Summer 2019 UG Fellowship Programme

Project Descriptions

Project Number	1
Project Title	Video Analytics: Face normalization
AIT supervisors' name(s) and URLs	Aristodemos Pnevmatikakis and Stefanos Astaras https://www.ait.gr/team/aristodemos-pnevmatikakis/ https://www.ait.gr/team/stefanos-astaras/
Estimated group size	3
Estimated duration (3 weeks/6 weeks)	3 weeks
Project description	Face normalization: Simple normalization: Affine or projective transform, Face morphing for normalization

Project Number	2
Project Title	Video Analytics: Recognition
AIT supervisors' name(s) and URLs	Aristodemos Pnevmatikakis and Stefanos Astaras https://www.ait.gr/team/aristodemos-pnevmatikakis/ https://www.ait.gr/team/stefanos-astaras/
Estimated group size	3
Estimated duration (3 weeks/6 weeks)	3 weeks
Project description	Face, Age, Gender, Emotion recognition: Train classifier (Bayesian, HOG, CNN), use to recognize

Project Number	3
Project Title	Video Analytics: Context in images
AIT supervisors' name(s) and URLs	Aristodemos Pnevmatikakis and Stefanos Astaras https://www.ait.gr/team/aristodemos-pnevmatikakis/ https://www.ait.gr/team/stefanos-astaras/
Estimated group size	3
Estimated duration (3 weeks/6 weeks)	3 weeks
Project description	Context in images: Experiment with a deep learning CNN that recognizes 1000 types of objects. Evaluate performance

Project Number	4
Project Title	SW development for Android and the web
AIT supervisors' name(s) and URLs	Aristodemos Pnevmatikakis and George Lalas https://www.ait.gr/team/aristodemos-pnevmatikakis/ https://www.ait.gr/team/george-lalas/
Estimated group size	3
Estimated duration (3 weeks/6 weeks)	6 weeks
Project description	Android GPS logger stores locally the GPS location of the user. A backend collects the stored data, and presents them to the Android clients of users that are accepted as friends. This is a project in two parts, to actually take place for the entire duration of the students' stay @ AIT

Project Number	5
Project Title	Introduction to text mining on social networks
AIT supervisors' name(s) and URLs	Fotis Talantzis https://www.ait.gr/team/fotios-talantzis/
Estimated group size	2
Estimated duration (3 weeks/6 weeks)	3
Project description	Vast amounts of new information and data are generated everyday through economic, academic and social activities, much with significant potential economic and societal value. Techniques such as text and data mining and analytics are required to exploit this potential. Using data originating from major news providers (e.g. BBC, CNN etc.) the student is expected to implement a web-based system that: • Extracts and Collects most significant keywords from news items and stores them in a database including their category (e.g. Sports, Finance etc.) • Creates summary from large chunks of text (news items) • Given a specific news item, suggest similar news items based on the extracted keywords • Given a specific news item, suggest its originating category (e.g. Sports, Finance etc.)

Project Number	6
Project Title	Analysis of social profiles
AIT supervisors' name(s) and URLs	Fotis Talantzis https://www.ait.gr/team/fotios-talantzis/
Estimated group size	2
Estimated duration (3 weeks/6 weeks)	3
Project description	Social network analysis involves studying the relationships between a set of users. In many situations, there are patterns to the types of relationships that are formed - for example, communities of people who are more likely to link to each other than to other people in the network. Using Twitter as an example students will start with a Twitter user and identify relationships of the users that follow him (followers) by recursively examining the followers of each of the followers of the original user. The student is expected to implement a web-based system that • Interfaces with the Twitter API • Fetches and prints the followers of a user identified by their username • Given a depth (integer) fetch the followers of each of the followers of the user • Generate statistics e.g. Print those users that are followed by more users in the examined network

Project Number	7
Project Title	Blockchain support for supply chain
AIT supervisors' name(s) and URLs	Sofoklis Efremidis https://www.ait.gr/team/sefremidis/
Estimated group size	3 students
Estimated duration (3 weeks/6 weeks)	6 weeks
Project description	Blockchain is a relatively new technology that first appeared along with the bitcoin cryptocurrency. Besides being a foundational technology for a number of other cryptocurrencies, the potential of blockchains to support new innovative applications is still explored. In this project a sample application for tracking goods in a supply chain will be developed. The application will use a blockchain for tracking the transfer of goods between stakeholders of the supply chain and will use escrow accounts for implementing payments between them.

