PFC a Empreses (tardor 2010-2011)

Empreses on pots fer el PFC

Empreses i Institucions que ofereixen projectes a l'ETSETB i que gestiona l'escola
Última actualització: 23 de febrer 2010

Quan demaneu una plaça mitjançant l'Intranet, ho haureu de fer en referència al codi que surt a la taula.

ATENCIO: hi ha empreses que continuament estan ofertant projectes. Un dels requisits és que els has de sol·licitar pel teu compte, però pots demanar-nos qualsevol document que et sol·licitin i tingui a veure amb l'escola. Consulta aquí quines són.

- Thales Netherland
- IMEC / Holst centre
- EPFL
- M*MODAL
- Philips Research Europe
- TriaGnoSys GmbH
- Bell Laboratories
- Nokia Siemens
- DLR (German Aerospace Centre)
- Continental, A.D.C. GmbH

Thales Netherland

Thales Netherland Land & Joint BV. Huizen. The Netherlands.

Codi	NL THALES Hui_1
Data d'entrada	17/02/2010
Tipus d'estada	PFC
Descripció	**Disruption Tolerant Networking** Contemporary communication networks consist of a wide variety of wireless access technologies, ranging from commercial standards (e.g. Wireless LAN, WiMAX) to specific long range VHF communication equipment. The availability of these networks may vary widely between having no connectivity at all to having a large number of networks available. Typically one may take advantage of information that is present at lower functional layer to decide upon effective measures at the higher protocol layers of communication system as part of a cross layer approach. But also to benefit as much as possible from networks that are susceptable to interrupts and widely varying delay/availability characteristics by using novel Disruption Tolerant Networking (DTN) approaches. The goal of this assignment is to devise new concepts for cross layer and DTN optimizations to address the challenges in achieving high performances over constrained wireless networks. This includes conceptual and experimental work that should result in a demonstrator that is capable of showing the merits of the approach taken.
Durada	8/9 months, starting in summer 2010
Requisits	Programming in C/C++ Linux TCP IP Communication Networks courses in Programming Telecommunication and data networking.
Nombre de places	1-2
Compensation	economical compensation

IMEC / Holst centre

IMEC / Holst centre. Eindhoven. The Netherlands

Codi	NL IMEC Ein_1
Data d'entrada	17/02/2010
Tipus d'estada	PFC
Descripció	**Spectrum Sensing in Low-Power Wireless Sensor Networks** The limited availability of spectral resources calls for more efficient ways of spectrum usage in future wireless networks. Cognitive radios are an interesting solution to the spectral congestion problem, where the available resources are dynamically used across time and frequency in an opportunistic manner. In this context, spectrum sensing is needed to increase awareness of other technologies that share the same spectrum. In this project, the student will carry out research in the area of spectrum sensing. The objective is to design and test low-complexity (low-power) spectrum sensing techniques and to demonstrate them in a software and hardware platform, in a realistic scenario.
Durada	9 months
Requisits	We are looking for a student with background and interest in signal processing and digital communications. Good programming skills in C or C++/Java. Basic knowledge of Matlab is desired, although not a must. Good level of spoken and written english.
Nombre de places	1-2
Compensació	economical compensation

EPFL

Swiss Federal Institute of Technology Laussane

NOTA:
Una vegada hagueu estat nominats per l'ETSETB i admesos per l'EPFL sereu considerats, des del punt de vista acadèmico-administratiu, com a estudiantat del Programa de mobilitat UPC-EUROPA, en lloc d'UPC-EMPRESA.

Codi	CH EPFL LAU_1
Data d'entrada	17/02/2010
Tipus d'estada	PFC
Descripció	**Network Coding Tomography** Network tomography has been proposed as an efficient technique for inferring the underlying network graph by examining parameters such as round-trip time and packets loss of transmitted probe packets. These techniques are useful for locating the bottlenecks in the network which are the main cause of inefficient utilization of network resources. Network coding techniques can alleviate the effect of bottlenecks by allowing intermediate nodes to combine the received packets instead of store and forward them. Network coding can also be used for network tomography since from the coding coefficients we can infer the coding points and thus the bottlenecks of the network. In this project, we will develop a novel network tomography system through the use network coding techniques. The designed system will be extensively evaluated for dynamic networks under a variety of scenarios.
Durada	6 to 9 months

Requisits	C or Matlab programming, network protocols, basics of information theory.
Nombre de places	1-2
Compensació	el govern suís ofereix un ajut, per a més informació : http://sae.epfl.ch/page23143.html.

