the Scientific, Technological Research Council of Turkey (TÜBİTAK). For the international grants, the funding mainly comes from the EU 7th Framework Program.

We are pleased to see that during the last year, the university has continued to demonstrate progress in improving its overall performance and increasing the research grants budget by 5,5 times between 2009 and 2013. Please note that the catalog will also available online at TTO web site (http://tto.ozyegin.edu.tr)

The Özyeğin University, established in 2007, is one of the leading research oriented universities in Turkey. It has been qualified to rank among the top 10 universities in “The Most Entrepreneurial and Innovative Universities Index” announced by Ministry of Science, Industry and Technology in 2012 and 2013. In addition to this success, it has been selected as one of the first 10 awardees for the support of 10 M TL for 10 years TUBITAK “Technology Transfer Office (TTO) Support Program” in 2013.

As Technology Transfer Office (TTO), we mainly support our faculty members’ research activities and disseminate the research outcomes to better support the goals and the innovation agenda of our University. We hope that this catalog aligns perfectly well with our mission.

We are pleased to offer our congratulations to all of our faculty members who have been contributed to develop our research grants portfolio and this catalog.

Sincerely,

Nilay Papila
TTO Director

TECHNOLOGY TRANSFER OFFICE

ÖZYEĞİN UNIVERSITY

NATIONAL GRANTS

TECHNOLOGY TRANSFER OFFICE

National Grants 2009

Cross-Layer Optimized Design for Wireless Multimedia

ABSTRACT

Wireless communication systems to be developed in the near future will offer various multimedia services. When such services require high data rates or are intolerant to delay, a design philosophy based on conventional OSI layers may not deliver the appropriate system. The main purpose of this project proposal is to design a wireless communication system, which is vertically optimised across the layers. In such a system, system resources such as power, spectrum, time, code space, and antennas shall be shared by the users in the best and most adaptable way. Moreover, the time- dependant service quality requirements of all services offered within the system shall be met. Within this context, this project proposal will deliver the identifications of all physical layer blocks adaptable to a network using an IP protocol as well as the adaptable media access control protocol. Furthermore, the project proposal shall establish a cluster of service quality classes based on various services relevant to wireless media. How to enable the communication of the layers within the cross-layer optimised system, and what such communication should be comprised of will be among the results of the project. The project shall play an important role in terms of demonstrating the necessity of a perspective different from today's design philosophy, in the design of next-generation communication systems. The main expected result of the project is that almost all components of new generation systems aiming to deliver multimedia services will need to be adaptable.

**Doç. Dr.
Oğuz Sunay**

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
oguz.sunay@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 3501

START DATE
2009

DURATION
36 months

OZU BUDGET
168,000.00 TL

TÜBİTAK

Design of Minimum Delay Content-Adaptive Streaming Video Systems for Wireless Media Using Multi-Objective Cross-Layer Optimization

ABSTRACT

The aim of this project is to use interlayer multipurpose optimisation methods in IP-based media to design video systems that will enable uninterrupted video flow. Wired and wireless internet networks were analysed with a view to optimising the weighted failure metric and the pre-recording delay in video transfers. The main result is that the design philosophy based on OSI layers is not sufficient for systems with rigid delay limits, which require variable bit rates. The recommended alternative solution is based on an interlayer optimised system design.

Doç. Dr.
Oğuz Sunay

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
oguz.sunay@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
2009

DURATION
48 months

OZU BUDGET
158,400.00 TL

TÜBİTAK

Investigation of Near-Field Radiative Transfer for Development of Thermo/Photovoltaic Power Generators

ABSTRACT

The objective of this project is to study the fundamentals of near field radiative transfer both experimentally and numerically. Although radiation transfer follows the Planck law at all scales, once the gap distance falls below the length of the wavelength, radiation transfer is significantly enhanced. Using this concept, innovative devices can be designed to operate at nanoscales. We show that near-field effects can be used for both nano-machining and nano-thermophotovoltaic cells.

We have developed a simulation tool to model nano-machining using an atomic force microscopy tip. In addition we have established an experimental system to measure near field radiative transfer. For this we have prepared a number of different samples which were used in the experimental system. Contnuation of these fundamental studies will help to establish nano-machining concepts (NM-AFM) and allow us to design and build better nano-thermophotovoltaic cells (N-TPV).

**Prof. Dr.
M. Pınar Mengüç**

DEPARTMENT
Mechanical Engineering,
Center for Energy,
Environment and Economy

CONTACT
pinar.menguc@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
15.11.2009

DURATION
24 months

OZU BUDGET
225,295.00 TL

TÜBİTAK

National Grants

2010

Crew Planning and Fleet Assignment Problems at Turkish Airlines

ABSTRACT

Air transport industry is one of the major industries in Turkey and its national significance increases drastically due to the expected high growth rate in the following years. In recent years, intense domestic and international competition coupled with fluctuating fuel prices forced airline companies to operate more efficiently. One means to improve efficiency is reducing the crew related costs such as crew salaries, layover costs and deadheading costs. In order to minimize crew costs in an airline operation, one has to determine the optimal assignment of crews to a pre-determined flight schedule with minimum total cost.

Crew scheduling problem, which is considered to be one of the most challenging problems in airline planning, is the problem of assigning crews to the flight legs with minimum total costs. Generally speaking the domain of this optimization problem is huge as it involves optimization of thousands of flights and hundreds of crews. Furthermore, the desired output of the problem, a feasible flight schedule for the crews, should satisfy several complex rules and regulations. Therefore, crew scheduling problem is a complex optimization problem on a large scale that requires advanced and efficient optimization techniques to solve. On the other hand, the benefit of solving crew schedule problem overweighs its challenges as small improvements can lead to significant savings in such a large magnitude.

In this project, the objective is to investigate possible ways to improve the efficiency of operations of Turkish Commercial and Civil Aviation sector. More specifically, we propose to develop methods to solve the crew scheduling problem of Turkish airline companies. Turkish Airlines, the industrial partner of the proposed project, will provide real data and problem specifics that will be used in this project.

In the literature, standard and complex solution methodologies are proposed to solve crew pairing problem of the airlines. Most of these studies consider North American or European airlines, the problem of whose are quite different than the crew pairing problem of Turkish airline companies such as THY. THY's crew scheduling problem has its specific properties (i.e. fixed crew salaries, only one crew base for cockpit crew, round trip type flight schedules, several consideration besides cost minimization). Therefore, the objective for the first phase of this project is to develop novel solution methods to address THY's non-generic crew scheduling problem.

In the second phase, the integrated fleet assignment and crew pairing problem will be analyzed. In the literature these two interacting problems are solved sequentially, which leads to sub-optimal solutions for the overall problem. The objective of the second phase of the project is to develop methods to solve the integrated problem of THY, which may provide significant benefits compared to sequentially solving these two important problems. For both phases, computationally efficient mechanisms will be developed to ensure that the methods are implementable to solve real life sized problems of THY.

The major impact of the proposed project is to improve the operational efficiency of the Turkish airlines companies to create a competitive edge in this highly competitive environment. As a result, the project will improve the profitability of a major growing industry in Turkey and contribute to the national economy.

Yrd. Doç. Dr.
Okan Örsan Özener

DEPARTMENT
Industrial Engineering

CONTACT
orsan.ozener@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.12.2010

DURATION
30 months

OZU BUDGET
172,049.00 TL

Rapid Unsupervised Speaker Adaptation for HMM-based Text-to-Speech Synthesis

ABSTRACT

Concatenative synthesis method has been the dominant approach in text-to-speech synthesis (TTS) in the last decade. Despite its success, the concatenative synthesis approach has several disadvantages. One of the disadvantages is the spurious errors that pop up during synthesis which can significantly distract the listener. A second disadvantage with the concatenative approach is the difficulty in modifying the voice characteristics, voice style, and emotions.

Recently, statistical speech synthesis (SSS) approach is proposed that can address both of these problems. In the SSS approach, statistical models are used to synthesize the speech sounds. Smooth synthetic speech that does not have the spurious error problem of the concatenative synthesis methods can be generated with the SSS approach. Moreover, voice style and characteristics as well as emotions can be easily transformed. In the latest TTS Blizzard challenges, one of the instances of the SSS techniques outperformed the concatenative synthesis techniques in Mean Opinion Score (MOS) quality tests.

The high quality and intelligibility speech it generates, the flexibility it offers in voice/speaker/emotion conversion, and its small memory requirements make SSS systems a strong candidate to replace the concatenative systems that are the most popular TTS systems in use today. SSS systems already started to enable high quality embedded speech synthesis products because of its small memory footprint requirements. Moreover, the SSS technology is receiving increasing attention from companies that offer server or PC-based TTS applications because of its competitive voice quality and flexibility in voice conversion. The success of the current SSS systems is expected open new research avenues which will lead to new discoveries and potentially make the SSS technology the dominant TTS technology in the next decade.

One of the most exciting research directions in the SSS field is speaker adaptation where the goal is to adapt the voice model to a target speaker that does not exist in the training data. Maximum a posteriori (MAP) and maximum likelihood linear regression (MLLR) methods are the two of the commonly used approaches used for adaptation. MLLR method performs better than the MAP method when the amount of adaptation data is small. Therefore, MLLR adaptation is more suitable for rapid adaptation. Several variations of the MLLR technique and combination of the MLLR and MAP techniques are used in the context of SSS.

Unsupervised adaptation is difficult to achieve with SSS because of the rich context information used in speech sounds. It is very difficult to generate the correct context using speech recognition tools as is commonly done in unsupervised speech recognition systems. There is only one paper on unsupervised adaptation for SSS [1]. The idea proposed in [1] attempts to extract only the triphone context ignoring the other information such as syllable, location of the sound in the syllable etc..

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**Yrd. Doç. Dr.
Cenk Demiroğlu**

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
cenk.demiroglu@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 3501

START DATE
01.03.2010

DURATION
36 months

OZU BUDGET
108,400.00 TL

TÜBİTAK

Analysis and Design of Cooperative Diversity Systems for Underwater Cooperative Communications

ABSTRACT

Cooperative diversity is a transmission method which extracts spatial diversity advantages through the use of relays. The concept of cooperative diversity has been recently applied to underwater communication and the number of current studies in this area is very limited. Our main objective in this project is to determine the fundamental performance bounds of relay-assisted underwater communication considering the inherent characteristics of the underwater channel and design novel transmitter/receiver architectures to enable high transmission speeds and high link reliability. Towards this overall objective, this project consists of three main workpackages. The first package addresses the information theoretic performance of underwater communication. In this workpackage, the underwater channel capacity will be derived taking into account the effect of relay geometry and achievable maximum rates and transmission ranges will be determined for various cooperation protocols and relaying modes. In the second workpackage, the design and analysis of orthogonal frequency division multiplexing (OFDM)-based cooperative communication systems will be carried out for underwater channels assuming various cooperation protocols. In the third workpackage, sparse channel estimation algorithms for cooperative underwater communication will be designed. The results obtained within this project will provide insight into the fundamental performance bounds of underwater communications and contribute to the design of next generation underwater communication systems.

Prof. Dr.
Murat Uysal

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
murat.uysal@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.09.2010

DURATION
36 months

OZU BUDGET
182,485.00 TL

TÜBİTAK

Synthesis of Clock Trees for Sampled-Data Analog IC Blocks

Yrd. Doç. Dr.
Hasan Fatih Uğurdağ

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
fatih.ugurdag@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.10.2010

DURATION
24 months

OZU BUDGET
147,187.00 TL

TÜBİTAK

ABSTRACT

This project aimed to develop a methodology for automated design of clock trees in Sampled-Data Analog Circuits (SDACs). The current practice in the industry and academia for clock tree design of SDACs is a manual process, which is time-consuming and error-prone. Clock tree design in digital domain, however, is fully automated and is carried out by what we call Clock Tree Synthesis (CTS) software. In spite of some critical differences, SDAC clock tree design problem has fundamental similarities with its digital counterpart. Therefore, this work started with the question of "Why don't we use CTS software for analog circuits while we are able to utilize them successfully for digital?"

It is obvious that automated design of clock (buffer-cell) network of SDACs would eliminate the possibility of error, reduce development time, and allow analog IC design engineers to focus their attention on parts of the design that need creativity.

The claim of our project is that we are indeed able to automate the design of SDAC clock distribution circuits by writing an extra software layer that runs on top of (digital) CTS software. The deliverables of our project were a methodology and a software. The methodology deliverable is also useful in the case of manual design. Software deliverable of the project (called ACTreS for Analog Clock Tree Synthesis), on the other hand, synthesizes the circuit as well as the layout of clock distribution network. ACTreS does so by driving an already existing CTS software (in multiple runs) with constraint files it automatically generates.

We successfully validated our methodology and ACTreS software for the design of a 10-bit 0.18 micron 60 MHz 2-step Flash differential-input ADC circuit as a test case.

