

PFC a Empreses (Primavera 2010-11)



Empreses on pots fer el PFC

Empreses i Institucions que ofereixen projectes a l'ETSETB i que gestiona l'escola Última actualització: 07 d'octubre de 2010

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

ATENCIÓ: 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.

Everything Everywhere

NEC Laboratories Europe, Network Division

TriaGnoSys GmbH

DLR – German Aerospace Centre, Institute of Communications and Navigation

Swiss Federal Institute of Technology Lausanne (EPFL)

Nokia – Siemens

Philips Electronic Modules, Solid State Lighting

Trident Microsystems

Thales

Everything Everywhere

Everything Everywhere. UK

Codi	UK Evertthing Everywhere-1
Data d'entrada	13.10.10
Tipus d'estada	PFC
Títol i Descripció	Radio access network SW/HW validation The student will be involved in the validation of a certain piece of SW or HW in the Everything Everywhere (Orange UK and T-Mobile merger) 2G/3G network. The work will include the evaluation of the new features, creation of a test plan, execute the testing laboratory phase, analyse the live trial statistics and finally run an E2E test campaign in the field to measure the network performance. The student will be responsible for the production of accurate technical reports including recommendations to aid the decision making process with regards to Go/No Go decisions for Everything Everywhere. The scope of the project is susceptible to change if forced by unforeseen circumstances.
Inici	February
Durada	6 months
Requisits	Must have skills. Accomplished a high academic standard, ability to learn quickly and autonomously. Troubleshooting and investigation skills are also required. Have a academic profile mainly focused in mobile network technologies such as GSM/3G/HSPA having studied some of the following subjects: mobile Communications laboratory, cellular access networks, multimedia mobile communications, 3G mobile systems and its evolution. Competent verbal and written English language skills, CAE or similar preferred if applicable. Have competent communications skills being able to work and coordinate tasks across different teams. Influence and persuasion skills are needed. Nice to have skills. Have previous work experience in a student placement, especially valuable if it was in a mobile network operator environment. Have an in-depth knowledge in 2G, 3G and HSPA networks. Theoretical knowledge of RF propagation. Understanding of IP and MPLS networks. Experience using mobile network testing tools.
Nombre de places	1
Compensation	£500 per month as accomodation expenses. Reasonable travel expenses subject to negotiation.

Codi	D NEC Hei-4
Data d'entrada	14.10.10
Tipus d'estada	PFC
Títol i Descripció	Implementation and Evaluation of OSGi based Thin UPnP Media Proxy (THUMP) Prototype for Home Gateways With the introduction of home gateways (HGWs) instead of simple modems, multiple devices inside the home have been enabled to connect to the internet and amongst themselves. UPnP is getting more and more popular for home electronic consumer devices like TVs, stand alone media servers, portable devices, game consoles etc. Not all devices connected to the home network that are able to browse the internet are also UPnP capable, e.g. Smartphones or Tablet PCs with WLAN access. As the number of UPnP media sources in the home network increases, it is convenient to have a central point in the home network to accommodate media requests also for non UPnP capable devices – a "MediaHub". Given the central role of the HGW in the home it is natural to place this MediaHub functionality into the HGW. As enabler for implementing such functionality on the HGW, the Open Source Gateway initiative (OSGi) specified a modular, extensible Java based framework that allows HGWs to be extended with software modules. The student's work will start with defining and analyzing the

	requirements for a use case implementation of the MediaHub in the HGW. Following this, the student will work on the design and development of a prototype using modular software components for discovering and controlling UPnP media devices in the home network and create a convenient user interface based on web technologies. If time permits, expansion of the MediaHub to internet-based media sources is welcome. The implementation will be done on one of NEC's commercial product HGW prototypes using the OSGi framework. Finally, an evaluation of the developed concepts will be performed by the student.
Inici	November/December 2010
Durada	6-8 months
Requisits	The applicant must have: the ability to work on concepts and design, strong software development skills, strong knowledge in Java, basic knowledge on OSGi, basic knowledge on web technologies, knowledge of networking principles (IP, TCP, UDP, ...), and home networking (UPnP), good communication skills (English), enthusiasm to work in an international team.
Nombre de places	1
Compensation	

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NEC Laboratories Europe, Network Division

NEC Laboratories Europe, Network Division. Heidelberg, Germany

Codi	D NEC Hei-1
Data d'entrada	14.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Implementation of a Large-Scale P2P Monitoring System and its Applications</p> <p>Monitoring is crucial both to the correct operation of a network and to the services that run on it. However, doing so is increasingly difficult to the explosion of traffic rates: global IP traffic will nearly double every two years through 2012; as a result the Internet in 2012 will be 75 times larger than it was in 2002, 6 times larger than it was in 2007, and 4 times larger than it was in 2008. The student will extend work on a general, scalable and dynamic P2P monitoring architecture. In more detail, the work will focus on leveraging Distributed Aggregation Trees (DATs) and probabilistic data structures. In addition, the work will look at developing monitoring applications to run on the system and their evaluation. Time permitting, the student will put effort towards producing a demo.</p>
Inici	Flexible
Durada	minimum 5-6 months - maximum 8 months
Requisits	The applicant must have: strong software development skills, strong knowledge of C/C++, knowledge of Python, knowledge of software development with Linux (make, gcc, svn, etc), knowledge of networking principles (IP, TCP, UDP, ...), good communication skills (English). Knowledge in one or more of the following areas is advantageous: knowledge of P2P systems (Chord, Pastry, etc), VoIP protocols/architecture knowledge (SIP, RTP).
Nombre de places	1
Compensation	