Codi	CH EPFL LAU_2
Data d'entrada	17/02/2010
Tipus d'estada	PFC
Descripció	**Video communications using low cost UEP network coding** During the past few years, mobile/wireless systems have become the dominant means of communication. Peer-to-peer networks have been used for the reliable transmission of pictorial information, like video. These networks offer significant network diversity that streaming systems should take benefit to enable high quality video communication. Network coding has been proposed as an alternative to the above techniques which allow network codes to process the information before forwarding it to the destination nodes. However, traditional network coding scheme usually have high computational cost that limit their application in real networks. In this project, we will focus on the design of low cost network coding solutions that take into account the importance of the data.
Durada	6 to 9 months
Requisits	C or Matlab programming, network protocols and basics of optimization theory.
Nombre de places	1
Compensació	el govern suís ofereix un ajut, per a més informació : http://sae.epfl.ch/page23143.html

Codi	CH EPFL LAU_3
Data d'entrada	17/02/2010
Tipus d'estada	PFC
Descripció	**Robust Delivery of Correlated Data Captured by Multiple Cameras using Network Coding** In this project, we are interested in robust delivery of data, which are specifically scenes captured by multiple cameras. Due to the proximity of cameras, the captured scenes may be correlated with each other. A robust delivery of the data can be possible based on network coding technique, while minimizing the performance degradation due to several constraints such as limited time for completing transmission, transmission power, etc. In this project, students will study and investigate the correlation model among the data captured by multiple cameras. Then, they will design a novel approach for recovering the originally capture data, which have been encoded by network coding techniques, exploiting the correlation model, when enough packets are not available. In the final step of this project, the students will deploy the proposed solutions into real camera networks.
Durada	6 to 9 months
Requisits	A basic knowledge of linear and abstract algebra and probability Matlab or C/C++ programming
Nombre de places	1
Compensació	el govern suís ofereix un ajut, per a més informació : http://sae.epfl.ch/page23143.html.

Codi	CH EPFL LAU_4
Data d'entrada	18/02/2010
Tipus d'estada	PFC
Descripció	**Discovering Structure in Video** People have considered various structural similarity metrics (SSIM) for natural images. The goal is to discover the underlying structure of an image that is impervious to rotations, translations, resizing, and other transformations that one can apply to the image data (pixels). Then, one can easily compare images without being affected by their different scales and any kind of intermediate processing that they have experienced. Applications include classification, retrieval, synthesis, etc. The question that this project raises is whether we can do something analogous for video. In particular, can we identify the key components characterizing the video data so that similar videos can be detected regardless of diffences in their frame size, frame rate, and image content. A major part of the project would necessitate exploring the design of structural metrics that would marry the concepts of texture+shape and motion, where the latter is a specific characteristic of video.
Durada	6/9 months, starting summer 2010
Requisits	A basic knowledge of linear and abstract algebra and probability Matlab or C/C++ programming
Nombre de places	1
Compensació	el govern suís ofereix un ajut, per a més informació : http://sae.epfl.ch/page23143.html.

Codi	CH EPFL LAU_5
Data d'entrada	18/02/2010
Tipus d'estada	PFC
Descripció	**Context-driven media computing** Online social networks have become a commonplace of our Internet existence. We are awashed by the amount of data that can be obtained through online social networking sites. Some of it, like information on our contacts and content preferences, can describe the prefered paradigm for media computing that many of us would like to experience. The goal of this project would be to explore ways in which social network data can be employed for providing enhanced media services, such as coding, representation, and delivery. We expect that this context-driven media computing will affect many aspects of our digital lives in which we experience ever increasing amounts of media content. Part of the project would be on identifying major applications that would benefit from such integration of contextual information into their operation. Examples include personalized video compression and delivery, ambient computing for smart homes, targeted advertising in digital media streams, etc.
Durada	6 to 9 months
Requisits	visionary thinking is a must :) , knowledge of online social networks, scripting languages (for example Perl), basic knowledge of digital media systems, video compression and multimedia communication. Matlab programming could certainly be a plus.
Nombre de places	1-2
Compensació	el govern suís ofereix un ajut, per a més informació : http://sae.epfl.ch/page23143.html.

Codi	CH EPFL LAU_6
Data d'entrada	18/02/2010
Tipus d'estada	PFC
Descripció	**Stochastic modelling of prediction errors of distortion models** There is a body of research on distortion models which attempt to describe the influence of packet loss on the increase in video signal distortion. In this project, we will like to analyze the prediction error as a stochastic signal and study its dependency on various parameters. These include the number of packets lost and their inter-positions (i.e., the packet drop pattern), the specific type of content (its motion activity), the type of error concealment that is incorporated at the video receiver, etc. The analysis will enable us to design a distortion model that is more accurate than current existing schemes, which in turn can be leveraged for better compression and packet scheduling techniques.
Durada	6/9 months, starting in summer/fall 2010
Requisits	Basic knowledge of video compression and statistical modelling Matlab or C programming is important to perform empirical experiments upon which the theory can be developed
Nombre de places	1
Compensació	el govern suís ofereix un ajut, per a més informació : http://sae.epfl.ch/page23143.html

Codi	CH EPFL LAU_7
Data d'entrada	18/02/2010
Tipus d'estada	PFC
Descripció	**Sparse signal reconstruction from irregularly sampled data on a manifold** Recent development of new application-driven sensors brought an increased interest to a manifold signal processing. In particular, an omnidirectional video and audio information, as well as many measurements collected in astronomy, meteorology, cartography, volcanology, etc., have to be efficiently processed, where efficient compression and analysis are performed on uniform grid. However, sensors are not positioned uniformly due to a topography or geo-physical conditions. This project aims to reconstruct a signal from sensors distributed irregularly on the manifold. We assume that a manifold signal is sparse or compressible, therefore, that it can be approximated with a small number of basis functions. The project is an extension of our work on a simple manifold and it can be split into two sub-parts. The first part is related to a dictionary generation on a manifold, and the second part represents the reconstruction problem formulation. Dictionary in this context is a set of basis functions composed out of several generating functions and their transformations (translation, rotation, scaling), similarly as the dictionary is a collection of the words that build the language.