Design and Implementation of a Data Stream Management System with Complex Event Processing Capabilities

Yrd. Doç. Dr. İsmail Arı

DEPARTMENT
Computer Science

CONTACT
ismail.ari@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.06.2010

DURATION
36 months

OZU BUDGET
107,057.00 TL

ABSTRACT

The world has seen proliferation of data stream applications over the last decade. These applications include network or traffic monitoring, online trading or transaction monitoring, supply chain management with Radio Frequency Identification (RFID), health monitoring, data center automation, web click-streams, other military and civilian applications using sensor networks, and many more. All of these applications are considered to be mission-critical by related organizations and require real-time processing, so that strategic decisions can be made quickly. The analysis needs of these emerging applications substantiate inherently different design and implementation specifications compared to those for existing Database Management Systems (DBMS), which are sometimes used in an ad-hoc fashion to address the processing needs of the listed applications. An emerging system architecture called Data Stream Management System (DSMS) is better suited for this purpose. The main differences between DSMS and DBMS are mentioned below. First, DSMS run queries over unbound, fast moving and dynamic data streams usually while the data is in-memory and before the data is ever stored (persistence is actually optional in DSMS). In DBMS, ad-hoc queries are run over stationary data that is already saved into the database, which is a problematic assumption for handling data streams that are characterized as being unbound and possibly bursty. In DSMS, queries are first "registered" with the system and become Continuous Queries (CQ). CQ are relatively static while the data they process is dynamic. As a result query plan optimization is still an open research field for DSMS as it is extremely challenging to build, optimize and adapt query plans for unbound and unpredictable datasets. The nature of unpredictability comes from stream characteristics such as unknown and varying arrival rates, missing tuples, out-of-order arrivals, and ad-hoc dependence on external data. Second, semantics of a Continuous Query Language (CQL) need richer temporal and spatial clauses than its counterpart called Structured Query Languages (SQL) in DBMS due to the time-window constraints in data streams. Finally, Complex Event Processing (CEP) in real-time requires making complex joins for correlations, mixing in-flight data with data stored elsewhere (e.g. databases, data warehouses) and possibly running different mining algorithms to forecast values or events in the near future. Our research will primarily focus on these final CEP-related challenges. In this project our goal is to design and implement a DSMS system with advanced CEP capabilities to address the emerging challenges for the stream applications mentioned above. Several other academic and industrial systems have been developed over the last years (Borealis, Streams, TelegraphCQ, SASE, Cayuga, CEDR, etc.) and they tried to address fast data stream processing issues. Most have also been quite successful in building efficient stream processing engines showing applications on one or more of the areas mentioned above. However, it is hard to find a broadly-applicable, flexible system that brings together the following advanced CEP capabilities, which we plan to design, implement and execute as a part of this project:

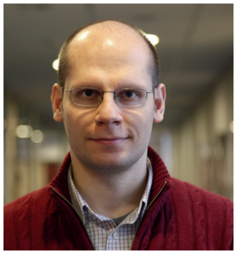
- Finding statistical or semantic correlations of values from multiple streams or within a single stream
- Using multi-dimensional, sequential and duplicative nature of data stream sources (when applicable) to provide data reduction over high volume data streams
- Mixing data from data streams with data stored in databases or data warehouses
- Defining elements of a CQL language for DSMS (analogous to SQL of DBMS) for declarative authoring, parsing and processing of continuous queries and for publishing of complex events.
- Finding feasible data mining algorithms (e.g. linear regression or clustering) that can be run over data streams to realize the novel concept of "stream mining". As a proof-of-concept we will build a prototype DSMS with the listed CEP capabilities. Like other related work in the literature, we will first have to deal with queuing, scheduling, efficient in-memory processing, efficient communication issues related to basic event stream processing. However, we plan to benefit from some of the existing DSMS systems in the academia to address these issues and to bootstrap our research, so that we can quickly extend them with the required CEP features to meet our goals within the project time-frame. The project manager has practical design and development experience with some of the existing DSMS that currently lack our proposed feature set, but can be extended for the purpose. To provide system scalability and sustainable CEP performance, we will investigate techniques such as multi-query optimization, multi-core and distributed processing over multiple computing resources and report the emerging sharing, parallelization and communication problems and other findings. Finally, we will use rule-based, wavelet-based, or other learning-based techniques detect changes and anomalies in streams. To demonstrate the benefits of our R&D efforts, we will define novel mission-critical use cases and show how we can detect abnormal patterns, spatio-temporal correlations, threshold violations, make predictions, etc. over one or more data streams generated by these applications using our prototype. The duration of the project is estimated to be 32 months and we intend to employ 1 full time M.S. and 1 full time PhD student to work with the project manager for the duration.

TÜBİTAK

Run-Time Program Generation and Empirical Optimization

ABSTRACT

This project aims to explore the combination of run-time program generation (RTPG) and empirical optimization (EO) and to develop a system that brings these two to obtain high performance code. Run-time program generation is the technique of generating programs under programmer control. It takes advantage of information that becomes available only at run-time to produce a specialized version of a program. Empirical optimization, also known as auto-tuning, is the optimization technique that finds the best version of a program by testing those versions on the target machine. RTPG and EO are effective techniques; however, the high potential of their combination has been neglected so far. RTPG achieves speed-up by specializing a program according to run-time inputs; however, it has poor performance portability because it does not take into account the characteristics of the data and the target machine. Moreover, it has problems in dealing with real-sized problems. EO finds the version of an algorithm that performs the best on the target machine according to the characteristics of the data; however, all the candidate algorithms are fixed – no new version is generated based on run-time inputs. For these reasons, RTPG and EO are complementary methods. If they are used together, speed-ups that have not been achieved so far can be obtained.



Yrd. Doç. Dr.
Tankut Barış Aktemur

DEPARTMENT
Computer Science

CONTACT
baris.aktemur@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.09.2010

DURATION
24 months

OZU BUDGET
62,544.00 TL

TÜBİTAK

Simultaneous Tracking of Head Motion and Occlusion Regions Using Multi-Modal Sensors for Augmented Reality Applications

ABSTRACT

In this project, we will develop novel methods and technologies for tracking head motion and occluders using multi-modal sensors to achieve a more immersive augmented reality experience in cultural heritage applications. For a high feeling of immersion, real and virtual objects have to be aligned correctly in 3D. Therefore, the video sent to both eyes of the user has to be rendered according to the position and orientation of the user's head. This necessitates the user's head to be tracked accurately. In case there are moving people in the scene, the regions occluded by these people will be tracked as well, and these regions will be removed from the display when appropriate. In addition, this occlusion information will be utilized to improve the tracking performance in return. In this project multi-camera video data is going to be used for head tracking in order to achieve more realistic results compared to methods using only monocular or binocular video data. However, methods using just video may not yield good tracking results when the head motion is quick and the images change too fast. Since inertial sensors can track better when there is fast motion, multi-modal tracking is going to be performed in this project. That is, video data from the cameras and accelerometer and gyroscope data will be used together under a recursive Bayesian estimation framework. Placing transmitters, receivers or visual tags may damage the historical sites and/or alter the appearance of the environment in cultural heritage applications. Therefore a method that works without the need of placing any tool or tag to the scene is going to be developed in this project. On the other hand, the 3D map of the scene is going to be extracted beforehand and utilized during head tracking. A Bayesian filter which will be developed in this project and that uses the inertial sensor data, will be utilized to capture the 3D scene data. During the augmented reality application, previously captured 3D scene information will be refined during the head tracking. Another novelty of this project is the tracking of moving occluders together with the head motion, visual features and inertial sensor parameters. A hybrid filter will also be developed for head tracking, which will combine the benefits of the recursive Bayesian filter and the structure from motion approach. Furthermore, various filters to be developed in this project will also be implemented on a head mounted display system and their performance will be demonstrated on a cultural heritage application.

Prof. Dr.
Arif Tanju Erdem

DEPARTMENT
Computer Science

CONTACT
tanju.erdem@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.09.2010

DURATION
30 months

OZU BUDGET
212,038.00 TL

TÜBİTAK

Long-Term Marketing Effectiveness in Turkey: Does It Differ from that in the US and Western Europe?

ABSTRACT

Throughout economic booms and recessions, Turkish companies aim to sustain and grow their market performance. Marketing actions such as product innovations, price changes, distribution channels and communication activities all have the potential to deliver this performance. Unfortunately, very few companies know how much additional sales or profits are generated by a specific marketing actions – but those that do outperform their competitors in terms of revenue growth, market share and profitability (CMO Council 2004). In the United States and Western Europe, long-term marketing effectiveness has been quantified for a wide range of marketing actions and industry sectors. In Turkish marketing literature, authors have considered manager and consumer perception of sales promotion (Akyüz and Ayyıldız 2008, Tığlı and Pirtini 2003), advertising (Gülçubuk 2007), mobile marketing (Akbiyik, Okutan, Altunisik 2008) and packaging (Sütütemiz, Çiftyıldız and Konuk 2008). These studies survey consumers and/or managers on which marketing actions are perceived to be more versus less effective. Unfortunately, these stop short of quantifying the actual effectiveness of marketing actions with market data. It is well documented that consumers often change their purchasing behavior in response to marketing actions, even though they do not express this in a survey. In sum, companies doing business in Turkey currently lack hard numbers for long-term marketing effectiveness, which is crucial to making intelligent decisions on where to cut spending and where to increase it. This project aims to quantify long-term marketing effectiveness in Turkey and compare it with the marketing effectiveness observed in previous studies on US and Western European companies. The original value of the project consists of identifying and interpreting differences in long-term marketing effectiveness for an important emerging market versus mature markets. Differences are expected when compared to current research in mature markets. In the US, return on marketing investment is highest for new product introductions, then for pricing and promotions, next for pricing actions, then for distribution actions, and finally for communication (Pauwels 2004). In contrast, the researcher expects that communication and distribution effects dominate in Turkey, based on conversations and preliminary data analysis with Sony Eurasia. Moreover, communication effects are expected to far exceed the 0.05 elasticities typically reported in mature markets. Most importantly, the researcher expects to find several cases of permanent marketing effects, leading to long-term competitive advantage for the company studied. These findings will require the development of new frameworks and recommendations for Turkish businesses and policy makers that operate in emerging markets. Besides the important practical value to Turkish business, knowledge of long-term marketing effectiveness may also provide input to Turkish long-term economic development plans and European Union development projects. The scientific approach involves the persistence modeling framework introduced by Dekimpe and Hanssens (1999) and further refined by Pauwels (2004) and Pauwels and Hanssens (2007). This approach follows 3 steps: unit roots tests reveal the sustainable versus temporary advantage nature of marketing actions, vector auto-regressive models allow for short-term and long-term marketing effects, for competitive effects and for complex feedback loops, while impulse response functions simulate the over-time impact of a proposed marketing actions for forecasting and what-if-analyses. From previous experience, the researcher is confident this project can be executed in a team of 4 (primary investigator, collaborator and two research assistants) over a period of 24 months. Six months are needed to establish company contacts and obtain the data necessary for the analysis. Three months typically suffice to clean the data and prepare it for model estimation. Six months are needed for the econometric model estimation, and another six months for the validation of the model results with the involved companies. Finally, three months are needed to interpret the final findings, and integrate these insights into the final report.

Prof. Dr.
Koen Pauwels

DEPARTMENT
Economics and
Administrative Sciences

CONTACT
koen.pauwels@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.01.2010

DURATION
18 months

OZU BUDGET
186,715.00 TL

TÜBİTAK

Perceptions of Supplier Opportunism in Turkey: The Role of Bounded Rationality in Buyer-Supplier Governance

ABSTRACT

Business to business (B2B) marketing is an important component of marketing in Turkey due to the large volume of B2B transactions taking place in many industries. An example of this is the the automotive industry where a huge volume of transactions take place between the automotive manufacturers and the suppliers (most of which are based in Turkey) (Wasti and Wasti 2008; Wasti 1998; Akbulut 1997; Azcanlı 1995; Erdoğdu 1999). A key issue in these B2B relationships between manufacturers and suppliers is how to best govern the relationships to the benefit of all parties involved. These governance decisions are made by managers in response to the actions and behaviors of partner firms. The extant marketing literature notes that suppliers on occasion appear to engage in opportunistic behavior involving breaches of contract and one challenge facing managers in manufacturer firms is how to deal with these breaches. This study will examine why some managers in manufacturer firms react differently when exposed to the same types of behavior by a supplier. This study will integrate insights from transaction cost economics and attribution theory to explain the differences in responses. Specifically, employing attribution theory, the study examines differences in the determination of opportunistic behavior based upon controllability perceptions, repeated behaviors on perceptions of behavior stability and its influence on governance outcome decisions. The two-step study utilizes both qualitative and quantitative techniques. In the first step of the study, a qualitative study will be undertaken involving detailed interviews with procurement managers in manufacturing firms to help develop an experimental scenario. In the following step, an experiment will be conducted with 240 procurement managers across different industries in order to test our hypotheses. This study will take two years to complete and will provide greater insights into how managers govern their relationships with suppliers. Project deliverables will include publications in indexed and peer-reviewed academic journals and conference presentations at both the national and international level. Our project team consists of Assistant professor Steven H. Seggie (Principal Investigator, Özyeğin University), and Associate Professor Koen Pauwels (Research Associate, Özyeğin University).

Yrd. Doç. Dr. Steven Head Seggie

DEPARTMENT
Economics and Administrative Sciences

CONTACT
steven.seggie@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 3501

START DATE
15.03.2010

DURATION
15 months

OZU BUDGET
69,925.00 TL

TÜBİTAK

Appointment System Modeling in Presence of Seasonal Demand and Walk-Ins in Outpatient Care

ABSTRACT

This study investigates appointment systems as combinations of access rules and appointment rules that are explicitly designed for dealing with walk-in seasonality. In terms of access rules, alternative policies are tested for adjusting capacity to incorporate the intra-week and monthly seasonalities of walk-ins. In terms of appointment rules, various strategies are tested to determine which particular slots to double-book or leave open in cases where seasonal walk-in rates exceed or fall short of the overall yearly rate, taking into consideration the intra-day variations in walk-in arrivals. Simulation optimization is used to find quasi-optimal strategies, which are consequently used to derive some practical heuristic solutions to the appointment-scheduling problem. The goal is to provide some guidelines for healthcare practitioners on how to most-effectively design their appointment systems when seasonal walk-ins exist. Another important contribution is that, unlike earlier studies that have addressed capacity and appointment-scheduling problems separately, our integrated model allows evaluation of several micro (in-clinic) and macro level performance measures simultaneously.