Codi	D NEC Hei-2
Data d'entrada	14.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Implementation and Evaluation of a Flexible, Scalable Flow Processing Platform (Flowstream)</p> <p>The Internet has seen a proliferation of specialized middlebox devices that carry out crucial network functionality such as load balancing, packet inspection or intrusion detection, amongst others. Traditionally, high performance network devices have been built on custom multi-core, specialized memory hierarchies. Recently, however, commodity PC hardware has experienced a significant increase in performance; combining these PCs with programmable switches such as those supporting the Openflow protocol provides a new network commodity platform. Such a platform enables new flow processing and forwarding at an unprecedented flexibility and low cost, while still yielding very good performance. For instance, one such platform could be processing certain flows through a firewall module, some others through a DPI module and yet some others through an IP forwarding module. The student will work on enhancing the capabilities of this platform's controller software with innovative features. The work will likely include looking at issues like resource allocation (how to map the available hardware to the requests of the platform's users), resource monitoring (e.g., how loaded is a computer or switch), and fairness. The work will also consist of evaluating the platform's performance with a view towards publication in a top-tier conference. Part of the work will consist of continuing work on the platform's GUI with views</p>

	towards a demo. More information about the platform: http://www.cs.ucl.ac.uk/staff/f.huici/publications/flowstream_ccr.pdf
Inici	October 2010 (flexible)
Durada	minimum 5-6 months - maximum 8 months
Requisits	The applicant must have: strong software development skills, strong knowledge in Python, strong knowledge in C/C++, knowledge of software development with Linux (make, gcc, svn, etc), knowledge of networking principles (IP, TCP, UDP, ...), good communication skills (English).
Nombre de places	1
Compensation	
Codi	D NEC Hei-3
Data d'entrada	14.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Multi-Channel Operation for Car-2-X Communication</p> <p>At NEC Laboratories Europe in Heidelberg, we have been working on vehicular communications based on wireless short-range technology (WLAN or IEEE 802.11) and position-based routing, i.e., geographic routing. We have been taking part in research projects and contributing to standardization bodies. The communication is based on ad hoc networks for car-to-car and car-to-infrastructure networks (Car-2-X communication). Target applications include safety, road traffic efficiency, and infotainment applications.</p> <p>We are currently conducting research in multi-channel operation for Car-2-X communication. For this purpose, we are looking for a student who will conduct an internship or his/her Master's thesis on this topic. A central question that the student will investigate in his/her work is how to deal with adjacent channel interference that can occur due to imperfect transmit mask. Another crucial question is how to use all available wireless channels in a coordinated and efficient manner. The work will consist of both conceptual design and experimental work.</p> <p>Benefits. Exposure to the interesting and expanding field of vehicular communication. Excellent opportunities to obtain experience in an industrial working environment. Interesting follow-up opportunities. Hands-on tutoring by leading experts in the research area of vehicular communication. Opportunity to publish papers.</p>
Inici	Flexible
Durada	6-9 months
Requisits	Required skills. Basic knowledge of IP4/IPv6 and Wireless LAN. Basic knowledge of programming language C, Java and Linux. Knowledge of ns-2. Spirit of team work.
Nombre de places	1
Compensation	Student salary
Codi	D NEC Hei-4
Data d'entrada	14.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Implementation and Evaluation of OSGi based Thin UPnP Media Proxy (THUMP) Prototype for Home Gateways</p> <p>With the introduction of home gateways (HGWs) instead of simple modems, multiple devices inside the home have been enabled to connect to the internet and amongst themselves. UPnP is getting more and more popular for home electronic consumer devices like TVs, stand alone media servers, portable devices, game consoles etc. Not all devices connected to the home network that are able to browse the internet are also UPnP capable, e.g. Smartphones or Tablet PCs with WLAN access. As the number of UPnP media sources in the home network increases, it is convenient to have a central point in the home network to accommodate media requests also for non UPnP capable devices – a "MediaHub". Given the central role of the HGW in the home it is natural to place this MediaHub functionality into the HGW. As enabler for implementing such functionality on the HGW, the Open Source Gateway initiative (OSGi) specified a modular, extensible Java based framework that allows HGWs to be extended with software modules. The student's work will start with defining and analyzing the requirements for a use case implementation of the MediaHub in the HGW. Following this, the student will work on the design and development of a prototype using modular software components for discovering and controlling UPnP media devices in the home network and create a convenient user interface based on web technologies. If time permits, expansion of the MediaHub to internet-based media sources is welcome. The implementation will be done on one of NEC's commercial product HGW prototypes using the OSGi framework. Finally, an evaluation of the developed concepts will be performed by the student.</p>
Inici	November/December 2010
Durada	6-8 months