Project Number	8
Project Title	Blockchain support for implementing Service Level Agreements
AIT supervisors' name(s) and URLs	Sofoklis Efremidis https://www.ait.gr/team/sefremidis/
Estimated group size	3 students
Estimated duration (3 weeks/6 weeks)	6 weeks
Project description	Blockchain is a relatively new technology that first appeared along with the bitcoin cryptocurrency. Besides being a foundational technology for a number of other cryptocurrencies, the potential of blockchains to support new innovative applications is still explored. Smart contracts can be implemented on a blockchain for automatically enforcing business rules and Service Level Agreements. In this project smart contracts will be developed for this purpose. In an environment where Service Level Agreements have to be enforced between federated service providers and service consumers.

Project Number	9
Project Title	Blockchain support of IoT applications
AIT supervisors' name(s) and URLs	Sofoklis Efremidis https://www.ait.gr/team/sefremidis/
Estimated group size	3 students
Estimated duration (3 weeks/6 weeks)	6 weeks
Project description	Blockchain is a relatively new technology that first appeared along with the bitcoin cryptocurrency. Besides being a foundational technology for a number of other cryptocurrencies, the potential of blockchains to support new innovative applications is still explored. In this project blockchains will be used for IoT support for anonymized data and metrics collection and credit point redemption for a retail marketing setting.

Project Number	10
Project Title	Planar Antenna Design
AIT supervisors' name(s) and URLs	Dimitrios Ntaikos https://www.ait.gr/team/dimitriosntaikos/
Estimated group size	4 students (2 teams, 2 students each)
Estimated duration (3 weeks/6 weeks)	3 weeks
Project description	For this Project, students will become familiar with the basic knowledge of antennas and electromagnetic theory. After discussion with the supervisor, each team will be appointed with an antenna design, for which they will perform a detailed study of this specific planar antenna. They will calculate on paper, using the analytical mathematical expressions and equations provided, the physical dimensions and characteristics of the proposed antenna. They will run electromagnetic simulations of the chosen planar antenna. They will write a report summarizing their findings. Requirements: Knowledge of MatLab, Mathematics (Complex and Vector Calculus).

Project Number	11
Project Title	Sub-6 GHz Wireless Over-the-Air Transmission
AIT supervisors' name(s) and URLs	Ioannis Chondroulis
Estimated group size	4 students (2 teams, 2 students each)
Estimated duration (3 weeks/6 weeks)	3 weeks
Project description	This project's objective is to transmit over-the-air data in frequencies below 6 GHz using the B-WiSE lab's software-defined radio modules. During the course of the project, wireless communication theory, MATLAB programming and simulation, as well as key aspects of hardware design will be covered. In particular, students will become familiar with the physical layer of the B-Wise lab's WARP programmable radio modules and have the chance to transmit and receive actual data over the air. A number of experiments involving different antenna configurations and user setups will be performed. A respective report will be composed. Requirements: Basic network knowledge, familiarity with Matlab.

Project Number	12
Project Title	Detecting Addictive Behavior in Online Games of Chance
AIT supervisors' name(s) and URLs	Ioannis Christou https://www.ait.gr/team/ioannischristou/
Estimated group size	1 student
Estimated duration (3 weeks/6 weeks)	3 weeks
Project description	Abstract: Online Games of Chance are increasingly confronted with addictive behavior from certain subscribers of their services; to tackle such problems that affect both the players, as well as the companies themselves, the latter, in order to obtain certain accreditations and certifications, are obliged to show that they have significant Responsible Gaming Initiatives installed. According to the DSM-5 manual for addictive behaviors, two common tell-tale signs of addictive behavior is the continuous gambling for long periods of time despite accumulated losses, and the "doubling of bets" phenomenon where the player more than doubles their bets with each gamble in an effort to break even. The project involves therefore developing a system for detecting either one of the above two conditions in CSV files containing historical data of anonymous players. The objective is to develop efficient Java code that will parse such files, and detect if some players exhibit such behavior, taking into account some necessary user-defined parameters (such as what constitutes a time-window, and how many bets must a player place in order to raise an alarm). Pre-requisites: excellent knowledge of Java, Source-code control systems (Git), Data Structures, Data Bases, Algorithms.