Yrd. Doç. Dr.
Tuğba Çayırlı

DEPARTMENT
Economics and
Administrative Sciences

CONTACT
tugba.cayirli@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 3501

START DATE
01.04.2010

DURATION
16 months

OZU BUDGET
69,840.00 TL

TÜBİTAK

Women's Literature and Analytical Research of Women Writers' Profiles

ABSTRACT

The scientific question around which this project is built relates to women's literature and profile of women writers in Turkey. We started with questioning whether we can talk about a specific women's literature "canon" in Turkey? Does such a canon exist? To answer this question, common qualities of life/literature of women writers should be examined. Is it therefore worth asking whether women writers in Turkey have a common profile sociologically or culturally, and in terms of their education or economical situation of their families, and that whether they form a literary solidarity in accordance with the idea of a canon? Our project serves as the Turkish representative of the EU-supported COST action "Women Writers in History: Toward a New Understanding of European Literary Culture" and focuses on the literature produced by women in Turkish since the 16th century. Our project aims to carry out analytical examination of the idea of canon and the profile of women writers in Turkey. It is also our aim to establish a trilingual (Turkish, English and French) electronic database that will make biographical and bibliographical information about women writers in Turkey visible and increase both the research potential and citations of previous research on their work. We adopt the construction of such a database as a pillar of the project because of the lack of information on women writers of Turkey in several international electronic databases worldwide, which either provide little or no information on women writers of Turkey. This project will make an important contribution to the visibility of women writers of Turkey not only nationwide but also globally, with help from developments in e-transformation, digital archiving and open access. It will also contribute to research on advantages of digitalizing and making information electronically visible and accessible via online databases. The most important contribution of our project will be discussing the relevance of the term women's literary canon in the Turkish context and commenting on the profile of women writers in Turkey, by comparative research on the work of women writers, and making women writers of Turkey a part of the global developments in open access.

Yrd. Doç. Dr.
Çimen Günay Erkol

DEPARTMENT
Arts and Sciences

CONTACT
cimen.erkol@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
15.05.2010

DURATION
24 months

OZU BUDGET
132,070.00 TL

National Grants

2011

Non-Perturbative Approaches to Hadron Interactions in Quantum Chromodynamics

ABSTRACT

Quantum chromodynamics (QCD) is the theory that explains the dynamics and interactions of quarks, which are one of the fundamental particles of matter, in terms of gluon exchanges. Quarks, which carry one of the three color charges (red, green or blue), cannot exist as free particles. However, quarks combine so as to form colorless hadrons (mesons as quark—anti-quark and baryons as three quark states) such as the proton and the neutron or those that can be observed via high-energy and nuclear physics experiments. The hadronic sector is composed of light u, d, s and heavy c, b, t quark flavors. The lightest quarks u and d have masses of the order of a few MeV, whereas the strange (s) quark has a mass around 150 MeV. As compared to the typical hadron mass scale (~1 GeV), one can assume an approximate SU(3) symmetry [flavor-SU(3)] between the u, d and s quarks. The interactions of hadrons have long been studied both theoretically and experimentally as they provide key answers with regard to fundamental structure of matter and the symmetries of nature. One important issue in LHC is to understand the QCD background. While there are some model-dependent approaches in the literature, hadronic interactions are in principle explained by QCD. Such a first-principles description of the hadron-hadron interaction, however, is highly complicated, particularly at low energy, where QCD is a non-perturbative theory. Two of the approaches that are commonly used in this framework are the methods of QCD sum rules and lattice QCD. The QCD sum rules method is a powerful tool to extract qualitative and quantitative information about hadron properties. For this reason it has been extensively applied in the literature to analyze various problems. In this method one uses an analytical technique to match the behaviors of hadrons at high and low energies. This matching then allows us to obtain the characteristic properties of hadrons as obtained directly from QCD. The information obtained though this method has long been used as an input for other theoretical approaches and experimental efforts. Lattice QCD is another approach which offers a method of calculating hadronic observables. It allows us to obtain information about hadron properties starting from first principles and without making any model-dependent assumptions. In this technique, QCD is formulated on a space-time lattice and the resulting equations are solved numerically on a computer. Lattice QCD has proved to be rather successful in predicting the spectral properties of mesons and baryons, as well as the parameters characterizing their interactions. The goal of this project is to determine the spectrum and the interactions of octet and decuplet baryons. In particular, we aim to concentrate on the axial and the electromagnetic charges together with the form factors of baryons. For this purpose we are going to utilize the method of QCD sum rules and lattice QCD. A determination of these parameters will provide precious information about the structure of baryons and will allow us to explore the strangeness sector and to check whether flavor-SU(3) is a good symmetry of nature or not. Our work will be compared and provide input to other theoretical approaches and to experimental efforts.

Doç. Dr.
Güray Erkol

DEPARTMENT
Mechanical Engineering

CONTACT
guray.erkol@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.01.2011

DURATION
36 months

OZU BUDGET
280,730.00 TL

TÜBİTAK

Physical and Upper Layer Solutions for Next Generation Optical Wireless Communications

ABSTRACT

Optical wireless transmission (OWC) refers to optical transmission in unguided environments through the deployment of optical carriers at infrared, ultraviolet, and visible wavelengths. With attractive features such as high bandwidth capacity, low cost, and unregulated spectrum, OWC systems can be considered as a complementary and/or alternative technology to fiber optic and radio frequency (RF) wireless systems. Despite the large number of potential application areas, the wide scale deployment of OWC systems has been hampered by their rather disappointing performance particularly in long ranges. The major degrading factors that significantly affect the link reliability and coverage area of terrestrial OWC systems are atmospheric turbulence induced fading and sensitivity to meteorological conditions. The main objective of this project is to present advanced physical layer and upper layer solutions to improve the link reliability and the link range in the presence of such adverse conditions. Towards this main objective, the project consists of five workpackages. The first work package involves the application of relay-assisted cooperative diversity principles to OWC systems. In this work package, we will design low-complexity OWC systems that will provide a high link reliability in long ranges and analyze their performance in various turbulence environments. In the second work package, considering the quasi-static nature of atmospheric turbulence channel and therefore the possibility of reliable feedback information, we will develop adaptive transmission algorithms in which system parameters are varied according to the channel conditions. In the third work package, we will design hybrid RF/OWC systems to exploit media diversity and therefore ensure high link reliability regardless of meteorological conditions. In the fourth work package, we will investigate a data link layer technique known as automatic repeat request (ARQ) in the context of OWC systems. In the fifth work package, we will work on the analysis and design of scheduling methods for a multi-user OWC network. The proposed algorithms, techniques, methods, and systems will be investigated in detail over the optical wireless channels under consideration and their superiority will be demonstrated with respect to the existing ones in the literature.

Prof. Dr.
Murat Uysal

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
murat.uysal@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 2515 - COST

START DATE
01.11.2011

DURATION
36 months

OZU BUDGET
251,580.00 TL

Mathematical Analysis of Nonlinear Nonlocal Partial Differential Equations

ABSTRACT

This project aims to obtain some rigorous results on mathematical analysis of nonlinear partial differential equations arising in nonlocal elastic models of solids. The cornerstones of the project are local and global existence of solutions of initial-value problems, finite time blow-up of solutions, global existence of small amplitude solutions and existence and orbital stability of travelling waves.

Various generalizations of the conventional (local) theory of elastic solids have been proposed in the literature. One of these generalized theories is called non-local elasticity theory in which the equations of motion are integro-differential equations. It is very important to suggest an applicable nonlinear model within the context of nonlocal elasticity theory. In recent two studies (N. Duruk, A. Erkip and H.A. Erbay, IMA Journal of Applied Mathematics vol. 74, page 97-106, 2009 and N. Duruk, H.A. Erbay, A. Erkip, Nonlinearity vol. 22, page 1-12, 2010), one such model has been proposed in one-dimensional case and the corresponding initial-value problem has been studied. The model involves a convolution integral operator with a general kernel function whose Fourier transform is nonnegative. For suitable choices of the kernel function, the equation of motion reduces to some well-known examples of nonlinear wave equations, such as Boussinesq-type equations. In Duruk et al (2010), assuming enough smoothness on the initial data together with some positivity conditions on the nonlinear term it has been shown that the Cauchy problem is globally well-posed in suitable Sobolev spaces. Furthermore, conditions for finite time blow-up have been provided.

This project aims to study various extensions of the model proposed in Duruk et al (2009, 2010). The five fundamental problems to be studied are:

1. The aim of the first problem is to extend the analysis presented in Duruk et al (2010) about the global existence and finite time blow-up of solutions to the case of two coupled nonlocal nonlinear partial differential equations.

2. The aim of the problem is to prove the global existence of small amplitude solutions of the Cauchy problem introduced in Duruk et al (2010).

3. This problem aims to do what has been done in Duruk et al (2010) in one-dimensional case for the case of two-dimensional wave propagation.

4. The aim of the problem is to prove existence and orbital stability of travelling wave solutions of the Cauchy problem introduced in Duruk et al (2010).

5. The aim of this problem is to discuss local existence, global existence and finite time blow-up of solutions of the Cauchy problem arising in the peridynamic formulation of one dimensional elasticity theory. The peridynamic model proposed by Silling (S.A. Silling, journal of the Mechanics and Physics of Solids vol. 48, page 175-209, 2000) has also nonlocal character but it has a different flavor.

Prof. Dr.
Hüsnü Ata Erbay

DEPARTMENT
Natural and Mathematical Sciences

CONTACT
husnuata.erbay@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
1/1/11

DURATION
24 months

OZU BUDGET
94,496.00 TL

TÜBİTAK

TECHNOLOGY
TRANSFER
OFFICE

National Grants

2012

Advanced Microfluidics for Thermal Management of Electronics

ABSTRACT

With the recent advancements in microelectronics technologies size, reliability, and performance have been primary drivers for compact high functionality systems. However, thermal rela estate has been shrinking for those advanced systems such as ultrabooks, smart phones, smart TVs, avionics and data centers. This project is investigating novel microfluidics systems fo fundamentalf of vortex shedding and augmentation of cooling from microelectronics surfaces.

Doç. Dr.
Mehmet Arık

DEPARTMENT
Mechanical Engineering

CONTACT
mehmet.arik@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
15.12.2012

DURATION
30 months

OZU BUDGET
328,720.00 TL

TÜBİTAK

Strategies for Protecting the Text-Independent Speaker Verification Systems against Attacks Using Hidden Markov Model Based Speech Synthesis and Developing Synthesis Algorithms for More Effective Attacks

**Yrd. Doç. Dr.
Cenk Demiroğlu**

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
cenk.demiroglu@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.10.2012

DURATION
24 months

OZU BUDGET
163,796.00 TL

TÜBİTAK

ABSTRACT

Recently, there has been major progress in text-independent speaker verification systems. Especially, the success of the factor analysis approach to speaker verification enabled the deployment of those systems in the call centers of banks and telecom operators. However, despite all the progress and increasing use in our daily lives, the state-of-the-art systems are found to be vulnerable to attacks with Hidden Markov Model (HMM)-based TTS systems which can synthesize speech with MFCC features that are commonly used in the speaker verification systems. Indeed, in one paper, it has been found that the false alarm probability increases 5-folds in a factor analysis based speaker verification system when attacked with an HMM-based speech synthesizer.

Despite the importance of the problem in practical scenarios, there is very limited literature on attacking the speaker verification systems with speech synthesis. Existing literature only documented the vulnerability of the speaker verifications but there is no proposed effective solution to the problem. Moreover, there is no literature on improving the HMM-based synthesis methods for attacking the speaker verification systems more effectively. Therefore, the gap in the literature offers opportunities for research and publishing papers with high impact.

The proposed project has two goals. The first goal is to develop algorithms to make the speaker verification systems more robust to attacks with speech synthesis. The algorithms that will be investigated in the project aim to substantially reduce the risk in real-life use of speaker verification systems. The second goal of the project is to develop synthesis methods such that more effective attacks to the speaker verification systems can be accomplished with very little data from the target speaker. That way, not only reaching the first goal will become more difficult, but also, in the process of improving the speech synthesizer, more knowledge and experience will be gained which will help improve the robustness of the speaker verification systems to attacks.

The results of the methods that will be investigated to achieve the two goals of the project are of major importance to banks and intelligence organizations that are currently using the speaker verification systems.

Moreover, the speech synthesis and adaptation algorithms proposed here are expected to make impact outside the context of this project. For example, the algorithms proposed to increase the speaker similarity and naturalness of the speech synthesizer are expected to make impact in the general field of parametric speech synthesis

Four different novel speech synthesis detection mechanisms are proposed in the project. The proposed mechanisms focus on the differences in discriminative features and excitation signal between natural and synthetic speech. Moreover, unnatural transitions between speech sounds will also be studied. Furthermore, as a novel approach in speaker verification systems, probabilistic linear discriminant analysis (PLDA) is proposed to filter out the session variability effects while preserving the variability due to speech synthesis. On the speech synthesis side, to more effectively deceive the proposed protection mechanisms, algoritms are proposed to better model the discriminative speech features, create more natural speech excitation, and model a linear relationship between the MFCC features and discriminative features to make the synthesized speech sound closer to the target speaker. This way, while trying to increase the robustness of the speaker verification systems, synthesis system will be improved to bypass the new protection mechanisms and the rate of success in doing that will be investigated.

The project team has been working on speaker verification and rapid adaptation for the HMM-based text-to-speech systems at the Ozyegin University speech lab since 2009. The speaker verification and text-to-speech system prototypes developed by the team is in the process of commercialization. Moreover, the team participated in the NIST 2010 Speaker Recognition evaluations and will again participate in the NIST SRE challenge in 2012. An international collaboration agreement has been signed between the Ozyegin speech lab and AT&T speech research group in the US to work on the speaker verification and text-to-speech synthesis technologies. The team has expertise in both domains and has the capacity and infrastructure to create a synergy in the intersection of them and explore an open area in the literature.