Requisits	The applicant must have: the ability to work on concepts and design, strong software development skills, strong knowledge in Java, basic knowledge on OSGi, basic knowledge on web technologies, knowledge of networking principles (IP, TCP, UDP, ...), and home networking (UPnP), good communication skills (English), enthusiasm to work in an international team.
Nombre de places	1
Compensation	
Codi	D NEC Hei-5
Data d'entrada	26.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Implementation and Evaluation of ICT based solutions which will support the elderly in their daily life and the care organization in their daily work at home</p> <p>The demographic development in Europe with an increasing number of elderly and less young people is one of the biggest societal challenges in the next years. In 2030 we will have only two workers per elderly. This implies a shortage of resources -both, financial and human- needed to cope with the care of the elderly people.</p> <p>The NEC Laboratories are investigating ICT based solutions which support the elderly in their daily life and the care organization in their daily work at home. One topic is using simple home robots integrated with home automation systems to provide supportive services in the areas of home care, emergency detection and handling, and also entertainment. The thesis will contribute to this research topic and will cover technology research, system integration and service development tasks. The student will be able to evaluate his/her work in our home-living lab with a real robot and modern telecommunication equipment (Android Smartphones, Home Gateways, Femtocell,etc).</p>
Inici	February, also April might be an option
Durada	6-9 month
Requisits	The applicant must have: very good English. Profound object oriented software engineering skills human communication skills. Experience in areas like Social Network Services, User Interaction, Sensors, and above mentioned technologies, preferably Java programming skills.
Nombre de places	1
Compensation	
Codi	D NEC Hei-6
Data d'entrada	26.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>ICT based solutions for a smart home which will support the elderly in his/her daily life are currently investigated</p> <p>The demographic development in Europe with an increasing number of elderly and less young people is one of the biggest societal challenges in the next years. In 2030 we will have only two workers per elderly. This implies a shortage of resources -both, financial and human- needed to cope with the care of the elderly people. ICT based solutions for a smart home which will support the elderly in his/her daily life are currently investigated. Those solutions address typical activities within the home environment like dressing up, cooking etc, as well as tasks for homecare. To perform this the homes will need a comprehensive technological equipment with a broad range of capabilities, e.g. monitoring and actuator control. Those capabilities could also be used for additional services offered by external providers. This kind of services may include remote monitoring of health status, integrated home-outside-hospital health treatment, services for social inclusion, communication services, Training and coaching, and also entertainment. Also services for the benefit of third parties like facility management, energy management, environmental knowledge brokerage, etc are thinkable.</p> <p>A potential business model to realize this foresees one or a few stakeholders in a mediating position between the user (home) and the remote service providers. This mediating stakeholder could be for example the telco. For a realization of this model the usage of Cloud technologies is most promising.</p> <p>The thesis' target is the design and prototypical development of a cloud service platform which implements service enabling technologies based on augmented smart home capabilities. For this the student shall explore the multitude of such external services and analyze the requirements for the exposure of smart home services and information 'into the cloud'. A set of service enablers has to be selected, designed and developed and integrated into a cloud based provisioning platform. Demonstration services will proof the developed concept.</p>
Inici	February, also April might be an option
Durada	6-9 month
Requisits	The applicant must have: very good English. Profound object oriented software engineering skills human communication skills. Experience in areas like Social Network Services, User Interaction, Cloud technologies.
Nombre de places	1
Compensation	

TriaGnoSys GmbH**TriaGnoSys GmbH. Wessling-Oberpfaffenhofen. Germany**

Codi	D TriaGnoSys Wess-1
Data d'entrada	19.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Robust Header Compression (RoHC) Implementation in an IPv6 Aeronautical Testbed</p> <p>In this diploma thesis, several issues related to the implementation of Robust Header Compression (RoHC) protocol (IETF RFC 5225) in TriaGnoSys IPv6 aeronautical networking test-bed are to be investigated. It includes (but is not limited to) implementation of nested RoHC, RoHC for short message-flows, and integration of RoHC in the testbed. Depending on the project demand, some work related to IP network security (IPSec) may also be included as part of the thesis.</p>
ci	February-March 2011
Durada	6 months, possible extension depending on the actual work demand
Requisits	Medium to advanced English language proficiency is required, advanced knowledge in C/C++ is strongly recommended, knowledge of Linux IP(v6) networking is recommended, knowledge of scripting languages (e.g. awk, Perl, or Tcl) and LaTeX is welcomed.
Nombre de places	1
Compensation	750€

Codi	D TriaGnoSys Wess-2
Data d'entrada	19.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Performance analysis of LTE in air-ground links</p> <p>LTE has been mainly designed for operation in urban and rural environments. It is for this reason that the achievable capacity of an LTE system in air-ground links is not yet fully known. Hence, the current Diploma Thesis shall characterize, through computer-based simulations, the performance of LTE in air-ground links under different system and scenario conditions.</p>
Inici	February 1st or later
Durada	6 months
Requisits	OFDMA, Matlab, Octave or any other numerical analysis software. Desirable: LTE, cellular networks, channel simulation/modeling.
Nombre de places	1
Compensation	750€

Codi	D TriaGnoSys Wess-3
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Data d'entrada	19.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Performance analysis of LTE in an aircraft cabin</p> <p>LTE has been mainly designed for operation in urban and rural environments. It is for this reason that the achievable capacity of an LTE system in an in-cabin environment is not yet fully known. Hence, the current Diploma Thesis shall characterize, through computer-based simulations, the on-board performance of an LTE cell under different system and scenario conditions.</p>
Inici	February 1st or later
Durada	6 months
Requisits	OFDMA, Matlab, Octave or any other numerical analysis software. Desirable: LTE, cellular networks, channel simulation/modeling.
Nombre de places	1
Compensation	750€

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DLR – German Aerospace Centre, Institute of Communications and Navigation