	In second part we formulate the reconstruction problem as the optimization problem and we solve it in a graph framework for the efficiency.
Durada	6 months, starting in summer/fall 2010
Requisits	Interest in signal processing, basics of linear algebra and Matlab (or C/C++) for conducting the numerical experiments.
Nombre de places	1
Compensation	el govern suís ofereix un ajut, per a més informació : http://sae.epfl.ch/page23143.html

M*MODAL

M*MODAL. Pittsburgh, USA

Codi	USA M*MODAL Pitt_1
Data d'entrada	17/02/2010
Tipus d'estada	PFC
Descripció	**New approaches for semi-supervised training for speech recognition for medical reports** M*Modal (www.mmodal.com) is currently looking for a student who is interested in a 6 months Master Thesis starting in August/September 2010. We are a fast moving speech technology company based in Pittsburgh, PA (USA). Our portfolio of conversational speech recognition and natural language understanding technologies is widely recognized as the most advanced in the industry. M*Modal is a leading innovator in the field of conversational documentation services (CDS) where speech recognition and natural language understanding are combined in a unique setup targeted to truly understand conversational speech and turn it into actionable and meaningful data. Our proprietary speech understanding technology - operating on M*Modal's computed grid hosted in our national data centers - is redefining the way clinical information is captured in healthcare. Task description: Final medical reports as transcribed by a professional transcriptionist differ substantially from a verbatim transcript of what the doctor actually said. For instance, he might dictate an entire paragraph and then say "remove the last paragraph". While there are various approaches to still use such data to train speech recognition systems, this topic merits further research work. The student would work in close cooperation with our research team to design and implement a new approach, and run experiments to compare the performance to the current implementation.
Durada	6 months
Requisits	Student in the field of Computer Science, Engineering or equivalent, Programming experience (e.g. in C++, java, python) Some knowledge in the fields of statistics and/or pattern recognition Good written and spoken English communication skills Some knowledge of speech processing / speech recognition would be beneficial
Nombre de places	1
Compensation	economic compensation will be given

Philips Research Europe

Philips Research Europe. Eindhoven, The Netherlands

Codi	NL Philips Ein_1
Data d'entrada	19/02/2010
Tipus d'estada	PFC
Descripció	**Multi access with coded light** At Philips Research we envisage the use of light to communicate between luminaires in the office or home. For that purpose we can encode signals within light without any perceptible deterioration of the light comfort. For a known sender and receiver it is currently possible to exchange a number of prearranged bits. We intend to extend this to sending packets between luminaires. Such a packet should follow the packet header layout as defined by the 6LoWPAN working group of the IETF. Once packets can be exchanged between a prearranged sender and receiver, the next step is to send packets within a multi-sender environment. The latter requires the construction of Multiple Access Control (MAC) software to detect carrier signals and only send when the channel is free; Carrier Sense Multiple Access (CSMA) techniques seem appropriate. The assignment can be divided in three main parts (steps): 1. Write a driver to send and receive appropriately formatted packets in the single sender use case. 2. Adapt existing MAC code used with RF radios to be used with coded light, enabling the transmission of packets in a multi-sender environment. 3. Develop a demonstration application which illustrates the communication of packets between multiple nodes.
Durada	9 months, starting July 2010

Requisits	Sound embedded software development skills (C programming). Strong understanding and experience with networking, in particular Internet Protocol stacks and applications. Willingness to gain expertise in Multiple Access Control (MAC). Experience with digital electronics design.
Nombre de places	1-2
Compensació	

Codi	NL Philips Ein_2
Data d'entrada	22/02/2010
Tipus d'estada	PFC
Descripció	**Positioning and commissioning of wireless devices based on RF signal strength** Wireless communication make installation of lighting control networks easier as it avoids having to drill holes and pull cables. However, as wireless devices need power the sensors and switches could be equipped with batteries. But batteries need replacement and this is a burden both from environmental point of view as well as from maintenance point of view. In order to make batteries obsolete one can deploy energy harvesting techniques: these allow devices to send simple commands e.g. at the press of a button, but the rest of the time the devices are dead. Especially, they are not able to receive configuration information, such as which lamps they are supposed to control. In order to find out which switch shall control which lamps, we want to locate the switches relative to the lamps. The subtasks of the thesis include: - Install a small network of batteryless wireless switches (senders) and receivers - Measure Received signal strengths for different combinations of senders and receivers - Experiment with different locations of senders and receivers - Collect and Analyse the experimental results - Devise algorithms to derive positions of the switches relative to the receivers - Propose guidelines how to place senders and receivers for optimal location estimation - Document the work done.
Durada	6 months, starting July 2010
Requisits	Education: Technical University; Computer Science or Electrical Engineering Knowledge of wireless data communication (802.15.4, 6LoWPAN) Experience with embedded SW programming Affinity with hardware Good English communication both verbal and in writing
Nombre de places	1
Compensació	