Contract Framing, Roles and the Network in Interorganizational Relationships

ABSTRACT

Inter organizational governance decisions and accordingly formations of contracts are strategically important for firms. Formation of contracts not only important for decision making in sustaining an exchange but it also shapes the perception of parties. In this study, framing of contracts and roles of parties are examined together in order to clarify the previously found mixed results on effects of contracts. In addition, as we recognize the importance of the social network of a firm, structural embeddedness is also taken account with roles and contract framing in analyzing the decision to end a relationship when opportunistic behavior occurred. Hypothesized relations have been tested with the data from 155 companies operating in the textile sector. As a result of the analysis, it is particularly found that when parties have friendship role they show a desire to continue to the relationship. In addition, under cases in which it is thought that there is mismatch between roles and contract framing (businessmen-promotion framed contract, friends-prevention framed contract)parties are more likely to continue the relationship compared to the cases in which contract framing comply with roles. Moreover, when there is prevention framed contract with businessmen role, high structural embeddedness mitigates the likelihood of ending the relationship. The results of this study will provide an important contribution to the expansion and development of the literature on inter organizational relationship management. In addition, our research will provide more in-depth understanding of the inter organizational relations and be a guide for purchasing managers..

Yrd. Doç. Dr.
Steven Head Seggie

DEPARTMENT
Economics and
Administrative Sciences

CONTACT
steven.seggie@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
15.10.2012

DURATION
12 months

OZU BUDGET
49,310.00 TL

TÜBİTAK

National Grants 2013

Contract Framing, Roles and the Network in Interorganizational Relationships

ABSTRACT

Inter organizational governance decisions and accordingly formations of contracts are strategically important for firms. Formation of contracts not only important for decision making in sustaining an exchange but it also shapes the perception of parties. In this study, framing of contracts and roles of parties are examined together in order to clarify the previously found mixed results on effects of contracts. In addition, as we recognize the importance of the social network of a firm, structural embeddedness is also taken account with roles and contract framing in analyzing the decision to end a relationship when opportunistic behavior occurred. Hypothesized relations have been tested with the data from 155 companies operating in the textile sector. As a result of the analysis, it is particularly found that when parties have friendship role they show a desire to continue to the relationship. In addition, under cases in which it is thought that there is mismatch between roles and contract framing (businessmen-promotion framed contract, friends-prevention framed contract)parties are more likely to continue the relationship compared to the cases in which contract framing comply with roles. Moreover, when there is prevention framed contract with businessmen role, high structural embeddedness mitigates the likelihood of ending the relationship. The results of this study will provide an important contribution to the expansion and development of the literature on inter organizational relationship management. In addition, our research will provide more in-depth understanding of the inter organizational relations and be a guide for purchasing managers..

Yrd. Doç. Dr.
Okan Örsan Özener

DEPARTMENT
Industrial Engineering

CONTACT
orsan.ozener@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 3501

START DATE
01.05.2013

DURATION
36 months

OZU BUDGET
181,243.00 TL

TÜBİTAK

A Robust Optimization Approach to Multiperiod Remanufacturing Planning with Uncertain Quality of Inputs

ABSTRACT

In this project, we consider a tactical production planning problem where inputs have different quality levels. The situation considered is typical of most remanufacturing environments, where inputs (cores) are used product returns and they must be remanufactured to achieve a certain quality in order to be re-disposed to the market. As an example, a computer firm's remanufacturing facility may receive a shipment of returned laptops from one of its customers. Each laptop must be remanufactured to a predetermined configuration and quality level before being offered again for sale. Although there is large body of literature in classical production planning, remanufacturing planning poses significant additional challenges and there is currently a growing body of literature addressing planning operations for remanufacturing. An important problem that arises in emanufacturing is that although the returned products can initially be categorized into different quality categories, the exact remanufacturing costs for returned items may not be known in advance until after the process of disassembly and remanufacturing starts. The reason for this is that for most products, exact damage that a product endures and its exact quality level could only be measured after the remanufacturing process starts where products are evaluated in detail during disassembly. As an example, while it is likely that a product, initially categorized into a higher quality level, incurs less remanufacturing costs, this may not always be the case. Based on the conditions of use, a core that is initially categorized into a high quality level, could in fact incur more cost, compared with products belonging to an immediate lower quality category. In contrast with the existing literature, we consider in this project that the remanufacturing costs associated with quality categories are not known exactly during the planning stage and propose a robust optimization approach to handle this uncertainty. Our problem at a high level is then to optimally determine, for each quality level and time period, the quantity of cores to remanufacture, and the quantity of cores and remanufactured units to carry over in inventory. This research has three contributions to the literature. First, we propose a robust optimization approach to account for the uncertainty in remanufacturing costs associated with different quality levels. Another way of handling uncertainty in this context is to use stochastic programming (SP) methods. However, SPs can grow exponentially large based on the number of scenarios used. Further, probabilities associated with scenarios must be elicited, which can itself be a difficult task when the number of scenarios is large, historical data is limited, and/or when a new product is introduced into the market. Hence, our contribution is to provide an alternative approach, namely a robust optimization framework, to remanufacturing planning under cost uncertainty. The desired result in this context is then to obtain tractable mathematical programming formulations for robust remanufacturing planning where input cores are heterogeneous and belong to different quality categories, and the exact remanufacturing costs within possible quality categories are not exactly known a priori. It is observed in various applications that the robust optimization methodology can provide benefits to a decision maker by generating optimal solutions that are less sensitive to perturbations in problem data. Further, robust optimal solutions tend to protect users from undesired objective function values in case the unknown data get realized in a worst-case manner. Our project's second contribution is that it provides a means to use these desirable properties of robust optimization in the context of remanufacturing. A desired outcome in this project is to investigate problem parameters and uncertainty sets for which using a robust approach is most beneficial. To this end, we provide a proactive approach to remanufacturing planning where input cores have heterogeneous quality levels. Our third contribution is that we provide a methodology to evaluate under uncertainty the value of initially categorizing (grading) cores according to different quality categories. An initial categorization of cores is itself a costly operation. On the other hand, a preliminary categorization can help eliminate low quality cores. Investigating this trade-off and revealing when it is beneficial to use grading under uncertainty is a desired outcome of this research. The project will be undertaken over a 2 year period. The first year is devoted to the development of robust mathematical programs for different polytopic uncertainty sets capturing remanufacturing costs related to the quality categories. The reasons to choose polytopic sets are that they provide tractable formulations and a natural way to capture various scenarios for uncertain remanufacturing costs.

Yrd. Doç. Dr.
Erim Kardeş

DEPARTMENT
Industrial Engineering

CONTACT
erim.kardes@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.10.2013

DURATION
24 months

OZU BUDGET
85,250.00 TL

TÜBİTAK

Profit-Driven Data Analytics: New Algorithms and Business Applications

ABSTRACT

The rapid growth in data capture and computational power has led to an increasing focus on data-driven research. So far, most of the research is focused on explanatory modeling, while predictive modeling has been less investigated. It is exactly this gap that will be addressed in this project by taking a profit-driven approach.

In the literature, numerous metrics have been proposed for measuring and comparing the performances of alternative classifiers. However, these performance measures are typically based on a statistical criterion without explicitly taking the costs and benefits into account. Hence, these often used performance metrics are not aligned with profit maximization, the main goal in a business context.

In this project, we will undertake the following three main research objectives (RO):

a. Definition of a generic framework for profit-based classification performance measurement

b. In-depth analysis of the dependencies between the parameters in the profit-based framework

c. Developing statistical and heuristic based classification algorithms using the defined profit evaluation metrics

Doç. Dr.
Ekrem Duman

DEPARTMENT
Industrial Engineering

CONTACT
ekrem.duman@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 2539 - FWO

START DATE
10/1/13

DURATION
24 months

OZU BUDGET
199,420.00 TL

TÜBİTAK

EVATEG - Energy Efficient Solid State Light Research, Development Education and Demonstration Center

ABSTRACT

Energy is one the most critical problems that needs to be addressed precisely and cost-effectively. While novel energy generation/harvesting technologies are going to meet some of those domands, a lon hanging fruit is utilizing energy effeciency techniques such as solid state lighting products (SSL). Currently LEDs have started penetrating applications that provides tremnedous energy savings compared to incadescents (5X of the energy used by LEDS)for the same amount of lumens. Moreover, LEDs are even better that fluoroscent lamps (CFL or LFL) by using 80% of the energy of a typical environmentally hazardous CFL/LFL (mercury content) lamps. EVATEG center is established at OzU in January 2014 in collabarion with over 9 global univeristies and more than 20 international companies. Primary goal if evateg is bringing global research groups-governments and industry members together for jointly developing technologies, disseminating information, and rapid adoption of SSL products. EVATEG center is fully equipped with state of the art lighting qualification equipments, advanced thermal measurements systems, micro scale defect detection systems and modeling a wide range of engineering issues thermal, mechanical, and optical.

Doç. Dr.
Mehmet Arık

DEPARTMENT
Mechanical Engineering

CONTACT
mehmet.arik@ozyegin.edu.tr

FUNDING SCHEME
ISTKA

START DATE
01.01.2013

DURATION
12 months

OZU BUDGET
1,774,999.00 TL

Development of a Medical Robotic System for Image Guided Needle Operations

ABSTRACT

The purpose of this project is to develop a robotics system for needle-based operations under intra operative image guidance. Specifically, development of control algorithms to enable the robot to compensate for biological motion during needle insertion, and development of image segmentation algorithms for tracking needle position and target points in real-time from intraoperative medical images. The developed algorithms will be implemented and validated on a prototype surgical robotic system.

Robotic Motion Control Algorithms for High-Precision Image-Guidance and Active Relative Motion Cancellation. In order to reach the target with high accuracy, it is necessary to track and cancel the fast biological motion due to breathing during needle placement. Algorithms for model-based prediction of biological motions, and a motion-tracking scheme that uses these predictions, as part of a receding horizon predictive control will be developed. Real-Time Image Segmentation for Needle Localization and Target Tracking. Real-time model-based image segmentation algorithms for localizing needle and target tissue on intra-operative ultrasound images will be developed. These algorithms will be used for high accuracy needle placement despite tissue motions due to breathing and tissue deformations. System Integration and Validation. The algorithms that are developed will be implemented on a 5 degrees-of-freedom robotic prototype system, and will be experimentally validated using artificial tissue phantoms.If successful, the project will make original contributions to scientific literature in three areas. The first contribution will be the development of robotic control algorithms for high accuracy active relative motion cancellation of biological motions. The second contributions will be the development of novel real-time image segmentation algorithms for target and needle localization in intra-operative medical imaging. Finally, these algorithms will be used to develop a novel robotic prototype system that will achieve higher accuracy needle placement than the previous studies in the literature.

With the technologies developed in this project, it will be possible to increase the accuracy, and as a result the efficacy, of the needle-based surgical interventions such as liver, kidney, prostate biopsies and brachytherapy. Also, development of such important technologies, for which many researchers around the world are competing on, will strengthen the robotics research in Turkey.

Yrd. Doç. Dr.
Özkan Bebek

DEPARTMENT
Mechanical Engineering

CONTACT
ozkan.bebek@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 3501

START DATE
01.04.2013

DURATION
36 months

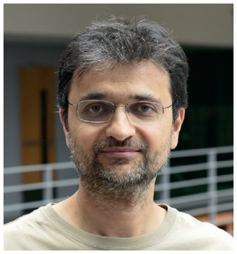
OZU BUDGET
292,495.00 TL

TÜBİTAK

Portable Low Cost Ultrasound Imaging System

ABSTRACT

Ultrasonic imaging systems are being widely used. Medical professionals such as doctors and sonographers use a handheld probe that is directly placed on to a patient to image different body parts. Various probes are used to image different body parts and internal organs. Probes usually employ a transducer array. Typically these transducer arrays have 64, 96 or 128 elements. While in use, each element of the transducer is driven by a dedicated beam former electronics in transmit. Similarly reflected acoustic echoes are collected again by a dedicated receive beam former electronics. By using beam formers 2D and 3D images are obtained without mechanical scanning. However due to high channel count and large amount of data that needs to be processed, ultrasonic imaging systems are quite expensive. A typical system costs somewhere between $100K to $250K. Recently low cost laptop computer based ultrasound systems have been developed to facilitate the common use of ultrasound devices. The cost reduction is achieved by reducing the channel count. The aim was to increase the use of ultrasound systems by doctors. However, even these systems are quite expensive, on the orders of $20K (except a few systems). This high cost limited the wide use of these systems. The main reason for the high cost is the duplicated beam former electronics as many times as the number of elements and large amount of data that needs to be processed digitally. A reasonable image quality requires a high channel count, which complicates the analog and digital circuitry resulting in high system cost.Recent studies showed that addition of an ultrasonic imaging to the clinical examination increases the early diagnosis of diseases. In these studies, usually laptop based ultrasonic systems have been studied. For these reasons, there is a need for a portable, low cost ultrasound imaging system that can be used for doctors during clinical examination. This project aims the design of a mechanically scanned hand-probe for ultrasound imaging with a significantly reduces channel count (2-4 array elements.) The mechanical scanning will be achieved by the hand movement of the operator. While the probe is swung on the body of the patient, the movement of the probe in the 3D space will be monitored by inertial sensors. Acceleration and rotation data from the inertial sensor will be converted to location data by the use of a positioning algorithm, and this data will then be used for the construction of the ultrasound image. This approach will significantly simplify the transducer electronics and, hence, will reduce the system cost.Within the framework of this project, a prototype of the stated system will be developed. The system will be composed of two functional units: the probe and the imaging unit. The operator will scan the organ to be imaged by the motion of his/her hand. The probe will consist of the transducer, inertial sensors and the driver electronics. The driver will convey the inertial sensor and ultrasound transducer data to the imaging unit by the use of a wireless link. The imaging unit will convert the acceleration and rotation data to position information to form the ultrasound image on the device's display. A pair of 6-axis inertial sensors (3 accelerometers and 3 gyroscopes) will form the position sensing sub circuit of the probe. There are commercially available sensors with sizes as small as 4 mm × 4 mm which might be used in the probe. The inertial data will be processed by an algorithm that involves the use of an extended Kalman filter to yield the position information. Using this data, the imaging unit will determine the directions for the A-scans, and will form the image.Using hand gestures for mechanical scanning and determining the position information using inertial sensors is a novel approach in ultrasonic imaging. The project, hence complies with the "Early diagnosis" and "Mobile devices" subjects of the call. The target price for the proposed device is less than $1000. The low cost of the device will enable the wide use of ultrasound systems in clinics and improve diagnosis in various diseases.