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

Codi	D DLR Wess-1
Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Adaptive Optics without Wavefront Sensor for Low-Order Atmospheric Distortion</p> <p>Optical free-space communication (FSO) is strongly influenced by atmospheric turbulence, which induces distortions of the beam wave-front. The effects of these distortions can be mitigated by adaptive optics (AO) systems, as they are now used in astronomy. At DLR a new AO method for wavefront correction without dedicated wavefront sensor has been developed which reduces system complexity and allows high processing speed. This method is limited to low-order distortions, i.e. the ratio of receiver aperture diameter to wavefront distortion pattern size is small, as it is usually the case in FSO systems. In this work the new method shall be simulated numerically and its correction quality shall be tested under different atmospheric conditions to find the limits of its applicability. If time allows, a real setup can be tested in DLR's AO lab testbed.</p>
Inici	May 2011 or later
Durada	6-8 months
Requisits	Medium to advanced English language proficiency is required, advanced knowledge in C/C++ is strongly recommended, knowledge of Linux IP(v6) networking is recommended, knowledge of scripting languages (e.g. awk, Perl, or Tcl) and LaTeX is welcomed.
Nombre de places	1
Compensation	700-800€
Codi	D DLR Wess-2

Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Interference Cancellation in Random Access Networks</p> <p>Random Access is a commonly used technique to allow users to transmit data in an uncoordinated way by accessing the same channel randomly. A well known example for a random access protocol is Slotted ALOHA. Recent developments in the area of interference cancellation have shown that the maximum throughput of the Random Access techniques can be drastically increased by sending replicas of a packet in different slots and use the information of the replicas to cancel the interference generated towards other users in order to enhance the overall throughput. Within this work different aspects of this technique shall be investigated with respect to performance gains (higher throughput, lower packet loss rates) in MF-TDMA random access channels. Tasks: focused literature review (Random Access techniques, in particular slotted ALOHA and variants, interference cancellation), extension of an existing simulation environment for analyzing the Random Access performance with interference cancellation in presence of coding, performing simulations of scenarios of interest, assessment and analysis of simulation result, written report.</p>
Inici	immediately
Durada	6-8 months
Requisits	Background (academic level) on communication systems, in particular random access techniques, coding, multiple access, programming knowledge and experience in C++, fluent spoken and written English, beneficial: Knowledge of discrete event simulation environments (OMNET++).
Nombre de places	1
Compensation	700-800€
Codi	D DLR Wess-3
Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Estimation techniques applied on Control Loops in Adaptive Optics for Laser Communications through the Atmosphere</p> <p>Optical free-space communication is strongly influenced by atmospheric turbulence, which induces signal fades but also distortions of the beam wave-front. The effect of wave front distortion can be mitigated by adaptive optics (AO) systems, as they are used in astronomy. These techniques traditionally involved sophisticated instruments (wave-front sensors, deformable mirrors) and therefore were very expensive. In the last years new methods have been developed which reduced cost and increased the reliability of these systems. This thesis or project is intended to investigate which kind of estimator is more suitable for controlling an AO system in order to mitigate atmospheric effects on optical free-space communications. The work includes theoretic investigations, Matlab simulations, and laboratory work to study the effects of atmospheric turbulence on optical communication with closed-loop AO system. This work especially targets the improvement of optical satellites downlinks through the atmosphere. Tasks: design of a suitable estimator for optical wave-front correction: theory and simulations, software development of the designed system, measurements in laboratory.</p>
Inici	immediately
Durada	6-8 months
Requisits	Basic background of communication systems, experience with estimation techniques, experience with software development (Matlab, C/C++), desirable some experience with optical/electronic devices, fluency in English.
Nombre de places	1
Compensation	700-800€
Codi	D DLR Wess-4
Data d'entrada	21.10.10
Tipus d'estada	PFC

Títol i Descripció	<p>Design techniques for low-floor turbo-like codes</p> <p>The candidate shall investigate techniques for the construction of low-error-floor iteratively decodable codes. In particular, for low-density parity-check codes, girth conditioning techniques shall be selected from literature review, and implemented. For turbo codes, suitable interleaver designs shall be investigated and implemented. Tasks: literature review for girth conditioning techniques and interleaver designs, implementation of the selected techniques, simulation of the performance of low-density parity-check and turbo codes constructed with the implemented techniques.</p>
Inici	immediately
Durada	6-8 months
Requisits	The candidate shall be enrolled in a MS degree program, and shall have attended a basic course on channel coding. Knowledge of basic algebra is required.
Nombre de places	1
Compensacion	700-800€
Codi	D DLR Wess-5
Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Efficient Decoding Algorithm for Reed-Solomon Codes on Erasure Channels</p> <p>The candidate shall investigate efficient decoding algorithms for Reed-Solomon (RS) codes on erasure channels. In particular, the candidate shall understand in depth existing (well-known) algorithms as the Berlekamp-Massey (BM) and the Euclid algorithms for RS decoding. Recent enhanced algorithms shall be analyzed as well. For a set of investigated algorithms, a software implementation of the decoder shall be developed. Tasks: literature review for efficient RS decoding algorithms, implementation of the selected algorithms, simulation of the performance on typical erasure channels.</p>
Inici	immediately
Durada	6-8 months
Requisits	The candidate shall be enrolled in a MS degree program, and shall have attended a basic course on channel coding. Knowledge of basic algebra is required.
Nombre de places	1
Compensacion	700-800€
Codi	D DLR Wess-6
Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Performance analysis and error floor estimation for codes based on sparse matrices for satellite Communications</p> <p>The candidate shall investigate techniques for estimating the performance of modern channel codes at low bit error rates. Tools for the error floor estimation have to be developed and tested on existing channel coding standards for deep-space communications. Tasks: literature review for error floor estimation techniques, implementation of tools, analysis of the performance of existing channel coding standards.</p>