TriaGnoSys GmbH

TriaGnoSys GmbH. Wessling-Oberpfaffenhausen, Germany

Codi	D TriaGnoSys Wess_1
Data d'entrada	19/02/2010
Tipus d'estada	PFC
Descripció	**Optimization of Mobile Ipv6 for Satellite Link in an Air Traffic Management (ATM) Network Test-bed** The concrete work to be performed will be in the direction of developing and implementing concepts for optimizing the IPv6 mobility protocol over the satellite link. The MIPv6 protocol was designed without specifically considering satellite links, where bandwidth is scarce and expensive. Some concepts to reduce the signaling overhead in MIPv6 for efficient use of the satellite link are envisaged. The most promising concept as the outcome of the study will be then implemented in the test-bed. Naturally the first days of the work will be dedicated to background reading and literature survey to capture the state-of-the-art. This will be followed by the main thesis work, where some independent research and creative concept proposals are expected from the candidate. At the end of the period the candidate is expected to write a self-contained scientific report (diploma thesis), comprehensively summarizing the work performed. It is envisaged to jointly submit key results of the diploma work as a paper for an international conference and/or a journal paper. The thesis is to be written in English. The company supervisor will provide support and materials required for the candidate to perform his/her task.
Durada	6/9 months, starting in summer 2010
Requisits	Medium to advanced English language proficiency is required. Basic to advanced knowledge in Matlab, C/C++, and Linux IP(v6) networking is strongly recommended. Knowledge of LaTeX is welcome. A high level of commitment, engagement, and independent research capability are expected from the candidate performing

	this work; however, the challenge of the task can only be appropriately met by excellent team work, which shall be guaranteed by close contact and regular discussion among candidate and supervisor(s) throughout the whole period.
Nombre de places	1
Compensation	economic compensation will be given

Codi	D TriaGnoSys Wess_2
Data d'entrada	19/02/2010
Tipus d'estada	PFC
Descripció	**Security in Air Traffic Management (ATM) Network** The concrete work to be performed will be in the direction of investigating the security mechanisms in aeronautical telecommunications network. Some research activities related with aeronautical communications security have been conducted by the ICAO ACP WP-I, within the EU FP6 research project NEWSKY (http://newsky-fp6.eu/), and potentially more research studies. The first days of the work will be dedicated to background reading and literature survey to capture the state-of-the-art. The investigation space covers the Internet security protocols, including IPSec, TLS, HTTPS, etc., and the security requirements (in terms of data authenticity, integrity, and confidentiality) of aeronautical telecommunication network. The literature study will be followed by the main thesis work, where some independent research and creative concept proposals are expected from the candidate. Among the potential security concepts, one is envisaged to be implemented in the TriaGnoSys in-house IPv6 network test-bed. At the end of the period the candidate is expected to write a self-contained scientific report (diploma thesis), comprehensively summarizing the work performed. It is envisaged to jointly submit key results of the diploma work as a paper for an international conference and/or a journal paper. The thesis is to be written in English. The company supervisor will provide support and materials required for the candidate to perform his/her task.
Durada	6/9 months, starting in summer 2010
Requisits	Medium to advanced English language proficiency is required. Basic to advanced knowledge in C/C++, scripting languages (e.g. awk, Perl, or Tcl), and Linux IP(v6) networking is strongly recommended. Knowledge of LaTeX is welcome. A high level of commitment, engagement, and independent research capability are expected from the candidate performing this work; however, the challenge of the task can only be appropriately met by excellent team work, which shall be guaranteed by close contact and regular discussion among candidate and supervisor(s) throughout the whole period.
Nombre de places	1
Compensation	Economic compensation will be given

Codi	D TriaGnoSys Wess_3
Data d'entrada	19/02/2010
Tipus d'estada	PFC
Descripció	**Terrestrial Trunked Radio (TETRA) over Satellite** The work to be performed is related to backhauling TETRA via satellite within the e-triage project. The student will first review relevant literature about it and then specify, develop and evaluate a lab prototype system for the e-triage project. Optionally, the student can also implement optimisation measures to mitigate typical satellite characteristics (delay, jitter, limited bandwidth). The diploma thesis will be aligned with a related theoretical and simulative TETRA over satellite diploma thesis conducted with our project partner German Aerospace Center (DLR).
Durada	6 months, starting in summer 2010
Requisits	Medium to advanced English language proficiency is required. Prerequisites for interested candidates are • medium to advanced English language proficiency • thorough understanding of communication protocols • basic to advanced knowledge in Linux IP networking Basic knowledge of TETRA and LaTeX are welcome. A high level of commitment, engagement, and independent research capability are expected from the candidate performing this work; however, the challenge of the task can only be appropriately met by excellent team work, which shall be guaranteed by close contact and regular discussion among candidate and supervisor(s) throughout the whole period.
Nombre de places	1
Compensation	Economic compensation will be given

