

## Empreses on pots fer el PFC

### Empreses i Institucions que ofereixen projectes a l'ETSETB i que gestiona l'escola Última actualització: 18 Novembre 2005

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.

PHILLIPS

DLR

TILAB

NEC

ACCENTURE

EPFL

## PHILLIPS

### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-6
Data d'entrada	09/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 2: RF interference detection with IEEE 802.15.4 transceiver</b></p> <p>The objective of the project is to develop concepts for enabling a IEEE 802.15.4-based wireless sensor operating in the 2.4 GHz ISM band to detect and identify other RF systems (e.g. Bluetooth, IEEE 802.11, ZigBee, microwave oven) in range. This information is used for logging of detected sources of RF interference and taking actions such as changing the radio channel to get out of the way of the interference. The developed concept should be realized by software running on an microcontroller and utilizing an IEEE 802.15.4 transceiver (such as the Chipcon CC2420).</p>
Durada	<p>Duration of the stay (diploma thesis involve preferable around 6 months of work): 6 months Starting time: March 2006 (or later) Finishing time: September 2006 (or later)</p>
Requisits	<ul style="list-style-type: none"> <li>- Languages: Fluent English in speaking and writing, German (optional)</li> <li>- Good knowledge and practical skills in C-programming</li> <li>- Experience in programming resource-constrained systems (e.g. programming of Atmel microcontroller in C, AVR studio)</li> <li>- Excellent knowledge in wireless communication technologies (e.g. IEEE 802.11, IEEE 802.15.4, Bluetooth, ZigBee).</li> <li>- Interest in distributed systems, wireless ad-hoc networking, embedded systems.</li> </ul>
Nombre de places	1

### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-7
Data de l'entrada	09/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 3: Congestion Control in Vehicular Networks</b></p> <p>Vehicular area networks (VANET) are collections of autonomous devices operating either as a mobile on-board unit (OBU) or as a static roadside unit (RSU). These devices are generally comprised of wireless transceivers, microcontrollers, sensors and actuators that enable the exchange of information between moving vehicles or infrastructure access points and the implementation of a wide range of services.</p> <p>Future vehicular networks are envisioned to support infotainment as well as applications designed to improve road safety. Allowing these services to share the same transmission medium will require mechanisms and policies to prioritize traffic and handle channel overload situations. This thesis aims at designing and evaluating the effectiveness of congestion control mechanisms for vehicular networks running multiple parallel applications. Initially, a distributed prioritization scheme will be defined which dynamically assigns bandwidth according to the relevance and needs of each application. This scheme will later be used to trigger countermeasures in low priority applications that are denied access to their requested bandwidth. The effectiveness of the resulting mechanisms will then be evaluated through simulations.</p>

Durada	Duration of the stay (diploma thesis involve preferable around 6 months of work): 6 months Starting time: March 2006 (or later) Finishing time: September 2006 (or later)
Requisits	<ul style="list-style-type: none"> <li>- Languages: Fluent English in speaking and writing, German (optional)</li> <li>- Good programming (C, C++) and documentation skills.</li> <li>- Software version management (CVS).</li> <li>- Communication networks protocols.</li> <li>- Experience with at least one network simulation environment (WARP2, ns-2, OPNET...).</li> <li>- Previous knowledge of SDL desirable but not required.</li> </ul>
Nombre de places	1

#### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-8
Data de l'entrada	09/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 4: Network Layer Support Service for Vehicular Networks</b></p> <p>Vehicle communications enable new information, entertainment and commercial applications for the comfort of drivers and passengers. These will allow the integration of vehicles to the Internet or home-network for content download (music, e-mail synchronization), extension of wireless payment systems capabilities and the exchange of data, voice or video between vehicles.</p> <p>Given the wide range of applications to be supported, a major consideration in the design of a communication subsystem for vehicular networks is the ability to efficiently accommodate their differences.</p> <p>This thesis aims at designing and implementing a network layer support service encompassing abstractions to simplify the integration of multiple dissemination protocols and their policies in the communication stack of a vehicular network. In order to achieve this goal, the initial step consists in identifying the key abstractions to be embedded into the support service. A specification of their functionality will then be described in SDL and integrated within our communication stack for vehicular networks. As a proof of concept, different dissemination protocols and policies will be implemented on top of the network support layer and their functionality evaluated through simulations. The final step will involve the integration of the service in a real demonstrator.</p>
Durada	Duration of the stay (diploma thesis involve preferable around 6 months of work): 6 months Starting time: March 2006 (or later) Finishing time: September 2006 (or later)
Requisits	<ul style="list-style-type: none"> <li>- Languages: Fluent English in speaking and writing, German (optional)</li> <li>- Good programming (C, C++) and documentation skills.</li> <li>- Software version management (CVS).</li> <li>- Communication networks protocols.</li> <li>- Experience with at least one network simulation environment (WARP2, ns-2, OPNET,...).</li> <li>- Previous knowledge of SDL desirable but not required.</li> </ul>
Nombre de places	1

#### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-9
Data de l'entrada	09/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 5: Clustering in Vehicular Networks</b></p> <p>Communication between vehicles and roadside units enabled by Vehicular Networks can improve the driving experience with many positive outcomes. Services intended to increase safety in the roads are likely the most notable use of this technology. Since the messages disseminated are meant to avoid collisions by notifying other road participants about potentially dangerous situations, the exchange of information has to be fast and reliable. Reliability however is compromised if the communication channel is saturated with nodes trying to broadcast the same information. A solution to solve this problem consists in the use of application dependent clusters where the cluster-heads manage all the relevant information thus reducing communication traffic and consequently improving reaction time.</p> <p>This thesis aims at studying clustering mechanism in the context of a highly dynamic environment. Having as starting point a warning application, clustering algorithms will be studied to guarantee reliable and fast message dissemination. Algorithms will be implemented in SDL and tested in our mobile ad-hoc simulator.</p>
Durada	Duration of the stay (diploma thesis involve preferable around 6 months of work): 6 months Starting time: March 2006 (or later) Finishing time: September 2006 (or later)

Requisits	<ul style="list-style-type: none"> <li>- Languages: Fluent English in speaking and writing, German (optional)</li> <li>- Analytical thinking.</li> <li>- Good programming (C, C++) and documentation skills.</li> <li>- Software version management (CVS).</li> <li>- Strong background in ad-hoc networking.</li> <li>- Helpful: network simulation using OPNET, ns2, or SDL.</li> </ul>
Nombre de places	1

#### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-10
Data d'entrada	09/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 6: Time Synchronization in Vehicular Networks</b></p> <p>Vehicular area networks (VANET) are collections of autonomous devices operating either as a mobile on-board unit (OBU) or as a static roadside unit (RSU). These devices are generally comprised of wireless transceivers, microcontrollers, sensors and actuators which enable the exchange of information between moving vehicles or infra-structure access points and the implementation of a wide range of services.</p> <p>This thesis aims at studying, implementing and evaluating a solution for distributed synchronization of the nodes in a vehicular network. Synchronization is primarily used to enable reliable operation of the mobile nodes in multiple channels; other purposes include MAC enhancement and resources optimization. The main challenges is to implement a solution that is compatible with the requirements of our inter-vehicles communication scenario:</p> <ul style="list-style-type: none"> <li>- Able to handle high mobility.</li> <li>- Suitable to operate in multiple channels and under Dynamic Frequency Selection.</li> <li>- Able to switch automatically between from distributed mode to master mode when a fixed roadside master unit is detected.</li> </ul> <p>Algorithms will be implemented in SDL specification language and tested in our mobile ad-hoc network simulator. This work is part of the large European Integrated project PREVENT.</p>
Durada	<p>Duration of the stay (diploma thesis involve preferable around 6 months of work): 6 months Starting time: March 2006 (or later) Finishing time: September 2006 (or later)</p>
Requisits	<ul style="list-style-type: none"> <li>- Languages: Fluent English in speaking and writing, German (optional)</li> <li>- Analytical thinking.</li> <li>- Good programming (C, C++) and documentation skills.</li> <li>- Software version management (CVS).</li> <li>- Strong background in ad-hoc networking.</li> <li>- Helpful: network simulation using OPNET, ns2, or SDL.</li> </ul>
Nombre de places	1

#### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-11
Data d'entrada	09/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 7: Body-coupled communication for Near-field Communication</b></p> <p>Body-coupled communication is a new short-range communication technology for personalized, automatic, safe communication, intuitive interaction, as well as for automatic identification systems. It is enabled by our Active Digital Aura technology, where the human body provides the communication channel.</p> <p>Near-field communication (NFC) is another new technology for short-range communication, which is currently being standardized.</p> <p>While Active Digital Aura is based on body-coupled communication, NFC bases on short-range communication between devices, e.g. mobile phones. NFC is used for short-term information exchange and transactions, like E-ticketing or 'smart posters'.</p> <p>We are aiming now at a new solution that combines Active Digital Aura and NFC in one and the same system, which will enable improvement of existing applications as well as various new applications.</p> <p>The master thesis project will realize the communication protocols being required for the combination of Active Digital Aura and NFC. The work will base on our new integrated hardware solution. Main task of this master thesis is to identify, specify and develop the different higher-layer protocols and services for an NFC-compatible dual-mode protocol stack. Feasibility and performance of the new protocols will be evaluated by identifying, realizing and measuring a new application that deploys both communication technologies.</p> <p>Objectives: Analysis of NFC protocol stack, Specification of higher-level NFC protocol extensions that support Body-coupled communication, Design and implementation of an NFC protocol stack for Body-coupled, communication, Develop test scenarios for system evaluation, Build demonstrator showing the developed concepts at one application.</p>

Durada	Duration of the stay (diploma thesis involve preferable around 6 months of work): 6 months Starting time: March 2006 (or later) Finishing time: September 2006 (or later)
Requisits	<ul style="list-style-type: none"> <li>- Languages: Fluent English in speaking and writing, German (optional)</li> <li>- Background in wireless networking and communication protocols.</li> <li>- Interest in mobile distributed systems.</li> <li>- Experience in programming in C/C++.</li> <li>- Initiative and analytical skills.</li> </ul>
Nombre de places	1

#### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-12
Data d'entrada	09/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 8: Security Management for medical wireless Body Sensor Networks</b></p> <p>Smart medical wireless body sensor networks (BSNs) will be deployed in hospitals for patient monitoring and care. In this context, security is paramount for the correct functioning of the BSN and for the privacy and safety of patients. For instance, the encryption of wireless messages exchanged by sensors protects patient privacy. In Philips PFL-Aachen we have developed medical BSNs enabled by ZigBee wireless technology. Medical sensors are attached to a patient for vital sign monitoring. Sensor readings can be displayed by a portable bedside monitor or by a clinician's PDA. However, ZigBee does not provide an appropriate security support. Medical BSNs are dynamic ad-hoc networks of very constrained devices. These characteristics impose new challenges on BSN security design, requiring computationally efficient cryptography as well as a suitable key management scheme. We have solved the efficient cryptography by a new key creation solution called DPKPS. Next step to take is key management, a keystone in security, which provides and manages the basic cryptographic keys and security material in a very secure yet efficient manner. This project aims at realizing key management protocols for medical ZigBee BSNs.</p> <p>The task of the master thesis is to develop a protocol suite, covering secure and efficient key distribution, key establishment and key revocation adapting to the needs of BSNs in the medical domain.</p> <p>Objectives: Requirements analysis on key management for medical BSNs, Design and implementation of a key management infrastructure for BSNs, Evaluation of key management infrastructure, Build demonstrator showing the developed concepts.</p>
Durada	Duration of the stay (diploma thesis involve preferable around 6 months of work): 6 months Starting time: March 2006 (or later) Finishing time: September 2006 (or later)
Requisits	<ul style="list-style-type: none"> <li>- Languages: Fluent English in speaking and writing, German (optional)</li> <li>- Background in wireless networking and communication protocols.</li> <li>- Interest in computer- and network security, mobile distributed systems and medical applications.</li> <li>- Experience in programming, at least in one of Java, C++, C#.</li> <li>- Initiative and analytical skills.</li> </ul>
Nombre de places	1

#### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-13
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Colour control of a multiple primary LED lamp</b></p> <p>The light of coloured light emitting diodes (LEDs) can be mixed to provide light sources with adjustable colour, including both saturated colours and white. Mixing three primary colours, usually red, green and blue, allows addressing a large colour space. For illumination mixing the light of more than three primary colours is of interest in order to improve colour rendering.</p> <p>In this project, a dSPACE rapid control prototyping system currently used to control LED lamps mixing the light of three primary colours shall be extended to control LED lamps with a larger number of primary colours. Control algorithms have to be implemented in the MATLAB / Simulink / dSPACE environment. Driver and sensor boards have to be modified to cope with the larger number of primaries.</p>
Durada	Duration: 6 months. Starting time: As soon as possible.
Requisits	<ul style="list-style-type: none"> <li>- Basic knowledge in control, power electronics and sensors.</li> <li>- Familiar with MATLAB and Simulink.</li> <li>- Practical skills to measure and to set up circuits.</li> <li>- High motivation and good English skills.</li> </ul>
Nombre de places	1

**PHILLIPS (Alemania-Aachen)**

Codi	D PHILIPS Aac-14
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>Oscillations in high current automotive circuits</b></p> <p>In modern automobiles, high current power electronics drive functions like electric braking, electric power steering, or active suspension systems. This leads to high current (e.g.400A/12V) switch-mode inverters that employ Power MOSFET switches.</p> <p>Philips Semiconductors is a supplier for state-of-the-art TrenchMOS transistors for the automotive industry. To achieve very high current capability, one preferred option is to connect several MOSFETs in parallel, in order to share the load current. However, a system of parallel connected MOSFETs can show a tendency to build up parasitic oscillations.</p> <p>Subject of this diploma thesis would be to do a literature study, to simulate a few applications, to characterise MOSFETs, and to measure the inclination to oscillations in a laboratory set-up. The aim is to identify and assess the parameters that support or suppress these parasitic oscillations. Final goal is to derive design guidelines for oscillation-free applications.</p>
Durada	Duration: 6 months. Starting time: As soon as possible.
Requisits	The student needs to have good knowledge in electronics and circuit theory. Practical skills to measure and to set up circuits are required. He/she should be familiar with a circuit simulation tool like PSpice. High motivation and good English are prerequisites.
Nombre de places	1

**PHILLIPS (Alemania-Aachen)**

Codi	D PHILIPS Aac-15
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>Loss calculation tool for power MOSFETs in PoL and VRM applications</b></p> <p>Modern advanced digital circuits require high currents at low voltages within narrow time limits. They typically have a dedicated power supply in their proximity, called "Point of Load Converter" (PoL) or "Voltage Regulator Module" (VRM). These consist nowadays of a synchronous buck converter that employs power MOSFETs to most efficiently realise the step-down conversion from, typically, 12 to 1 volts. Great efforts have been put into the design of high-performance MOSFET switches in order to cope with the stringent demands of future microprocessors and space constraints. An in-depth analysis of the converter power loss as well as the mechanisms that produce it is a crucial task to identify potential improvement options for the device technology.</p> <p>Philips Semiconductors is a supplier for state-of-the-art TrenchMOS transistors for these applications. The Philips Research Lab in Aachen has intensive knowledge of those circuits and systems.</p> <p>Subject of this diploma thesis will be to develop a loss calculation tool that allows to assess the performance of a MOSFET technology in the aforementioned circuit topology. This includes the theoretical description of the converter, including its parasitics, PSpice simulations, and, depending on progress, laboratory prototyping with experimental characterisation.</p>
Durada	Duration: 6 months. Starting time: As soon as possible.
Requisits	The student needs to have good knowledge in power electronics and circuit theory. He/she should be familiar with a circuit simulation tool like PSpice and interested in laboratory work. High motivation and good English are prerequisites.
Nombre de places	1

**PHILLIPS (Alemania-Aachen)**

Codi	D PHILIPS Aac-16
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>Design tool for high current automotive circuits</b></p> <p>In modern automobiles, high current power electronics will drive functions like electric braking, electric power steering, or active suspension systems. This leads to high current (e.g.400A/12V) switch-mode inverters that employ Power MOSFET switches.</p> <p>Philips Semiconductors is a supplier for state-of-the-art TrenchMOS transistors for the automotive industry. To achieve the required current capability, one preferred option is to connect several MOSFETs in parallel, in order to share the load current. Resulting systems of parallel connected MOSFETs are typically very rich in parameters regarding all involved electrical and</p>