Inici	immediately
Durada	6-8 months
Requisits	The candidate shall be enrolled in a MS degree program, and shall have attended a basic course on channel coding. Knowledge of basic algebra is required.
Nombre de places	1
Compensation	700-800€

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Swiss Federal Institute of Technology Lausanne (EPFL)

Swiss Federal Institute of Technology Lausanne (EPFL). Switzerland

Codi	CH EPFL Lau-1
Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Quantitative image analysis of damaged brains: study of acute stroke</p> <p>Stroke is a major cause of death and disability in both the more developed and the less developed world. Recent advances in Magnetic Resonance Imaging (MRI) offer unique advantages for the evaluation of cerebral acute strokes. Higher strength of magnetic field (1.5-3.0 T field strength) yielding better resolution of images and newer sequences of images have lead to widespread use of this technology in diagnosis and management of acute stroke. In this context, and in collaboration with Dr. Bogdan Draganski of the Laboratoire de Recherche en Neuroimagerie at the Lausanne University Hospital, we will investigate computer assisted image analysis methods that will allow an automatic segmentation of healthy brain tissues and damaged tissues due to stroke. Note that the precise segmentation of lesions is essential for the understanding of lesion-deficit mappings in human brain. MRI multimodal imaging data will be provided to take advantage of the different kinds of anatomical information provided by different imaging modalities. We will develop a robust framework for both tissue and lesion detection including tissue segmentation and a priori knowledge.</p>
Inici	February
Durada	6 months or more
Requisits	This project will be developed in Matlab and ITK (C++ environment). Basic knowledge in signal/image processing is required.
Nombre de places	1
Compensation	

Codi	CH EPFL Lau-2
Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Quantitative analysis and improvement of the accuracy of the StereoPod: the first miniature and highly accurate guide for neurosurgery</p> <p>In the last decades minimally invasive neurosurgery has undergone drastic changes. The apparition of Deep Brain Stimulation for the treatment of Parkinson's disease and essential tremors and the development of its possible uses for others therapies (Alzheimer, Epilepsy, depression and obesity) created new needs for the neurosurgeons in term of guidance systems that the current standards, the stereotactic frames do not cover. In this context, and in collaboration with Professor Jean-Philippe Thiran, professor of signal and image processing at EPFL, and with Dr. Claudio Pollo, senior neurosurgeon at the Lausanne University Hospital (CHUV), a new concept for stereotactic neurosurgery gathering software and hardware has been developed. The development of the device has given birth to a startup: StereoTools. The complete developed by StereoTools includes software to perform the detection of a localizer in an MR or CT Image, define the target and compute the parameters to reproduce with a calibration device the 3D position of the target in</p>

	reference to the frame. A full prototype has been developed and brought the proof of concept. Quantitative studies have been performed on plastic phantoms and cadavers; however additional experiments need to be performed and additional algorithms for the detection of the localizer need to be compared. A robust test bench will be developed to study the accuracy of the current algorithm for localizer detection and compare it with algorithms developed by the student.
Inici	February
Durada	6 months or more
Requisits	This project will be developed in ITK (C++ environment). Basic knowledge in signal/image processing is required.
Nombre de places	1
Compensation	
Codi	CH EPFL Lau-3
Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Multi-view Audio-Visual Speech Recognition</p> <p>During the last years a general framework for Audio Visual Automatic Speech Recognition has been developed. A practical deployment has not yet taken place because technology lacks robustness against non-ideal working conditions. Research has particularly neglected the variability of the visual modality subject to real scenarios, which is now object of some studies. As a particular exemple Audio-Visual Speech Recognition in a car provides a task where ideal conditions are not met and thus the feature extraction and audio-visual integration blocks of the system should be adapted. This project will focus modality fusion in multiple-view sequences, where several cameras provide multiple views of the speaker subject to different poses and lighting conditions. The aim of this project is to study how to combine the information of the multiple cameras into the speech classification system.</p>
Inici	February
Durada	6 months or more
Requisits	Good knowledge in signal/image processing is required, and in C/C++
Nombre de places	1
Compensation	
Codi	CH EPFL Lau-4
Data d'entrada	21.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Retrospective analysis of multimodal image registration in radiosurgery</p> <p>Radiosurgery is a sub-domain of neurosurgery where lesions like tumors are "removed" by very high intensity radiation beams. The Lausanne University Hospital has developed an expertise in using this technology for treating some types of tumors, with a device call the Gamma Knife. When planning an operation with this device, several 3D images of the patient's head are used, namely Magnetic Resonance (MRI) and Computed Tomography (CT). Their registration, i.e. their geometrical alignment and superimposition, is now based on the placement, on the head of the patient, of a heavy box, called a stereotactic frame, visible in both the MRI and C images, that serves as a landmark for aligning the images. In this project we want to study 3D MRI and CT image registration techniques that do not involve the frame, but use directly the content of the images for the registration. The accuracy of such a registration will be measured, and its influence on the radiation dose delivery to the target and to adjacent regions will be studied.</p>
Inici	February