Codi	D TriaGnoSys Wess_4
Data d'entrada	19/02/2010
Tipus d'estada	PFC
Descripció	**Aeronautical Wireless Sensor Network Testbed** The main task of this series of practical Diploma Thesis consists in setting up a laboratory testbed emulating a small scale

version of an on-board WSN. The concrete work to be performed includes the following (not preventing adaptations and flexible reaction to lessons learnt while performing the work):

- study related literature with particular emphasis on their applicability in the constraints found in the aeronautical environment, i.e. energy limitations, high density of nodes

- study the system architecture and requirements of the aeronautical WSN under scope

- implementation of sensor nodes in a system on chip (SoC); this includes programming the WSN routing and eventually MAC protocol for the selected microcontroller platform

- implementation of a wireless data concentrator (WDC), which includes, among others, the interfacing to a communication bus, and programming protocol translation from wireless to wired network

- implementing a server as a communication end-point, containing among others data base of collected data and configuration files;

- run tests and compare achieved results with expected performance, as well as critically analyse them with respect to the design.

The following two steps are the natural first and last tasks, respectively:

- with support of supervisor/team, mostly self-organized training, background reading and literature survey capturing the state-of-the-art;

- write a self-contained scientific report (diploma thesis), comprehensively summarizing the work performed. The thesis is to be written in English.

Durada	6/9 months, starting in summer 2010
Requisits	Medium to advanced English language proficiency is required. Basic to advanced knowledge in C/C++ Experience programming microcontrollers is strongly recommended. Knowledge of WSNs is welcome but not mandatory. A high level of commitment, engagement, and independent research capability are expected from the candidate performing this work; however, the challenge of the task can only be appropriately met by excellent team work, which shall be guaranteed by close contact and regular discussion among candidate and supervisor(s) throughout the whole period.
Nombre de places	2-3
Compensation	Economic compensation will be given

Bell Laboratories

Bell Laboratories (Alcatel·Lucent). New Jersey, USA

Codi	USA ALCATEL-LUCENT_NJ_1
Data d'entrada	22/02/2010
Tipus d'estada	PFC
Descripció	**High Capacity Fiber-Optic Transmission Systems** Fiber-optic communications are envolving from simple intensity modulation with direct detection systems towards sophisticated multilevel modulation with coherent detection. Furthermore, digital signal processing techniques are also under development to overcome the main limitations given by transmission impairments. The scope of the project is to investigate on advanced modulation and detection schemes to exploit the huge capacity of an optical fiber.
Durada	6/9 months, starting September 2010
Requisits	Fiber-optic communications Digital communications Signal processing Laboratory skills Matlab simulation Excellent academic records Good English knowledge.
Nombre de places	1
Compensation	economic compensation will be given

Nokia Siemens

Nokia Siemens. Aalborg, Denmark

Codi	DK NSN Aal_1
Data d'entrada	01/03/2010
Tipus d'estada	PFC

Descripció	**Autonomous Component Carrier Selection: study and real-world implementation** Project is intended to study and implement autonomous component carrier selection on a hardware platform. Autonomous Component Carrier Selection (ACCS) is a class of methods envisaged to implement spectrum aggregation in wireless (cognitive and cellular) networks. Indeed, to achieve very high rate and use the spectrum efficiently, wireless networks will resort to the aggregation of several channels, these channels having possibly completely different characteristics. ACCS is a spectrum aggregation algorithm developed in the frame of cellular networks (4G), enabling the user to aggregate spectrum across different operators, these operators exchange information over the air (between base stations) to synchronize and perform the resource allocation. The project will investigate newly developed ACCS algorithms, identify PHY-layer challenges for its implementation on an OFDMA based platform and perform the implementation of basic building blocks on the hardware platform.
Durada	6/9 months, starting 01.09.10
Requisits	students should provide a proved background on wireless communications, lower level networking aspects (PHY,L2 ISO-OSI stack), upper level networking aspects (L3/L4 ISO-OSI stack; appreciated but not necessary), programming skills (C/C++, basic knowledge of Linux)
Nombre de places	2-3
Compensation	in cooperation between Nokia Siemens Networks and Aalborg University