Yrd. Doç. Dr. Göksen Göksenin Yaralıoğlu

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
goksenin.yaralioglu@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1003

START DATE
01.09.2013

DURATION
24 months

OZU BUDGET
466,553.00 TL

TÜBİTAK

Semantic Representation and Fusion of Uncertain Information and Modelling Trust in the Fused Information

ABSTRACT

The volumes of information streamed and collected from disparate sources have increased dramatically in recent years. Fusing such multimodal information have increased the decision-maker's ability to make informed decision in rapidly changing complex environments which would not have been possible if the information were taken individually. While such approaches have drawn a considerable attention from the community, the trustworthiness of the fused information stands as a critical issue yet to be addressed.

The purpose of this project is to model trustworthiness of information sources, detect conflicts in information, and estimate if the provided information is misleading. Then, this project will use these models, detected conflicts, and estimations to calculate trustworthiness of the fused information. Furthermore, this project goes beyond calculating trust and will propose mathematical approaches for trustworthy information fusion. In this context, the project is composed of 3 main work packages: 1) Semantic representation of uncertain information, 2) Modeling trust in the fused information, and 3) Trustworthy information fusion. The listed scientific contributions will make a significant impact on different areas of research and applications where information from diverse and uncontrolled sources should be fused for decision-making. On the Web, service consumers are overloaded with genuine and bogus information (e.g., ratings and reviews) about potential service providers from different sources. In a forensic investigation, the Police collect possibly conflicting and misleading reports from multiple witnesses about an incident. In military settings, information from controlled sensors (e.g., satellites, UAVs) and intelligence from uncontrolled sources (e.g., ally countries) should be carefully fused before making critical decisions. Failures in fusion may lead to serious problems in decision-making, which may lead to disasters. These are only a few examples where the outcomes of this project can contribute to the quality of the resulting fused information.

Yrd. Doç. Dr.
Murat Şensoy

DEPARTMENT
Computer Science

CONTACT
murat.sensoy@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 3501

START DATE
01.10.2013

DURATION
36 months

OZU BUDGET
130,000.00 TL

TÜBİTAK

Istanbul Financial Risk Management Laboratory

ABSTRACT

The “Istanbul Financial Risk Management Laboratory” established by Özyeğin University and supported within the scope of Knowledge Based Financial Support Program of the Istanbul Development Agency (ISTKA) aims to build the necessary infrastructure for high potential financial products and services that will transform Istanbul into an international financial center. The laboratory not only seeks to build the necessary data platform, simulation and risk management infrastructure required for derivatives, energy and carbon emission markets but also endeavors to develop pricing and risk management applications in the pursuit of ensuring a more effective use of debt instruments employed by the public and private sectors as well as local governments.

Yrd. Doç. Dr.
Emrah Şener

DEPARTMENT
Economics and
Administrative Sciences

CONTACT
emrah.sener@ozyegin.edu.tr

FUNDING SCHEME
ISTKA

START DATE
01.01.2013

DURATION
12 months

OZU BUDGET
739,000.00 TL

Urban Implications and Governance of CEE Migration

ABSTRACT

Migration from Central and Eastern-European (CEE) countries has evolved into one of the main migration flows within Europe. CEE migrants are EU citizens and their mobility can be seen as a form of socio-economic participation on the European labour market. This project raises the question what the consequences are of this type of mobility for urban cohesion and urban policies. Latest studies show that migration patterns of CEE migrants are diversifying beyond seasonal labour migration to more permanent forms of migration. This has raised questions concerning how to deal with primarily urban social consequences of temporary and more permanent forms of CEE migration. The aim of this project is to enhance our theoretical and practical understanding of how urban regions can cope with the implications of CEE migration. This involves (1) an identification of types of migration from CEE countries, (2) an analysis of social implications of these types of migration for the receiving urban regions (3) an analysis of governance approaches by local governments in the receiving urban regions to these social implications. The project focuses on urban regions in Austria, the Netherlands, Sweden and Turkey and includes the perspective of the CEE countries themselves as well.

Yrd. Doç. Dr.
Deniz Sert

DEPARTMENT
International Relations

CONTACT
deniz.sert@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1001

START DATE
01.06.2013

DURATION
36 months

OZU BUDGET
210,040.00 TL

TÜBİTAK

Reference-Dependent Choices: A Theoretical Investigation

ABSTRACT

Experimental and empirical evidence have established that choices depend on references. A status quo, which is a well-accepted reference, is known to influence choices by (1) increasing the relative attractiveness of itself (Samuelson and Zeckhauser (1988)), and (2) changing the ranking among other alternatives (Masatlioglu and Uler (2013)). The main purpose of this project is to propose and axiomatically characterize a novel choice model that can explain status quo effects and to study its economic applications.

**Yrd. Doç. Dr.
Begüm Güney**

DEPARTMENT
Economics and Administrative Sciences

CONTACT
begum.guney@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 3501

START DATE
01.09.2013

DURATION
24 months

OZU BUDGET
27,879.00 TL

TÜBİTAK

ÖZYEĞİN UNIVERSITY

INTERNATIONAL GRANTS

TECHNOLOGY TRANSFER OFFICE

International Grants

2009

NF-RAD - Near-Field Radiation: Absorption and Scattering by Nanoparticles on Surfaces

ABSTRACT

The process of engineering, controlling and fabricating structures of 1-100 nanometers in size, which defines "nanoscale," and using them for advanced engineering applications is a challenging endeavor. The unusual characteristics of such structures are due to their small sizes and high percentage of atoms in surface states, which yield unique properties that differ from those of the same bulk materials. Nanosize metallic particles and colloids can give rise to many unprecedented optical, electronic, and structural properties. With these new properties, such structures and particles can be used for many novel and innovative engineering and biological applications. However, manufacturing of these nanosize building blocks requires careful control of their composition, structure, shape, and size distribution, which necessitates further understanding of the underlying physics and chemistry. This would be possible if these particles can be visualized and measured in real time and non-intrusively. Newly developed characterization and computational methodologies by Prof. Menguc and his group using scattering of polarized evanescent waves by particles on a smooth surface are geared toward the success of this area. This research has allowed to advance these approaches to the next level by understanding the influence of near-field effects on absorption, emission and scattering by nanoparticles, coagulates and surfaces in close proximity to each other. The Marie Curie International Reintegration Project has helped the PI to seamlessly transfer the knowledge base he has developed at the University of Kentucky in Lexington, Kentucky, USA, to Ozyegin University, in Istanbul Turkey.

Prof. Dr.
M. Pınar Mengüç

DEPARTMENT
Mechanical Engineering,
Center for Energy,
Environment and Economy

CONTACT
pinar.menguc@ozyegin.edu.tr

FUNDING SCHEME
EC - Marie Curie
International Reintegration
Grants

START DATE
01.05.2009

DURATION
36 months

OZU BUDGET
75.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

ROMIDASHBOARD - Measuring and Improving Return on Marketing Investment with actionable dashboards: Which marketing actions yield most returns in fast moving economies?

ABSTRACT

Driving profitable growth is the No.1 priority of companies and their leaders across the world. While many look to marketing as a prime responsible for creating and sustaining that growth, they are often disappointed in the ability of marketing managers to deliver on the promise. Faced with increased pressure from demanding customers, powerful channel partners and activist shareholders, companies need to measure the return on their marketing investments (ROMI) so that they can make informed decisions to achieve their business objectives. In particular, the development of econometric marketing mix models enables organizations to achieve competitive advantage and increase profitability through ROMI based marketing. Recently, organizations have began to summarize ROMI insights into marketing “dashboards”, with 40% of large US and UK companies report substantial efforts in this area. Unfortunately, current dashboards often fail to live up to their promises because they simply identify performance metrics and offer descriptive data on their progress: they do not establish empirical relations among the metrics, perform forecasting and what-if analysis and link them to financial consequences. This research proposal sets out to do just that for both mature and fast moving European markets.

The research objectives are:

1) to empirically model how marketing actions (such as new product launch, (re)branding, pricing, adding new channels and communication activities) drive firm top-line and bottom-line financial performance;

2) to develop new dashboard tools based on this model to aid policy makers in organizations improve their return on marketing investment;

3) to compare and contrast the calculated return on marketing investment in fast-moving economies versus mature markets in Europe and the US. These insights will derive models, dashboards and case studies, and be communicated through both an academic paper and a practitioner-oriented book.

Prof. Dr.
Koen H. Pauwels

DEPARTMENT
Economics and Administrative Sciences

CONTACT
koen.pauwels@ozyegin.edu.tr

FUNDING SCHEME
EC - Marie Curie International Reintegration Grants

START DATE
01.06.2009

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

International Grants

2010

NANO-PROX - Nano-Scale Protective Oxide Films for Semiconductor Applications & Beyond

ABSTRACT

Conventional demands for development in semiconductor industry are changing as the Moore's Law approaching to its limits. Continuous decrease in the size of the transistors is coming close to atomic levels creating a fundamental barrier for further process developments as the semiconductor manufacturing is established today . Growth of thin films and inherent stress development within the film and film/substrate interface are critical for multiple phases of microelectronics manufacturing. Particularly, protective oxides of metal films are foreseen to have wide applications as (i) an interfacial layer to improve the adhesion and/or limit penetration of reactive chemicals of a deposited film (ii) as a subtractive layer to achieve selective material removal and (iii) as a nanofilm with inherent self growth limiting capability that could be used for nanoscale electronics manufacturing. Fundamental understanding of the proposed research is expected to be utilized in many other fields such as in biological systems to improve corrosion on bio-implants and, applications in which the interface and thin film properties affect permeation of reactive chemicals such as fusion reactor design or as ferroelectric capacitors where hydrogen permeation detoriates device functionality.

Dr. Basim, the Principal Investigator of this study has been actively involved in semiconductor research and development for more than ten years at major semiconductor companies in US. Her expertise is on integration of newly adapted semiconductor processes, defect reduction during manufacturing and chemical and mechanical interactions on thin films. She will initiate her research at Ozyegin University, Mechanical Engineering Department with the support of the IRG funds if awarded. Dr. Basim's new appointment at Ozyegin University is expected to bring all these expertise and experience to E.U. to promote the ongoing research and development.

Yrd. Doç. Dr.
Gül Bahar Basım Doğan

DEPARTMENT
Mechanical Engineering

CONTACT
bahar.basim@ozyegin.edu.tr

FUNDING SCHEME
EC - Marie Curie International Reintegration Grants

START DATE
01.04.2010

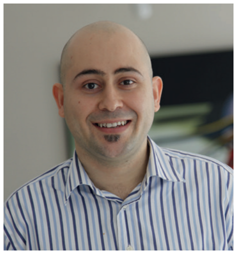
DURATION
48 months

OZU BUDGET
100.000,00 EUR

CONN-BRO - Connectivity Brokerage for Collaborative Optimization Heterogeneous Wireless Networks

ABSTRACT

Traditional approach to resource allocation is inefficient, and optimal mapping of them to different applications is a promising alternative in order to meet the stringent requirements of some future wireless network applications. Recent developments such as opportunistic spectrum access have brought new resources on the table. Collaborative optimization of heterogeneous technologies is an important direction as well. For the real life implementation of such algorithms, practical considerations such as dynamically varying conditions and the overhead of collaboration also need to be considered. For this purpose, a distributed, scalable, universal, dynamic and extendable software architecture that enables information sharing between different technologies is needed. In this project, such a collaborative optimization framework for heterogeneous wireless networks is designed and demonstrated.



Yrd. Doç. Dr.
Ali Özer Ercan

DEPARTMENT
Electrical - Electronics Engineering

CONTACT
ali.ercan@ozyegin.edu.tr

FUNDING SCHEME
EC - Marie Curie International Reintegration Grants

START DATE
01.09.2010

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

FOCUS - Free-Space Optical Systems for Next Generation Communication Networks

ABSTRACT

Free-space optical (FSO) communication is a license-free access technology with high-bandwidth capacity. It is a powerful alternative and/or complementary solution to commonly deployed fiber optic and wireless radio-frequency links. FSO is appealing for a number of applications including metropolitan area network extensions, enterprise/campus network connectivity, fiber back-up, back-haul for wireless cellular networks, disaster recovery, and quantum key distribution among others. Despite the major advantages of FSO technology and variety of its application areas, its widespread use has been hampered by its rather disappointing performance for long-range links. The major performance limiting factor for FSO links with ranges longer than one kilometer is the atmospheric turbulence-induced fading. Building upon the concept of cooperative diversity, this project will devise efficient physical layer solutions tailored for the inherent characteristics of the FSO channel that remedy the shortcomings of existing systems. The proposed systems and techniques will provide a novel research framework on the design and analysis of relay-assisted (cooperative) FSO transmission. The results of this project will be instrumental in the building of long-range, highly reliable, and ultra-fast FSO systems to meet the demanding requirements of next generation communication networks.