Durada	6 months or more
Requisits	This project will be developed in ITK (C++ environment). Basic knowledge in signal/image processing is required
Nombre de places	1
Compensation	

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Nokia – Siemens

Nokia – Siemens. Munich. Alemanya

Codi	D NS Mu-1
Data d'entrada	22.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Nonlinear digital signal processing for high-speed next generation optical systems</p> <p>During the recovering of optical communication, digital signal processing (DSP) algorithms for optical receivers gained a considerable momentum. Currently, coherent optical receivers employing DSP algorithms are seen as a valid and cost-efficient substitute to compensate for linear transmission impairments. In a near future, optical systems will approach data rate of 1Tb/s, leading to a even more significant use of DSP algorithms to compensate for linear and nonlinear propagation effects. The task of the thesis is to investigate the reliability and effectiveness of nonlinear compensation DSP for single and multi-carrier polarization –multiplexing optical systems.</p>
Inici	As soon as possible
Durada	six months, if needed extendable to nine
Requisits	Knowledge in optical communications, in digital communication, of Matlab and English or German
Nombre de places	1
Compensation	~800€/month

Codi	D NS Mu-2
Data d'entrada	22.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Comparison of OFDM with single carrier in high-data rate optical communication systems</p> <p>Recent outburst in bandwidth hungry applications has led to intense research and development in the area of advanced modulation formats. The candidate for the future of fibre optical communication needs to be spectrally efficient and fibre impairment tolerant. Single carrier and multi-carrier (OFDM) transmission are both promising methods with their own pros and cons. However, a comparative and extensive study needs to be performed to clarify advantage and disadvantages of one method against the other. The objective of the project is to look into one of the deciding factors: the tolerance against nonlinearities. The task of the master thesis will be to investigate the performance of a high-speed single carrier and OFDM systems in realistic scenarios in presence of nonlinearities.</p>
Inici	As soon as possible
Durada	six months, if needed extendable to nine

Requisits	Knowledge in optical communications, in digital communication, of Matlab and English or German
Nombre de places	1
Compensation	~800€/month
Codi	D NS Mu-3
Data d'entrada	22.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Performance estimation of CP-QPSK modulated signals by modelling the phase variations</p> <p>Next high-data rate optical communication systems will operate over fully meshed networks at different data-rates and by employing several kinds of modulation formats. Within this realistic scenario, the degradation introduced by fibre propagation nonlinearities is one of the strongest limitations to the performance of long-haul systems. The goal of the thesis is to investigate and model the behaviour of phase variance for the aforementioned optical systems. From these results simple modelling rules should be derived, so that the performance of different transmission scenarios can be calculated.</p>
Inici	As soon as possible
Durada	six months, if needed extendable to nine
Requisits	Knowledge in optical communications, in digital communication, of Matlab and English or German
Nombre de places	1
Compensation	~800€/month

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Philips Electronic Modules, Solid State Lighting

Philips Electronic Modules, Solid State Lighting. Aachen. Germany

Codi	D PHILIPS Aac_1
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Pulse driver for simple addressing of a high number of LEDs (The result of this project shall be kept confidential)</p> <p>With increasing efficiency and decreasing cost of solid state light sources (LED, OLED), their usage will extend into applications with a high number of light points, needing some individual control to result in a flexible light distribution. For LED displays (i.e. video walls) there are control methods and hardware available, but they focus on precise control of each single LED. The number of driver channels and the wiring effort (the number of required cables and connection within a complete system) is quite high, rendering these solutions not suitable for flexible general illumination light sources, where the "pixel accurate" addressing is not required. There are ideas and demonstrators resulting in a dramatic reduction of the number of driver channels and wiring while maintaining sufficient flexibility in light distribution. However, this kind of control requires new drivers and new interconnect media for efficient and cost effective application. Subject of this diploma thesis would be to do a literature study, get familiar with high frequency (RF) power amplifiers, extend the existing simulation model to enable efficiency evaluation, develop efficient driver topologies and finally realize a part of the circuit in a demonstrator to prove the expected improvement.</p>
Inici	Begin 2011
Durada	6 months