Codi	DK NSN Aal_2
Data d'entrada	01/03/2010
Tipus d'estada	PFC
Descripció	**Study on a Data Fusion Technique in the Measurement Reporting Framework for a next generation Cognitive Radio-based Wireless LAN Access Technology.** In the framework of Cognitive Radio (CR), the spectrum awareness involves a system of distributed spectrum measurements and their reporting into the network. The true enabler of spectrum awareness, and, therefore CR technology, is the intelligence built to aggregate all available information. In a typical Access Point-based access scenario, the AP receives spectral measurements from all its affiliated user equipments. The AP has to solve the problem of verifying the reliability of such measurements and combine them in order to facilitate spectrum decision. This Project is intended to study a proper Data Fusion technique to build spectrum awareness, which will be combined to already existing Radio Resource Manager, in order to obtain the most profitable use of the available spectral resources.
Durada	6/9 months, starting 01.09.10
Requisits	students should provide a proved background on wireless communications, PHY layer for wireless access, Data Fusion/Pattern Recognition, Matlab programming skills
Nombre de places	1-2
Compensation	in cooperation between Nokia Siemens Networks and Aalborg University

Codi	DK NSN Aal_3
Data d'entrada	01/03/2010
Tipus d'estada	PFC
Descripció	**Parameters Learning Techniques within a Dynamic Spectrum Sharing framework for a next generation Cognitive Radio-based Wireless LAN Access Technology** In the framework of Cognitive Radio (CR), two are the key aspects that such a technology emphasizes: the wide flexibility in the spectrum usage, and the self-adaptivity to several working conditions. Both the sides can be combined in order to have autonomous systems able to tune the Dynamic Spectrum Sharing algorithms in order to achieve as optimal performances as possible given a set of possible operative scenarios. This Project is intended to study proper Pattern Recognition/Machine Learning techniques to build a parameters learning/identifier entity, which will be combined to the already existing Radio Resource Manager, in order to obtain the most profitable use of the available spectral resources.
Durada	6/9 months, starting 01.09.10
Requisits	students should provide a proved background on wireless communications, lower level networking aspects (PHY,L2 ISO-OSI stack), upper level networking aspects (L3/L4 ISO-OSI stack; appreciated but not necessary), fundamentals of Pattern Recognition and/or Machine Learning, Matlab programming skills
Nombre de places	1-2
Compensation	in cooperation between Nokia Siemens Networks and Aalborg University

Codi	DK NSN Aal_4
Data d'entrada	01/03/2010
Tipus d'estada	PFC
Descripció	**WLAN as an offloading solution for Femto Base Station Deployment** The deployment of small base stations (BS), so-called Femto BS, is very much discussed in connection with next generation mobile communication (4G). Femto BS could be used to provide capacity (and coverage) in local area hot-spots and thus complement existing macro/micro BS networks. While we can expect quite high performance from a Femto BS, there is always a compromise between performance and cost, especially given that there is already a quite developed, though less performing, WLAN infrastructure in place. In this project, the students are supposed to investigate to what extent WLAN can be used as an offloading solution for Femto BS deployment: Can we direct certain traffic to WLANs and support the more demanding (high data rate) from Femto

	BSs, or does a Femto BS deployment have an overall better cost-performance tradeoff given that we can rely on a more intelligent radio resource management? Potentially, the project can define features to improve WLAN performance so that it is a more attractive solution altogether – a new WLAN generation?
Durada	6/9 months, starting 01.09.10
Requisits	students should provide a proved background on wireless communications, lower level networking aspects (PHY,L2 ISO-OSI stack), upper level networking aspects (L3/L4 ISO-OSI stack; appreciated but not necessary), fundamentals of Pattern Recognition and/or Machine Learning, Matlab programming skills
Nombre de places	1-2
Compensation	in cooperation between Nokia Siemens Networks and Aalborg University

DLR (German Aerospace Centre)

DLR (German Aerospace Centre), Institute of Communications and Navigation. Oberpfaffenhofen-Wessling, Germany

Codi	D DLRMun_1
Data d'entrada	03/03/1010
Tipus d'estada	PFC
Descripció	**Optical Fiber Amplifier Module for Space Application** Optical fiber amplifier technology, well known from terrestrial fiber communications, sgall be adapted for optical free-space communications in space. Within this work an optimised optical fiber amplifier will be designed in close cooperation with a manufacturer. The limitations for space applications in terms of radiation-, vibration- and temperature range will be investigated, assessed and later tested on the prototype model.
Durada	6 months
Requisits	Background knowledge in optical Communications Advantageous: Knowledge in Fiber physics, material physics, lab test equipment.
Nombre de places	1
Compensation	

Codi	D DLRMun_2
Data d'entrada	03/03/1010
Tipus d'estada	PFC
Descripció	**Investigation of Optical Communications Technologies for Space Exploration** Optical free-space communication is a favorable future means for downlinks from explorationand deep-space probes. It enables highest signal intensity at the earth-based receivers due to the minimized signal divergence. Up to now, it has not developed the maturity to adopt the Rfbased telemetry links of e.g. NASA's deep-space network. Space-exploration agencies like the JPL and ESTEC are working on this topic for future high-speed Moon- and Mars-downlinks that will boost transmission rates by at least a factor of hundred. Germany's DLR is getting more involved in exploration missions recently and on the other hand has developed mobile optical free-space communications systems for near-earth applications. This work shall investigate generally the limits of long range optical communication links in terms of system constraints and transmission system sensitivity. Further, different modulation techniques (OOK, PPM, coherent) in combination with optimum FEC algorithms shall be investigated. Simulations on overall system efficiency shall enable the optimization of system parameters. After these analysis', finally an optimum system design shall be developed.
Durada	6/8 months
Requisits	Study of Electrical Engineering with focus on Communications Technology Experience with Forward Error Correction Techniques (FEC) Fluency in English
Nombre de places	1
Compensation	