Prof. Dr.
Murat Uysal

DEPARTMENT
Electrical - Electronics Engineering

CONTACT
murat.uysal@ozyegin.edu.tr

FUNDING SCHEME
EC - Marie Curie International Reintegration Grants

START DATE
01.09.2010

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

BI4MASSES - Business Intelligence for the Masses

ABSTRACT

Whoever can process more data faster and turn it into useful information quickly becomes a global leader in today's digital world. There may be millions of personal computers and thousands of supercomputers in the world, but the analysis of both stored and streaming data keeps lagging due to the lack of online, easy-to-use, and semi-automated data processing and analytics software. USA has made breakthrough progress over the last decade both academically and industrially in the KDE field and there is ongoing work towards realizing the so called "Business Intelligence (BI) for the Masses" vision. Other recent news suggest that India and China may also be making significant progress in the same direction. Therefore, it is crucial for Europe to boost investments in novel CC-based KDE technologies. This objective of this proposal is to design and implement an on-demand, integrated, and scalable cloud analytics technology with a high potential for wide-scale use and impact.

Numerous databases, data processing engines have been developed in the past, but the stateof-the-art in this domain can simply be summarized as "enterprise-class desktop applications". The proposed project will consist of four major phases each taking about 1 year and each consisting of four parts. PHASE1 is the design and implementation of a scalable distributed cloud infrastructure as a service. It is followed in PHASE2 by the design and implementation of the data mining and reporting service over the infrastructure developed in PHASE1. In PHASE3, we focus on developing the real-time data stream and complex event processing service. Finally, in PHASE4 we will develop and demonstrate the intelligent applications using the platform services developed in phases 2 and 3. We also plan to use open-source software methodologies and tools and provide open access to each architectural layer through web services.

Yrd. Doç. Dr.
İsmail Arı

DEPARTMENT
Computer Science

CONTACT
ismail.ari@ozyegin.edu.tr

FUNDING SCHEME
EC - Marie Curie International Reintegration Grants

START DATE
02.07.2010

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

International Grants

2011

CLSASTs - Rapid Cross-Lingual Speaker Adaptation for Statistical Text-to-Speech Systems

ABSTRACT

Unit selection has been the dominant approach to text-to-speech synthesis (TTS) in the last decade. Recently, statistical TTS (STS) is proposed where statistical models are used for speech synthesis. The high quality and intelligibility speech it generates, the flexibility it offers in voice/speaker/emotion conversion, and its small memory requirements make STS systems a strong candidate to be the dominant TTS technology in the next decade. One of the most exciting research directions in the STS field is speaker adaptation where the goal is to adapt the voice characteristics to a target speaker. Maximum a posteriori and maximum likelihood linear regression methods are two of the common approaches for adaptation. There is also a recent and growing interest in cross-lingual speaker adaptation using the STS approach where the goal is to use speaker adaptation techniques to generate speech with a speaker's voice characteristics in a target language that the speaker does not speak. Globalization and the need to communicate in multiple languages in social, economic, and political interactions increase the importance of the problem. In this proposal, a novel rapid adaptation approach is proposed for the cross-lingual speaker adaptation problem using the eigenvoice adaptation technique with the STS systems. In the proposed approach, two sets of eigenvoices are produced, one for the target language and one for the source language. Then, a regression function is generated between the source and target eigenvoice weights. Given a speaker, eigenvoice weights for the source eigenvoices are computed using a novel, perceptually-motivated objective function, and then the regression function is used to estimate the target eigenvoice weights which are then used to synthesize speech in the target language.

The proposed system is expected to be the first high-performance cross-lingual speaker adaptation method for STS that can work with 5-10 seconds of adaptation data.

Yrd. Doç. Dr.
Cenk Demiroğlu

DEPARTMENT
Electrical - Electronics Engineering

CONTACT
cenk.demiroglu@ozyegin.edu.tr

FUNDING SCHEME
EC - Marie Curie International Reintegration Grants

START DATE
01.02.2011

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

SymNet: Industrial Symbiosis Network for Environment Protection and Sustainable Development in Black Sea Basin

ABSTRACT

The main goal in SymNet is to establish an industrial symbiosis system and minimize environmental degradation by taking into account the effects of climate change while maximizing economic cooperation and sustainable development in the Black Sea Basin.

SymNet Project looks closer into the current status of the manufacturing, logistics, tourism and energy industries and the existing commercial networks in the Black Sea Basin as well as the dynamics of these four sectors in the participating countries. Data collected from Romania, Turkey, Bulgaria and Moldova is fed into Black Sea Industrial Symbiosis Platform (BSISP) established in the framework SymNet project. BSISP aims to provide communication as well as cooperation platform for the companies of the Black Sea Region, all supported by a database of the companies in the region. There are 3 special tools of BSISP, namely GIS mapping, trade optimisation tool and carbon footprint tool. Each member company of BSISP is free to use these tools for its own benefit. BSISP is a not for profit organisation and participation to BSISP and using the tools of the platform is free for the period of 2011-2013.

Another target is to optimize the collected data by incorporating environmental impacts and sustainability to see how trade in the Black Sea region can be increased by minimizing environmental as well as climate change impacts. To reach this target an industrial sybiosis strategy in the foru sectors is developed and the relevant strategy book published. Pınar Özuyar is the IPA Coordinator leading the Turkish partners as well as responsible for the development of the symbiosis strategy and BSISP and its tools. Following the completion of the project, Pınar Özuyar acts as the co-coordinator of BSISP. Partners: Bulgarian Academy of Sciences, CEEE-Ozyegin University, Romanian National Institute for Marine Research and Development, Academy of Science of Moldova, Istanbul's EU Pioneers Association.

http://www.projectsymnet.eu; http://www.bsisp.org

Dr.
Pınar Gökçin Özuyar

DEPARTMENT
Center for Energy,
Environment and Economy,
Faculty of Arts and Sciences

CONTACT
pinar.ozuyar@ozyegin.edu.tr

FUNDING SCHEME
EU-Black Sea 2007-2013
Joint Operational Programme

START DATE
12.07.2011

DURATION
24 months

OZU BUDGET
265.816,00 EUR

Black Sea
CROSS BORDER
COOPERATION

International Grants

2012

Customer Churn Prediction Using Social Network Analysis in a Turkish Bank Setting

ABSTRACT

The main goal of this joint project is to exchange knowledge and expertise and to transfer technology among the involved research institutions within an industrial application driven setting. More specifically, the project aims to develop and implement relational learners to predict customer churn using social network information in a banking context.

Huge amounts of networked data on a broad range of network processes and information flows between interlinked entities are available, such as for instance money transfers connecting bank accounts, or call logs linking telephone accounts. These massive data logs potentially hide information that is extremely valuable to companies and organizations, but as well is extremely difficult to discover due to the size and the fragmentation of the data. Building upon an established research experience in the fields of data mining and relational learning, marketing modeling in the financial sector, and customer churn prediction, the main objectives of this project are:

• RO1: to implement and develop scalable versions of current relational learning techniques that are applicable to bank transfer data

• RO2: application of social network analysis to improve the performance of customer churn prediction models using state-of-the-art relational learners in a real-life banking setting

Doç. Dr.
Ekrem Duman

DEPARTMENT
Industrial Engineering

CONTACT
ekrem.duman@ozyegin.edu.tr

FUNDING SCHEME
British Council

START DATE
12.06.2012

DURATION
4 months

OZU BUDGET
12.196,25 GBP

NEED4B - New Energy Efficient Demonstration for Buildings

ABSTRACT

NEED4B aims to develop an open and easily replicable methodology for designing, constructing, and operating new low energy buildings, aiming to a large market applications. The project incorporates a strong demonstration program over the construction of 27.000 m2 buildings, spread among 5 demo sites, one of which is at the Özyeğin University campus. In the demo sites, the energy consumption is planned to be 65% less yjan the norm and the CO2 emission to be 90% less compared to regular practices. Özyeğin Building, SCOLA, is already finished and monitoring of the use has started.

A first version of the NEED4B methodology is developed and then refined and improved within a feedback process supported by the experience gathered during design, construction and operation phases of the demo sites.

An extensive monitoring phase lasting 2 years is deployed. The dissemination potential of the project is leveraged due to the individual strengths of the demo sites regarding visibility and impact. Regarding the exploitation of the results, exploitation plans are developed containing SWOT analysis, exploitation roadmaps and analysis of the innovation value. Additional to the project outputs one of which is the state of the art SCOLA building, there will be 5 Masters thesis of the students involved in the project. The goal is to demonstrate the methodology and associated impacts by developing real cases going beyond current market standards but ensuring the replicability of the concepts deployed. Pınar Mengüç leads a group of engineers, architects and administrative people to reach the targets of the NEED4B project.

Partners: CIRCE Foundation – Centre of Research for Energy Resources and Consumption, Spain; Vue Sur Mons, Belgium; D'Appolonia, Italy; SP Technical Research Institute of Sweden, Sweden; Acciona Infrastructures S.A., Spain; The University of Mons, Belgium; Imprima Construction S.r.L, Italy; Derome, Sweden; M5, Belgium; B-Design, Turkey; Ingeniera y Control Electronico, Spain; Format D4, Belgium; Fiba Real Estate Development Construction and Investments, Turkey; Intesa SanPaolo Bank, Belgium. (http://www.need4b.eu)

Prof. Dr.
M. Pınar Mengüç

DEPARTMENT
Center for Energy,
Environment and Economy,
Mechanical Engineering

CONTACT
pinar.menguc@ozyegin.edu.tr

FUNDING SCHEME
EC FP7 Cooperation

START DATE
01.02.2012

DURATION
72 months

OZU BUDGET
1.267.000,00 EUR

COOPERATION

NPLC-LED - Immersion Cooling Of Suspended And Coated Nano-Phosphor Particles For Enhanced Thermal And Optıcal Extraction Of Light Emitting Diodes For General Illumination

ABSTRACT

The introduction of high brightness light emitting diodes (LEDs) with white light and monochromatic colors has allowed LED penetration into general illumination applications. The increased electrical currents used to drive these LEDs have resulted in high heat fluxes, often exceeding those for average silicon computer chips. The output of a typical HB LED is today over 100 lumens, achieved with heat fluxes in excess of 300 W/cm2. Thermal management is, thus, a critical technology for LED lighting. Much of the current LED thermal research and development is focusing on air cooling with heat sinks. While these approaches provide significant heat removal capability, they are constrained by the presence of multiple interface resistances and they cannot effectively address non-uniform chip temperatures and local phosphor hot spots. To overcome the limitations imposed by air cooling, this research will investigate the potential of direct liquid cooling to provide an additional thermal path for heat dissipated in the LEDs and phosphor layers. The introduction of topside liquid cooling with optically-transparent liquids is expected to dramatically reduce average chip temperatures and to improve the uniformity of chip and phosphor temperature, leading to higher light extraction efficiencies.

Doç. Dr.
Mehmet Arık

DEPARTMENT
Mechanical Engineering

CONTACT
mehmet.arik@ozyegin.edu.tr

FUNDING SCHEME
EC Marie Curie Career Integration Grants

START DATE
01.06.2012

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

Optical Wireless Communications - An Emerging Technology

ABSTRACT

Wireless transmission via optical carriers opens doors of opportunity in areas as yet largely unexplored. Offering significant technical and operational advantages, optical wireless communication (OWC) can be, in some applications, a powerful alternative to and, in others, complementary to existing radio frequency (RF) wireless systems. Variations of OWC can be employed in a diverse range of communication applications ranging from very short-range (on the order of millimetres) optical interconnects within integrated circuits to satellite links (larger than 10,000 kilometres). In many respects, OWC research is still in its infancy and calls for extensive research to begin to harness the enormous potential of the optical spectrum. This COST Action will serve as a high-profile consolidated European scientific platform for interdisciplinary OWC research activities, spanning from characterization of diverse propagation media to modelling, design and development of devices, components, algorithms/protocols and systems. It will make significant contributions to the fundamental scientific understanding, technical knowledge, engineering design and applications while promoting community awareness of this emerging field. Development of novel and efficient communication technologies resulting from integrated research activities made possible through this Action will be a significant enabler for future-generation heterogeneous communication networks supporting a wide range of wireless services/applications.

**Prof. Dr.
Murat Uysal**

DEPARTMENT
Electrical - Electronics
Engineering

CONTACT
murat.uysal@ozyegin.edu.tr

FUNDING SCHEME
EC COST Action

START DATE
01.03.2012

DURATION
48 months

OZU BUDGET
100.000,00 EUR
(min 400,000 EUR)

Advanced Transmission Techniques for Next Generation Terrestrial Wireless Optical Communications

ABSTRACT

This research project will introduce innovative advanced physical-layer techniques for next generation wireless optical communication (WOC) systems along with optimized front-end receivers. It will further present WOC link measurement data collected first time in Qatar made possible through the planned experimental set-up in this project. This project will establish a unique research capability which would highly contribute to Qatar scientific excellence in the area of telecommunications. Besides advancing state-of-the-art in the WOC field, it also has the potential to produce patents and products directly useful to the local ICT industry. Local companies such as Qtel and Qatar Vodafone might possibly consider the deployment of terrestrial WOC links which would be particularly appealing in the desert environment with the readily available line-of-sight.

Prof. Dr.
Murat Uysal

DEPARTMENT
Electrical - Electronics Engineering

CONTACT
murat.uysal@ozyegin.edu.tr

FUNDING SCHEME
Qatar National Research Fund (QNRF)

START DATE
15.11.2012

DURATION
36 months

OZU BUDGET
158.400,00 USD

الصندوق القطري لرعاية البحث العلمي
Qatar National Research Fund
Member of Qatar Foundation

CONVERGE - Convergent Human Learning for Robot Skill Generation

ABSTRACT

The human sensorimotor system enables the learning and control of an ever-growing number of artifacts ranging from simple tools such as chopsticks to advanced computer interfaces. The Researcher's recent work in Japan exploited this human capacity to obtain dexterous skills on robots, which otherwise would require expert programming. In this framework, a human operator is put in the control loop of a robotic system where (s)he controls the robot in real-time. The operator then 'learns' to make the robot perform a given task (e.g. wiping clean a table by controlling a robot). This is analogous to a beginner's learning to drive a car. After the operator becomes skilled, the signals coming in and leaving out of the robot are used to construct an autonomous controller. The key point of this framework is that it takes away the work from the cognitive system of an expert and places it on a layperson's sensorimotor system. Up to now, the framework involved a sequential learning scheme: first the human operator learned to control the robot. Then, data was collected when the robot performed the tasked under the skilled operator guidance. Finally, this data was used to learn a policy using a machine learning technique. This project will substantially improve this framework by having the robot simultaneously learn with the human operator. The dynamics of the simultaneous learning of the human operator and the controlled robot will be studied in depth for obtaining quantitative criteria for a convergent learning system. The results of the analysis will be deployed on a robotic platform, and evaluation experiments will be carried out to show that convergent learning can be ensured leading to a virtuous learning experience for both the human and the robot. The development of this framework to its full potential will drastically change how we develop smart prosthetics and build robotic systems that can coexist with humans, for which this project offers an important contribution.