Requisits	Sound knowledge in power electronics, control and electrical simulation (Spice). Preferred: practical experience on building and measuring circuits, knowledge on high frequency (RF) amps and circuits, creativity, high motivation and good English skills.
Nombre de places	1
Compensation	
Codi	D PHILIPS Aac_2
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Advanced LED Drivers</p> <p>The world is in the early stages of what is considered the third industrial revolution as we face the need of stabilizing the climate change. This fundamental industrial transformation is led by a host of clean technologies with the prospect to enable more sustainable ecosystems.</p> <p>Solid state lighting technologies are among the most prominent innovations influencing the way in which we improve our future by reducing energy consumption. So much so that the current 20% of the world's electricity consumed by lighting can potentially be reduced to 4% with the full-scale adoption of LEDs (Light-Emitting Diodes). Philips is underlining its global leadership in sustainable lighting by substantially broadening its portfolio of LED-based lighting solutions. Such lighting revolution is quickly developing and aggressively penetrating the markets, thereby calling for a rapid adoption involving challenges associated to the compatibility of LED light sources with the existing lighting infrastructures. In this context, LED replacement light bulbs must be compatible with the way in which actual solutions are powered today. Consequently, researchers are facing the demands to cope with cost-effective power management solutions to convert the form of the mains energy into the form required by the LED load while being compliant with mains regulations such as high power factor, low harmonic distortion and reduced electromagnetic interference. Added to this complexity, solutions are required to be extremely size limited, efficient, reliable and dimmable with conventional phase-cut dimmers. The Philips research group Solid State Lighting is searching for graduate and undergraduate students willing to contribute to this exciting lighting revolution. During a minimum period of six months, the student/s will work in a high tech industry facility together with a professional research team of electrical engineers. Related to this large research program, students may choose among the following specific topics: 1. Converter topology study: The student/s will closely work with the research team to fundamentally analyze a number of novel converter topologies suitable for offline drivers. 2. Converter control: The student/s will test a number of control strategies applied to novel converter topologies targeting a particular lighting application. 3. Dimmer compatibility: A fundamental understanding of phase-cut dimmers will be carried out by the student/s in order to identify the best solution candidates from a number of basic driver architectures. 4. Computer assisted hardware platform for converter prototyping: A computer aided reconfigurable power stage will be built and control with a software interface to automate the task of testing and characterizing novel converter topologies.</p>
Inici	As soon as possible
Durada	Minimum duration of any selected topic: 6 months
Requisits	Topic 1: Good knowledge in power electronics, circuit theory and circuit simulation tools are essential. Practical skills to measure and to set up circuits are optional. Topic 2: Good knowledge in control and circuit theory and related simulation tools are essential. Practical skills to measure and to set up circuits are optional. Topic 3: Good knowledge in circuit theory and practical skills to measure and set up circuits tools are essential. Topic 4: Practical skills to measure and set up computer controlled circuits are essential. Basic knowledge in power electronics is optional. For all candidates, high motivation, team work and good English (written and spoken) are prerequisites.
Nombre de places	1
Compensation	
Codi	D PHILIPS Aac_3
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Dynamic measurement of skin temperature (The result of this project shall be kept confidential)</p> <p>Both contact and non-contact methods of measuring the temperature of the human skin are well known. However, there are challenges regarding the use of small-sized sensors for dynamic measurements. Subject of this project would be to do a literature study, get familiar with temperature sensor characteristics, develop simulation models of dynamic skin temperature measurement systems, design, realize, and evaluate a demonstrator.</p>
Inici	Begin 2011
Durada	6 months

Requisits	Sound knowledge in measurement techniques. Preferred: practical experience with either LabVIEW or Atmel AVR microcontrollers. Good English skills.
Nombre de places	1
Compensation	

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Trident Microsystems

Trident Microsystems. Eindhoven. The Netherlands

Codi	NL Trident Ein_1
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Automatic detection of homemade videos</p> <p>The amount of video processing in television sets keeps increasing. One of the possible future features is automatic camera stabilization. This feature is intended to make home-made videos more stable. It should not be applied to professionally shot material, such as Hollywood movies, where the camera shaking is an intended effect. This assignment focuses on the automated detection of homemade versus professional video. The goal is to use relatively simple measures to distinguish between the two. The measures can for example be based on estimated motion, histogram analysis or a film grain detector. Since a single measure will not be reliable, a structured way of combining them is needed. For this assignment both the measures and the classification will have to be implemented in either C or Matlab.</p>
Inici	Curs 2010/2011
Durada	6-9 months
Requisits	The student must be familiar with signal processing. Knowledge of classification algorithms is a pre. The student should also be familiar with programming in either C or MatLab.
Nombre de places	1
Compensation	

Codi	NL Trident Ein_2
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Subtitle removal for camera stabilization</p> <p>The amount of video processing in television sets keeps increasing. One of the possible future features is automatic camera stabilization. This feature is intended to make home-made videos more stable. Even these home-made movies sometimes have subtitles or logos. The goal of this assignment is to stabilize the video, while keeping the subtitles at a fixed position. This assignment focuses on the final pixel processing. A motion estimator and subtitle detector will be provided; the problem lies in keeping the subtitles at a fixed position, while stabilizing the rest of the video. Since this requires shifting the subtitles relative to the video, naïve processing will cause 'holes' in the video. At these places image data has to be painted-in. While in-painting is a well researched topic, most of the algorithms are too expensive to use in a television set. Although optimizing the code is not required, the number of operations and memory accesses should be considered when designing the algorithm.</p>
Inici	Curs 2010/2011
Durada	6-9 months