Codi	D DLRMun_3
Data d'entrada	03/03/1010
Tipus d'estada	PFC
Descripció	**Development of a testbed for optical free-space Communications** The German Aerospace Center at Site Oberpfaffenhofen near Munich operates the "Optical Ground Station Oberpfaffenhofen" which consists of a 40cm Cassegrain telescope together with several optical devices. This facility is used to track satellites, aircraft and ground vehicles with the purpose of maintaining an optical high-speed communication link with these vehicles. For ground-tests and long-time-measurements, a testbed shall be developed to allow measurements using different wavelengths, data rates and modulation techniques. Therefore, a device containing transmitter and control electronics,

	lasers and alignment mechanics is to be developed and set up. The device shall be remote-controllable via Wi-Fi to allow unattended operation.
Durada	6/8 months
Requisits	Diploma Study of Electrical Engineering, Mechatronic (or similar) Interest in Optics Experience with Hardware (Soldering, PCB Layout, Mechanics, …) Fluency in English or German
Nombre de places	1
Compensation	

Codi	D DLRMun_4
Data d'entrada	03/03/1010
Tipus d'estada	PFC
Descripció	**Support of an Aircraft Downlink Measurement Campaign** Optical Free-Space Communications offer a solution for the increasing demand of data rate e.g. for the downlink of surveillance data from moving platforms (UAVs, …) to an Optical Ground Station (OGS). In the framework of the MINERVAA-project funded by the European Union (www.minervaa.org), a bi-directional video conference shall be demonstrated between an Optical Ground Station and one of DLR's research aircrafts (Do228-212). The system will comprise a highdata rate optical link in the downlink-direction, and a low rate RF-system in the uplink-direction. In the scope of this student work/internship, several supporting tasks shall be carried out. This includes programming work (e.g. protocol adaptation, network interfacing, …), electrical work (Soldering, Wiring of electronic devices, …), testing (RF link system, …) as well as mechanical work (installation of devices in 19" plug-in modules, …). During the actual campaign (June 2010), additional tasks may appear, as e.g. the evaluation of measurement data using Matlab.
Durada	3/6 months
Requisits	Diploma Study of Electrical Engineering (or similar) – FH/TH/… Profound PC Knowledge (C/C++, LabView, Matlab, …) "Hands-On" Experience with Hardware/Self-Motivated Working Style Fluency in English or German
Nombre de places	1
Compensation	

Codi	D DLRMun_5
Data d'entrada	03/03/1010
Tipus d'estada	PFC
Descripció	**Database Synchronization over Heterogeneous Networks** As key component of an electronic registration system for affected persons during a mass casualty incident (MCI) a distributed database system has to be designed and developed. Instances of this database reside in mobile nodes (e.g., Tablet PCs), coordination points in the field, and in remote disaster management centers. These databases have to be synchronized via different – depending on the availability – terrestrial wireless or satellite links which might offer only intermittent connectivity. In an earlier thesis a suitable core database system (Ingres) has been identified and a close-to-optimal synchronization algorithm (CPISync) for two hosts has been studied. This approach has to be extended to a distributed database system requiring a protocol for constructing a spanning tree between the hosts. The Master's Thesis is embedded in the research project "e-Triage" supported by the German Federal Ministry of Education and Research. Tasks Generally, students are encouraged to bring in their own ideas and approaches, and the focus of the thesis can be adjusted to the personal interests (simulation, algorithms/implementation, theoretical considerations, etc.). Aim of the Master's Thesis is (i) to find solutions for optimising the efficiency of the distributed database system (in terms of network load and latency) and (ii) to address stability and robustness issues. It is planned to design and implement a simulation environment based on virtual PCs running database instances and interconnected with virtual links. Based on a mobility model, which has to be developed, too, link properties change during runtime. This simulation environment is intended for the functional verification of the developed system which will be later transferred to hardware and used by medical services in training situations.
Durada	6/8 months
Requisits	Background and interest in communication protocols (IP-based) Interest and/or background in database systems Basic or good programming skills High level of commitment and engagement
Nombre de places	1
Compensation	

Codi	D DLRMun_6
Data d'entrada	03/03/1010
Tipus d'estada	PFC

	Interference Alignment for cooperative Networks
Descripció	The concept of interference alignment has recently attracted significant attention from the Information Theory and Signal Processing research communities. In this work we propose to apply these chiefly theoretical concepts into the design of a cooperative protocol that may potentially yield significantly higher gains than what conventional cooperative schemes presently offer with the promise of better scalability to larger networks than what is currently available. Tasks Design, analysis and simulation of cooperative ARQ protocols based on interference alignment. Publication of the results in a conference or journal article is desired.
Durada	6/8 months
Requisits	Experience in Signal Processing for Communications and ARQ protocols Basic knowledge if Information Theory desired but not required Knowledge of Matlab or C/C++ is necessary
Nombre de places	1
Compensació	