Doç. Dr.
Erhan Öztop

DEPARTMENT
Computer Science

CONTACT
erhan.oztop@ozyegin.edu.tr

FUNDING SCHEME
EC Marie Curie Career Integration Grants

START DATE
03.09.2012

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

BUILD-CYCLE - Integrated Environments for Advanced Spatial Construction Planning and Control

ABSTRACT

This project offers a novel integrated 3D planning and control environment for construction projects. While recent Building Information Modeling (BIM) and construction automation techniques have potential to significantly improve construction management, the benefits are yet to be realized for construction planning and controls. This proposed project will describe an integrated 3D platform for analysis and visualization of construction process data and energy use. Building on the geometry-based process modeling and simulation approach (GPM), it will describe a group of techniques to automate planning-control cycle for detailed operations for improved construction production management. Construction crew and equipment actions will be optimized using machine learning techniques on the simulation model. Sensor data will be integrated in the same environment for automated data collection to perform data fusion, measure energy performance, and improve progress feedback. Through collaborations with experts at leading universities at USA and European Research Area, this project is expected to make a large impact on computational modeling of construction systems. Moreover, it will contribute to the European excellence for the goals of virtual factory and energy efficient building.

Yrd. Doç. Dr.
Ragıp Akbaş

DEPARTMENT
Civil Engineering

CONTACT
ragip.akbas@ozyegin.edu.tr

FUNDING SCHEME
EC Marie Curie Career Integration Grants

START DATE
01.08.2012

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

European Entrepreneurship Colloquia

ABSTRACT

Within the context of three year project, there will be held three different colloquias in different cities of Europe in each year for professors and lecturers of entrepreneuship from several higher education institutions throughout Europe, for bringing together them to study on entrepreneurship based on used methodologies, implementation examples, learning methods, and approaches and interdisciplinary cooperation. The very first colloquia took place in Istanbul at Ozyegin University between June 30 and July 6, 2013 with great success.

European Entrepreneurship Colloquium (EEC) aims to:

- Provide a forum where the participants can learn about interactive teaching methods, including the use of case method, drawing upon the extensive experience of the Harvard Business School and leading universities across Europe.
- Develop and update skills in teaching entrepreneurship
- Experience the latest thinking in the field of entrepreneurship through interaction with leading academics and practitioners.
- Increase interaction with entrepreneurial practitioners in teaching and curriculum development.
- Generate more committed professors and educators to entrepreneurship.
- Accelerate cross-border exposure of universities and faculty.

The Project is run by a team of three Ozyegin academics and staff, namely Ihsan Elgin, Assist. Prof. Ahmet Murat Fis and Utku Tuncay.

İhsan Elgin

DEPARTMENT
Center for Entrepreneurship

CONTACT
ihsan.elgin@ozyegin.edu.tr

FUNDING SCHEME
CIP Entrepreneurship Education

START DATE
30.11.2012

DURATION
36 months

OZU BUDGET
108.237,35 EUR

cip competitiveness and innovation framework programme 2007–2013

International Grants

2013

BUNSMAT - Microstructural Design of Bulk Ultra-fine Grained and Nanostructured Materials for High Performance Applications

ABSTRACT

Bulk ultra-fine grained (UFG) and nanostructured (NS) materials have attracted immense interest in recent years due to the paramount goal of achieving simultaneous increase in strength and ductility. A unique method for obtaining these materials is the utilization of severe plastic deformation for structural refinement. Despite their technological importance in industries ranging from automotive and aerospace to energy and biomedical; efforts on difficult-to-work hexagonal close packed (hcp) materials have been comparably limited in quantity and scope. Robust utilization of UFG-NS materials in engineering applications will not be possible without exploring the mechanical behavior within given operation envelopes, typically not limited to ambient or monotonic conditions. This project aims to investigate the monotonic-cyclic response of severely deformed hcp materials by exhibiting the interplay of unique deformation mechanisms at the micro-nano scale, and strengthen the understanding of their effects on the observed mechanical behavior. With the aid of novel characterization techniques, trends in the processing-structure-property relations among the model materials will be demonstrated. These will be incorporated in physically sound constitutive models for improving the predictive capabilities. Ultimately, these efforts will fill in the crucial missing gap between engineered microstructures and envisaged applications for European competitiveness and welfare.

Yrd. Doç. Dr.
Güney Güven Yapıcı

DEPARTMENT
Mechanical Engineering

CONTACT
guven.yapici@ozyegin.edu.tr

FUNDING SCHEME
EC Marie Curie Career Integration Grants

START DATE
06.05.2013

DURATION
48 months

OZU BUDGET
100.000,00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

Free-Space Optical Systems for Next Generation Communication Networks

ABSTRACT

The purpose of this study is to develop a robotic surgery system for beating heart surgery. Specifically, the developed surgery robot will be used for off-pump Coronary Artery Bypass Graft (CABG) surgery, which means that the surgery is done while the heart is still beating instead of using a cardiopulmonary bypass machine and stopping the heart to perform the surgery. The robotic system developed in this project will actively track and cancel the relative motion between the heart surface and the surgical tools that are attached to the robotic manipulators, dynamically stabilizing the heart for the operation. In this scheme, the surgeon views a stabilized view of the heart on a video display with images provided by a camera mounted on the robotic arm, allowing CABG surgeries to be performed on a beating heart with technical perfection equal to traditional on-pump surgeries. The proposed surgical system, unlike the ones available, is a small, light weight, high bandwidth, 6-DOF system that is capable of tracking the highly dynamic heart motion, and dexterous enough to perform surgical manipulations.

Yrd. Doç. Dr.
Özkan Bebek

DEPARTMENT
Mechanical Engineering

CONTACT
ozkan.bebek@ozyegin.edu.tr

FUNDING SCHEME
EC Marie Curie Career Integration Grants

START DATE
01.07.2013

DURATION
48 months

OZU BUDGET
100.000,00 EUR

BRICKER: Total Renovation Strategies for Energy Reduction in Public Building Stock

ABSTRACT

The overall objective of BRICKER is to develop a retrofitting solution package aiming at deep energy efficient renovation of existing public-owned non-residential buildings and to demonstrate such a solution in three European buildings with different use, located in three different countries in 3 different climatic areas, achieving a high impact in all of them. It is expected that at least 50% reduction in energy consumptions will be obtained compared to the values before the BRICKER renovation. The demo site in Turkey will be selected as a public building in the Aegean Region. Directed by Pınar Mengüç, Center for Energy, Environment and Economy (CEEE) team is taking part at the R&D and is coordinating the demonstration works. Other demo sites are in Spain and Belgium. The BRICKER demonstrators will be complemented by a replication plan together with the development of dissemination and exploitation strategies ensuring a broader impact beyond the project itself. Partners: Acciona Infrastructures S.A., Spain; Fundation Cartif, Spain; Centro de Estudios de Materiales y Control de Obra S.A., Spain; Accademia Europea per la Ricerca Applicata ed il Perfezionamento Professionale Bolzano, Italy; Foundazione Bruno Kessler, Italy; Consejeria de Agricultura, Desarrollo Rural, Medio Ambiente y Energia, Spain; Greencom Development SCRL, Belgium; Onur İnş. Yaz. Bil. Enerji Rec. Yap. Mlz. Lab. Müh. San. Tic. Ltd. Şti., Turkey; Özyeğin University, Turkey; Purinova Sp Z.O.O., Poland; Steinbeis Innovation Gmbh, Germany; Laterizi Gambettola SRL (Soltigua), Italy; S.P.B. Service Provincial des Batiments, Belgium; Fundacion Tecnalia Research and Innovation, Spain; Universite de Liege, Belgium; Youris.com, Belgium; Expander Tech S.L., Spain.

**Prof. Dr.
M. Pınar Mengüç**

DEPARTMENT
Center for Energy, Environment and Economy, Mechanical Engineering

CONTACT
pinar.menguc@ozyegin.edu.tr

FUNDING SCHEME
EC FP7 Cooperation

START DATE
01.10.2013

DURATION
48 months

OZU BUDGET
443.680,00 EUR

COOPERATION

Enabling Cooperative Diversity Techniques for Underwater Acoustic Communications

ABSTRACT

The expected wide-scale availability of LEDs in the future opens the door for so-called visible light communication (VLC). VLC can be used in a wide range of short- and medium-range communication applications including wireless local, personal and body area networks, vehicular networks and machine-to-machine communication among many others. With its unique advantages and large potential application areas, VLC presents a transformative and far-reaching solution for wireless communications. However, in many respects, VLC is still in its infancy and requires further research efforts to overcome several major technical challenges before its wide-scale implementation. This project aims to significantly increase the scientific understanding and technical knowledge of the emerging field of VLC by exploring and developing novel methods, models and techniques in visible spectral bands that will facilitate the implementation of future generations of VLC systems.

The resulting high-performance, high-reliability, ultra-fast, powerefficient, and low-cost VLC systems are envisioned to be an indispensable part of the future wireless eco-system. The outcomes of this project will help establish VLC as a mature communication technology and present a powerful alternative and/or complement to existing technologies in a diverse range of communication applications.

Prof. Dr.
Murat Uysal

DEPARTMENT
Electrical - Electronics Engineering

CONTACT
murat.uysal@ozyegin.edu.tr

FUNDING SCHEME
Texas A&M University

START DATE
01.01.2013

DURATION
36 months

OZU BUDGET
132,079.20 USD

WISERLAB - Wireless Information Systems Engineering Research Laboratory

ABSTRACT

WISERLAB project is concerned with the research and development of a software-defined network architecture where multiple controllers jointly form the control plane of the network. As such, the dynamic mapping of data plane devices to the individual controllers, inter-controller communication and the optimal distribution of the controllers will be investigated as part of this

project.

Prof. Dr.
M. Oğuz Sunay

DEPARTMENT
Vice Chair of the Graduate School of Engineering, Electrical - Electronics Engineering

CONTACT
oguz.sunay@ozyegin edu tr

FUNDING SCHEME
DOCOMO

START DATE
16.01.2013

DURATION
12 months

OZU BUDGET
30.000,00 USD

Enabling Cooperative Diversity Techniques for Underwater Acoustic Communications

ABSTRACT

The project focuses on acoustic communications, which is the most viable and technologically mature option for wireless transmission under water. Despite its obvious advantages and wide range of potential application areas, the widespread deployment of underwater acoustic communications (UWA) systems has been hampered by their limited data rates and relatively short link ranges. In this project, we envision cooperative diversity, which has been originally proposed for terrestrial radio channels, as an enabling technique to address the demanding performance requirements of next generation UWA communications. Specifically, we consider an UWA communications network, which consists of both mobile and stationary nodes which exchange data such as control, telemetry, speech, and video signals among themselves as well as a central node located at a ship or onshore. The submerged nodes (which can, for example, take the form of an autonomous underwater vehicle/robot or diver) can be equipped with various sensors, sonars, video cameras, or other types of data acquisition instruments. In this project, we will present physical layer solutions for such an UWA wireless network developing efficient, reliable, and high-speed transmission solutions tailored for challenging and diverse requirements of underwater applications.

Prof. Dr.
Murat Uysal

DEPARTMENT
Electrical - Electronics Engineering

CONTACT
murat.uysal@ozyegin.edu.tr

FUNDING SCHEME
Qatar National Research Fund (QNRF)

START DATE
16.01.2013

DURATION
11 months

OZU BUDGET
40,000.00 USD

الصندوق القطري لرعاية البحث العلمي
Qatar National Research Fund
Member of Qatar Foundation

Trust-Based Fusion of Uncertain Information From Diverse Sources

ABSTRACT

In modern military operations, decision makers need to be capable of obtaining and fusing information from diverse sources (e.g., sensors, humans, etc.). In order to make informed decisions, the fused information should be combined and reasoned with domain knowledge. The ultimate aim of this project is to provide decision makers useful tools forreasoning over the noisy, incomplete, and misleading information provided by diverse and unreliable information sources.

**Yrd. Doç. Dr.
Murat Şensoy**

DEPARTMENT
Computer Science

CONTACT
murat.sensoy@ozyegin.edu.tr

FUNDING SCHEME
US Army Research Fund

START DATE
29.07.2013

DURATION
12 months

OZU BUDGET
54.200,00 USD

KAUST Bootcamp

ABSTRACT

KAUST Bootcamp is a week long bootcamp for technology startups that are selected by KAUST seed fund where CfE provides basic business modeling, customer development and lean startup management training along with the chance to get feedback from our network of mentors, investors and industry professionals.