Requisits	The student must be familiar with signal processing, with image processing in particular. The student should also be familiar with programming in either C or MatLab.
Nombre de places	1
Compensation	
Codi	NL Trident Ein_3
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>3D TV Gesture Interaction</p> <p>A modern TV set is equipped with a strong general purpose processor, graphic processor and a part dedicated to video processing. With the 3D displaying capabilities, wireless internet connection, camera and other sensors, TV might soon become the center of the home human-media interaction. This assignment focuses on the final pixel processing. A motion estimator and subtitle detector will be provided; the problem lies in keeping the subtitles at a fixed position, while stabilizing the rest of the video. Since this requires shifting the subtitles relative to the video, naïve processing will cause 'holes' in the video. At these places image data has to be painted-in. While in-painting is a well researched topic, most of the algorithms are too expensive to use in a television set. Although optimizing the code is not required, the number of operations and memory accesses should be considered when designing the algorithm</p>
Inici	Curs 2010/2011
Durada	6-9 months
Requisits	Programming skills (C/C++), eager to explore and set-up own experiments, followed courses related to pattern recognition or image processing
Nombre de places	1
Compensation	
Codi	NL Trident Ein_4
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Learning methods for picture quality enhancement</p> <p>Various levels of quality and various formats of video material are available. Increasing the quality of the video is important especially if they are displayed on a high definition LCD screen. Supervised learning techniques can be used to automatically learn optimal image enhancement algorithm parameters. A high definition video is used as the desired output of the system and a low quality video is generated from the high definition video by simulating camera blur, sub-sampling, interlaced data, etc. Machine learning algorithms can be applied to estimate the parameters that will give result as close as possible to the desired high-definition video. The goal of the project is building a database of training videos for various image enhancement problems. Furthermore designing and testing a number of supervised learning algorithms for learning parameters of various image enhancement algorithms should be performed.</p>
Inici	Curs 2010/2011
Durada	6-9 months
Requisits	Programming skills (C/C++), eager to explore and set-up own experiments, followed courses related to pattern recognition or image processing
Nombre de places	1

Compensation	
Codi	NL Trident Ein_5
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>3D TV: 2D to 3D conversion</p> <p>Aim: develop new methods for 2D to depth (3D conversion) Approach: literature survey of existing techniques and develop one new technique for depth generation. Multiple persons can work in this topic to explore multiple methods. Minimal goal, survey and one new technique for depth generation, maximum goal. Also, integration of the technique with our own techniques</p>
Inici	Curs 2010/2011
Durada	9 months
Requisits	Good mathematical skills, affinity with video processing, student with hands-on, programming skills.
Nombre de places	1 or more
Compensation	
Codi	NL Trident Ein_6
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>3D TV: Depth control for 3D stereo</p> <p>Aim: robust method for depth control for stereo 3D Approach: use motion/disparity estimation techniques to get disparity information and further create new two stereo 3D views (left and right) with changed disparity. Note this is a complex topic where we can absorb two students, one on estimation side and one on generation of stereo views based on estimates. Minimal goal, generation of stable disparity estimates, maximum goal, robustness for all different kind of content.</p>
Inici	Curs 2010/2011
Durada	9 months
Requisits	Good mathematical skills, affinity with video processing, student with hands-on, programming skills.
Nombre de places	1-2
Compensation	
Codi	NL Trident Ein_7
Data d'entrada	25.10.10

Tipus d'estada	PFC
Títol i Descripció	<p>3D TV: UI on stereo 3D video</p> <p>Aim: UI on stereo 3D video Approach: use motion/disparity estimation techniques that can reliably determine maximum disparity at low cost. Smaller scale processing can be used. Apply this to positioning the UIs on stereo 3D. Minimal goal, low cost method with moderate reliability of results, with real-time implementation for positioning UI on stereo 3D, maximum goal, develop new method to show UIs on stereo 3D video requires.</p>
Inici	Curs 2010/2011
Durada	9 months
Requisits	Good mathematical skills, affinity with video processing, student with hands-on, programming skills, flexible to also program for embedded programmable processors like TriMedia.
Nombre de places	1
Compensation	

Codi	NL Trident Ein_8
Data d'entrada	25.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>3D TV: depth/disparity tolerance</p> <p>Aim: depth/disparity variation tolerance for humans for stereo 3D content Approach: develop sequences with depth variation and observe how much can our brain absorbs before it becomes annoying. Minimal goal depth/disparity variation tolerance limits for humans. Maximum goal, classification of tolerance limits based on various kind of contents (too many objects, very few objects, with/without motion).</p>
Inici	Curs 2010/2011
Durada	9 months
Requisits	Affinity with video processing, student with hands-on, programming skills
Nombre de places	1
Compensation	

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Thales

Thales. Netherlands

Codi	NL Thales Hui_1
Data d'entrada	26.10.10
Tipus d'estada	PFC

Títol i Descripció	<p>Real-time application performance in mobile (ad-hoc) networking nodes (Simulation study)</p> <p>Vehicle communication systems have shifted from in-vehicle intercom systems towards IP-based multi-media networking nodes that connect a number of vehicles to exchange information. Initially, analog radios (networks) were used to deliver inter-vehicle voice services. Contemporary systems, however, rely on IP-based networks to transport voice and data services in a network topology that may change over time; vehicles may join or leave the network without any fixed infrastructure and the link quality may vary over time. These dynamics pose many challenges to the in-vehicle networking nodes with regard to routing, discovery, self-configuration and Quality of Service. The goal of this assignment is to (1) create a network simulation model (in OPNET Modeler) of the in-vehicle networking node, and (2) to evaluate the performance of a set of real-time applications (most notably VoIP-related) in a network consisting of several mobile networking nodes.</p>
Inici	January 2011
Durada	8 months
Requisits	Programming in C/C++, Simulation, Communication Networks, (OPNET if possible)
Nombre de places	1
Compensation	€500 per month for master thesis students plus a compensation for the accommodation of €250.
Codi	NL Thales Hui_2
Data d'entrada	26.10.10
Tipus d'estada	PFC
Títol i Descripció	<p>Disruption Tolerant Networking</p> <p>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 susceptible 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.</p>
Inici	January 2011
Durada	8 months
Requisits	Programming in C/C++, Linux, TCP, IP, Communication Networks.
Nombre de places	1
Compensation	€500 per month for master thesis students plus a compensation for the accommodation of €250.