Codi	D DLRMun_7
Data d'entrada	03/03/1010
Tipus d'estada	PFC
Descripció	**Optimizing Layer 1 and 2 for Free-Space Optical Data Transmission by Implementing FPGA-basedTransceiver Devices** Optical free-space communication enables licensing-free usage of Multi-Gigabit directional data-links. However, it suffers from fades caused by index-of-refraction turbulence. Although these fades are quite fast (in the millisecond range), due to the high data rates several million bits can be lost during one fade event. Standard layer 1 and 2 means like FEC and ARQ (e.g. by TCP) introduce overhead and delay, both of which can be unacceptable for a required Quality-of-Service standard. In this work advanced Layer 1 and 2 techniques shall be implemented and tested with a custom FPGA device in a lab or free-space testbed. Design and optimization of the FPGA-device could also be part of the work, depending on skills. FPGA-programming (VHDL) is a prerequisite.
Durada	6/8 months
Requisits	Study of Electrical Engineering with focus on Communications Technology Experience with FPGA-Technology Knowledge of FEC and ARQ–Techniques Fluency in German and English
Nombre de places	1
Compensació	

Codi	
Data d'entrada	20/04/1010
Tipus d'estada	PFC
Descripció	**Development of an Amplifier- and Automatic-Gain-Control Circuit** Optical Free-Space Communications offer a solution for the increasing demand of data rate e.g. for the downlink of surveillance data from moving platforms (UAVs, …) or even LEO satellites to an Optical Ground Station (OGS). The platform/satellite is typically illuminated by the OGS using a beacon laser. By using e.g. a 4 Quadrant Detector (4QD) as tracking sensor, the platform can track the OGS and transmit a narrow-diverging signal with a high data rate and power efficiency. However, the signal received by the platform is strongly affected by fading due to atmospheric effects. Furthermore, the link-distances change significantly during e.g. a satellite-pass, and thus the electronics need to support a high dynamic range. In the scope of this thesis, a Transimpedance-Amplifier and Automatic Gain Control (AGC) shall be implemented for a 4QD. This includes component research, the design, layout and manufacturing of printed circuit boards, as well as the test of the setup. Furthermerore, a DSP shall be programmed in C to control the AGC circuit. Finally, the system shall be evaluated and verified in a lab test-bed.
Durada	6 months
Requisits	Diploma Study of Electrical Engineering (or similar) Knowledge of PSpice (circuit simulation), Eagle (PCB layout) or similar Programming experience in C "Hands-On" experience with Hardware (Soldering, …) Fluency in English or German
Nombre de places	1
Compensació	

Continental, A.D.C. GmbH

Codi	D CONTINENTAL_Lin_7
Data d'entrada	19/10/09
Tipus d'estada	PFC
Descripció	**Increasing Range of IR-Laser Sensor** The Continental plant in Lindau (Lake Constance) is developing innovative Driver Assistance Systems for more comfort and safety. This project is dealing with an IR laser range sensor (LIDAR) which captures the environment of a vehicle in order to warn the driver or to initiate an emergency braking maneuver. In this context we are looking for a master thesis student to investigate approaches to improve the range of the sensor without changing the optics. Your Tasks: design and implementation of approaches by means of signal processing, design and implementation of approaches by means of receiver and amplification circuitry, definition, execution and evaluation of test procedures, compare and rate approaches, test drives with test vehicles.
Durada	at least 6 month.
Requisits	digital signal processing, experience with Matlab are advantageous, basic knowledge in optics, good language ability (English or German), fast comprehension, analytic skills, creativity and team spirit
Nombre de places	1

Codi	D CONTINENTAL_Lin_8
Data d'entrada	19/10/09
Tipus d'estada	PFC
Descripció	**Optimal Object Modelling and Tracking for an Automotive Application** Our company develops state of the art driver assistance systems employing radar and camera sensors for an accurate detection and tracking of traffic participants. Therefore it is necessary to develop algorithms that model the environment and associate sensor data to modelled objects. The offered position implies the implementation of a new approach to tracking and data association for radar reflections. A new object model has to be defined. Furthermore, the characteristics of this new approach should be evaluated in terms of RAM and CPU usage as well as tracking performance. The necessary tasks include: definition of the concept and design of the new tracking approach, implementation of a suitable Kalman tracker, implementation of efficient data association techniques, code Implementation in C for simulation and if possible embedded, documentation.
Durada	at least 6 month.
Requisits	ability of analytic and structured working, programming knowledge in Matlab and C/C++, knowledge of basic statistic methods and/or Kalman filtering, systems and signals lecture and competence, enthusiasm to study and develop new algorithms, good English language skills.
Nombre de places	1