İhsan Elgin

DEPARTMENT
Center for Entrepreneurship

CONTACT
ihsan.elgin@ozyegin.edu.tr

FUNDING SCHEME
KAUST Technology
Seed Fund

START DATE
19.06.2013

DURATION
1 week

OZU BUDGET
85.000,00 USD

ÖZYEĞİN UNIVERSITY

2014 GRANTS
(AS OF 15 DECEMBER 2013)

TECHNOLOGY TRANSFER OFFICE

Development of Minimally Invasive Steerable Active Catheter with Position Feedback

ABSTRACT

The aim of this project is to develop an active catheter system that can be employed for minimally invasive medical interventions. With this objective, there are three principal targets. The first target pertains to the development of suitable actuator components for realizing high motion capability and position feedback. The second target is related to the development of necessary algorithms to obtain high precision feedback control of the actuators. The third target is focused on validating the first prototype of the active catheter system composed of the developed actuator components. With its genuine approaches, the proposed study will be spearheading the development of active catheters. In addition, its innovative features and potential to improve life quality, makes the project highly relevant to the call topics. The outcomes of this project would enable the placement of catheters into hard-to-access locations and thereby lead to wider application of this medical procedure.

The originality of the project stems from the utilization of active composites for steering ability and from the utilization of advanced non-linear control algorithms for position feedback control of the catheter system. The proposed steerable catheter system would be a pioneering study in the area of medical devices. The approach in this project is based on three themes. First is the envision of the actuation mechanism improving the degree-of-freedom and bending ability of the catheter. Second is the establishment of necessary non-linear control algorithms for directing the mechanism to display the desired behavior. Third is the design and manufacturing of the first prototype, followed by pre-clinical experiments on close-to-actual models. Composite joints consisting of active materials will accomplish the actuation. Precise position check will be ensured by the application of advanced robust control techniques. Pre-clinical experiments will benefit from phantom models.

Yrd. Doç. Dr.
Güney Güven Yapıcı

DEPARTMENT
Mechanical Engineering

CONTACT
guven.yapici@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1003

START DATE
2014

DURATION
24 months

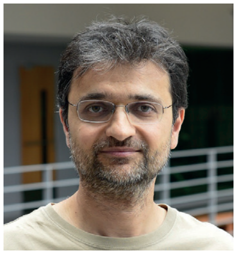
OZU BUDGET
583,186.00 TL

TÜBİTAK

Portable Low Cost Ultrasound Imaging System

ABSTRACT

Ultrasonic imaging systems are being widely used. Medical professionals such as doctors and sonographers use a handheld probe that is directly placed on to a patient to image different body parts. Various probes are used to image different body parts and internal organs. Probes usually employ a transducer array. Typically these transducer arrays have 64, 96 or 128 elements. While in use, each element of the transducer is driven by a dedicated beam former electronics in transmit. Similarly reflected acoustic echoes are collected again by a dedicated receive beam former electronics. By using beam formers 2D and 3D images are obtained without mechanical scanning. However due to high channel count and large amount of data that needs to be processed, ultrasonic imaging systems are quite expensive. A typical system costs somewhere between $100K to $250K. Recently low cost laptop computer based ultrasound systems have been developed to facilitate the common use of ultrasound devices. The cost reduction is achieved by reducing the channel count. The aim was to increase the use of ultrasound systems by doctors. However, even these systems are quite expensive, on the orders of $20K (except a few systems). This high cost limited the wide use of these systems. The main reason for the high cost is the duplicated beam former electronics as many times as the number of elements and large amount of data that needs to be processed digitally. A reasonable image quality requires a high channel count, which complicates the analog and digital circuitry resulting in high system cost.Recent studies showed that addition of an ultrasonic imaging to the clinical examination increases the early diagnosis of diseases. In these studies, usually laptop based ultrasonic systems have been studied. For these reasons, there is a need for a portable, low cost ultrasound imaging system that can be used for doctors during clinical examination. This project aims the design of a mechanically scanned hand-probe for ultrasound imaging with a significantly reduces channel count (2-4 array elements.) The mechanical scanning will be achieved by the hand movement of the operator. While the probe is swung on the body of the patient, the movement of the probe in the 3D space will be monitored by inertial sensors. Acceleration and rotation data from the inertial sensor will be converted to location data by the use of a positioning algorithm, and this data will then be used for the construction of the ultrasound image. This approach will significantly simplify the transducer electronics and, hence, will reduce the system cost.Within the framework of this project, a prototype of the stated system will be developed. The system will be composed of two functional units: the probe and the imaging unit. The operator will scan the organ to be imaged by the motion of his/her hand. The probe will consist of the transducer, inertial sensors and the driver electronics. The driver will convey the inertial sensor and ultrasound transducer data to the imaging unit by the use of a wireless link. The imaging unit will convert the acceleration and rotation data to position information to form the ultrasound image on the device's display. A pair of 6-axis inertial sensors (3 accelerometers and 3 gyroscopes) will form the position sensing sub circuit of the probe. There are commercially available sensors with sizes as small as 4 mm × 4 mm which might be used in the probe. The inertial data will be processed by an algorithm that involves the use of an extended Kalman filter to yield the position information. Using this data, the imaging unit will determine the directions for the A-scans, and will form the image.Using hand gestures for mechanical scanning and determining the position information using inertial sensors is a novel approach in ultrasonic imaging. The project, hence complies with the "Early diagnosis" and "Mobile devices" subjects of the call. The target price for the proposed device is less than $1000. The low cost of the device will enable the wide use of ultrasound systems in clinics and improve diagnosis in various diseases.



**Yrd. Doç. Dr.
Göksen Göksenin
Yaralıoğlu**

DEPARTMENT
Electrical & Electronics Engineering

CONTACT
goksenin.yaralioglu@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 1003

START DATE
2014

DURATION
24 months

OZU BUDGET
466,553.00 TL

TÜBİTAK

TICKOTEX - Tick Repellent Multifunctional Protective Textile Materials

ABSTRACT

The main objective of the project is the development of new multifunctional textile structures that include biological active compounds extracted from plants, to prevent spreading of infectious diseases like Borreliosis. The biologicaly active compounds will be encapsulated into polymeric matrices which will provide controlled release.

The tick-borne, multisystemic disease, Lyme borreliosis caused by the spirochete Borrelia burgdorferi became a major public health problem in the Central and Eastern European countries. Over the last 30 years, the tick-borne encephalitis (TBE) morbidity increased by 400%. Despite extensive researches to find treatment to heal Lyme infection, no cure was found until now, up to 35% of the infected people not responding to treatment or relapsing in the shortest time-frame. In fact, according to the World Health Organisation 35-58% of TBE patients suffer long-term neurological problems, such as various cognitive or neuropsychiatric complaints, balance disorders, headache, dysphasia, hearing defects, and spinal paralysis, and 2% die from the disease. The spirochetes that cause Lyme are stealth pathogens-they can hide within cells or alter their form so that antibiotics cannot affect them. A tick bite may deliver not only Borrelia but also co-infections which further complicate the treatment and increase the cost of Health Insurance System. As an example, in Germany, the expected overall cost for analyses only is estimated to be at 51,215,105C every 2 years. People who live and work or vacation/recreational activities in tick habitats are at obvious risk of acquiring tick-transmitted infections. Hence, the main objective of the Ticotex project is to identify new active ingredients that will be suitable for impregnation into clothing textiles through nanocapsulating them to enable controlled delivery of these bio friendly extracts.

Scientific and technological objectives are to be achieved with the effort of a multidisciplinary Consortium including SMEs and research organizations representing the whole value chain from plant extraction, microencapsulation and repellent textiles manufacturing.

Yrd. Doç. Dr.
Gül Bahar Başım Doğan

DEPARTMENT
Mechanical Engineering

CONTACT
bahar.basim@ozyegin.edu.tr

FUNDING SCHEME
EUREKA

START DATE
2014

DURATION
36 months

OZU BUDGET
118,000,00 EUR

EUREKA

Protein-integrated White Light-emitting Diodes for Efficient, High-quality and Biocompatible Solid-state Lighting

ABSTRACT

Green photonics aims to provide solutions that generate or save energy, reduce pollution and greenhouse gas emissions, produce environmentally sustainable outputs or enhance public health. Solid-state lighting (SSL), one of the most important green photonics technologies, offers 50% reduction in global electricity consumption for lighting that corresponds to the production by hundreds of coal plants and decrease in millions of tons of carbon emission, if the entire conventional white light sources are to be replaced with energy-efficient light emitting diodes (LEDs). However, the widely used phosphor-based white LED technology and the currently investigated nanocrystal-based white LEDs have limitations in terms of biocompatibility, energy efficiency and color quality. To this end, we propose a new class of color-conversion LEDs integrated with proteins to overcome the disadvantages of currently used and investigated color conversion materials. For this, we will work on the theoretical modeling, design, fabrication and experimental realization of these new solid-state lighting devices. The excellent optical properties of the fluorescent proteins including strong absorption, high şuorescence quantum yields and high photostability will enable us to achieve efficient and stable white light generation. Furthermore, the biocompatible characteristics of the proteins have the potential to minimize the pollution caused by the color-conversion materials and make them a strong candidate for “green lighting”. These hybrid photonic devices will embody fluorescent and transparent silk-fibroin proteins on III-V InGaN/GaN light-emitting structures. This project aims for protein-integrated color-conversion white LEDs that are expected to simultaneously achieve high-quality, efficient and eco-friendly solid-state lighting. Therefore, this project offers a potential solution to help addressing economical and environmental challenges we are now facing due to the energy problem.

Yrd. Doç. Dr.
Sedat Nizamoğlu

DEPARTMENT
Electrical - Electronics Engineering

CONTACT
sedat.nizamoglu@ozyegin.edu.tr

FUNDING SCHEME
EC Marie Curie
Career Integration Grants

START DATE
01.09.2014

DURATION
36 months

OZU BUDGET
75.000,00 EUR

LIFTING TANKS - Seismic Analysis of Liquid-Storage Tanks with a Focus on Tank-Base Uplift

ABSTRACT

The recent European economic crisis showed that effective use of resources is more important than ever for sustainability of companies. Inter-organizational cooperation is foreseen as a good opportunity to achieve further efficiency in operations that companies require to stay competitive in a global economy. However, up to now, very little quantitative insights and tools have been developed for managers that can actually help them in establishing such collaboration. In this proposed research, we focus on the difficulties in collaboration of service systems from an economic point of view using the techniques developed in the domain of Game Theory and Operations Research. Our ultimate aim is to create managerial insights that will help the practitioners to form sustainable collaboration by devising tools and rules for stable and fair allocation of benefits. As a fundamental step, the proposed research will investigate cooperative games of service systems and service supply chains in which cooperation by sharing resources improve the systems performance (reduce cost or increase profit). There are only a limited number of studies and little theoretical results in the literature that will help researcher to study these cooperative systems in more detail. This proposal will fill this gap by developing a mathematical framework and theoretical background that will help to characterise the cores of these games as much as possible and hopefully boost further research in the area.

Yrd. Doç. Dr. Bülent Erkmen

DEPARTMENT
Civil Engineering

CONTACT
bulent.erkmen@ozyegin.edu.tr

FUNDING SCHEME
EC Marie Curie International Incoming Fellowships Fund

START DATE
01.10.2014

DURATION
24 months

OZU BUDGET
167,390.40 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

Cooperation in Service Systems and Service Supply Chains

ABSTRACT

The recent European economic crisis showed that effective use of resources is more important than ever for sustainability of companies. Inter-organizational cooperation is foreseen as a good opportunity to achieve further efficiency in operations that companies require to stay competitive in a global economy. However, up to now, very little quantitative insights and tools have been developed for managers that can actually help them in establishing such collaboration. In this proposed research, we focus on the difficulties in collaboration of service systems from an economic point of view using the techniques developed in the domain of Game Theory and Operations Research. Our ultimate aim is to create managerial insights that will help the practitioners to form sustainable collaboration by devising tools and rules for stable and fair allocation of benefits. As a fundamental step, the proposed research will investigate cooperative games of service systems and service supply chains in which cooperation by sharing resources improve the systems performance (reduce cost or increase profit). There are only a limited number of studies and little theoretical results in the literature that will help researcher to study these cooperative systems in more detail. This proposal will fill this gap by developing a mathematical framework and theoretical background that will help to characterise the cores of these games as much as possible and hopefully boost further research in the area.

**Yrd. Doç. Dr.
Ulaş Özen**

DEPARTMENT
Operations Management

CONTACT
ulas.ozen@ozyegin.edu.tr

FUNDING SCHEME
EC Marie Curie Career Integration Grants

START DATE
01.06.2014

DURATION
24 months

OZU BUDGET
50,000.00 EUR

MARIE CURIE ACTIONS

SEVENTH FRAMEWORK PROGRAMME

Neurophysiology and Computational Modeling of Action-Observation

ABSTRACT

In this project we aim to challenge the current mirror neuron -MN- theory and to reach a better explanation of the MN phenomenon. For this we will take advantage of computational modeling and single cell recording method that provides information of high temporal resolution about the signals carried by neurons and is the most suitable technique to yield information about the high level functions of the primate brain, as well as providing the most precise data for computational modelling. This information will beinterpreted with a computational modelling perspective to reveal causally complete description of the brain mechanisms responsible for action understanding. The activity of single neurons will be recorded from the premotor areas F5 and F2, as well as from the primary motor cortex (MI) of trained macaque monkeys that will either perform themselves or obeserve the experimenter executing reaching-to-grasp movements in order to: (i) both characterize the observation elicited response of F5 neurons by assessing the response triggering features of the observed movement as well as the timing relationship between the response and the movement, and to provide precise data for computational modelling (ii) explore whether F2 and MI contain neurons responding to observation, characterize their observation elicited responses and compare them with those of area F5. The data obtained from the experiments will be used to construct a computational model of the action understanding process. The model will address cortical dynamics at diverse levels (i.e. neural, regional or network scale) and will comply with the empirical data (high temporal resolution signals obtained in the present study and available in the literature).

Doç. Dr.
Erhan Öztop

DEPARTMENT
Computer Science

CONTACT
erhan.oztop@ozyegin.edu.tr

FUNDING SCHEME
TÜBİTAK 2520 -GSRT

START DATE
01.10.2013

DURATION
24 months

OZU BUDGET
54.268.00 TL

TÜBİTAK

TECHNOLOGY
TRANSFER
OFFICE

Notes