	<p>thermal characteristics and tolerances. However, for a range of applications approximations can be found that describe the system at a sufficient level of accuracy.</p> <p>Subject of this diploma thesis is to develop a programme that combines those sort of approximations, which are given in terms of several systems of equations. The programme may assist a typical user in identifying the worst case configuration for his application and to ensure reliability at minimum expenses.</p>
Durada	Duration: 6 months. Starting time: As soon as possible.
Requisits	The student needs to have good knowledge in electronics and mathematics. He/she should be familiar with up to date programming tools (Visual Basic, Java). High motivation and good English skills are prerequisites.
Nombre de places	1

#### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-17
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>Evaluation of different LED drivers</b></p> <p>Large-volume application of high-brightness LEDs is well established for signalling and signage. They are expected to replace conventional lamps in automotive applications in the near future and incandescent, halogen and fluorescent lamps at least in some general illumination applications within a few years.</p> <p>For driving high brightness LEDs current rather than voltage sources are usually required which are implemented with many different topologies (e.g. buck converters, boost converters, Cuk converters, Sepic converters, ...), resulting in instantaneous LED currents of various shapes (triangular currents, dc currents, pulsed currents, ...).</p> <p>In this project a couple of drivers with different topologies should be built, optimised for driving a 3W LED, and the impact of the current shape on the light output of the LED be analysed using an already existing test setup.</p>
Durada	Duration: 6 months. Starting time: As soon as possible.
Requisits	<ul style="list-style-type: none"> <li>- Knowledge of power electronics (MOS and bipolar transistors, topologies, dc-dc power conversion).</li> <li>- Hardware experience (analog electronic circuits, power electronics).</li> <li>- Experience in software programming (preferably, but not necessarily LabVIEW).</li> </ul>
Nombre de places	1

#### PHILLIPS (Alemania-Aachen)

Codi	D PHILIPS Aac-18
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 9: Wireless sensor networks for Health- and safety- monitoring</b></p> <p>* Background: Personal Healthcare (PHC) is of growing importance. Applications like home health and activity monitoring increase quality of care. People can stay at home with risks that today require to be in assisted care facilities..</p> <p>* Project: This project will develop a system for dynamic multiparameter health and activity monitoring. The planned system is capable to collect measurements from heterogeneous sensors of a wireless sensor network. Sensors can be in the environment (e.g. to measure activities) as well as at the body (e.g. to measure heart-rate). The system automatically optimizes the usage of the available sensors in order to achieve best measurement results, as well as to achieve a minimal power consumption for the sensors. Finally, the system detects and stores the context in which each measurement was done (e.g. who used the sensor, where and when was the measurement done). The user gets feedback from the system via a mobile device.</p> <p>* Objective: The objective of the master thesis is to develop sensor network interaction protocols and context management for such an intelligent home monitoring system. The results will be applied for a concrete personal healthcare scenario, e.g. automatic fall detection.</p>
Durada	Duration: 6 months. Starting time: February/march 2006.
Requisits	<ul style="list-style-type: none"> <li>- Background in wireless networking and communication protocols.</li> <li>- Interest in mobile distributed systems and medical applications.</li> <li>- Experience in programming, at least in one of C, C##, Java.</li> <li>- Fluent English in speaking and writing.</li> </ul>
Nombre de places	1

## PHILLIPS (Alemania-Aachen)

Codi	D PHILLIPS Aac-19
Data d'entrada	18/11/05
Tipus d'estada	PFC
Descripció	<p><b>PROJECT 10: Performance of wireless network for light management systems</b></p> <p>* Background: New types of light sources (SolidStateLighting, halogen, fluorescent) – cannot only be switched ON and OFF, they also permit to adjust additional parameters like colour, directivity and intensity. As a result, the role of light in human life shifts from mainly functional towards enrichment by beautification, accenting and ambience providing.</p> <p>Miniaturized light sources, such as LEDs – equipped with controllers – can be put anywhere and harmonized to create a certain atmosphere. To achieve this, each light source must be equipped with a – at best wireless – communication interface, to create a network over which the light effects can be smartly managed.</p> <p>* Objective: The goal of this master thesis is to investigate to what extent wireless technologies (based on 802.15.4) are up to the task of delivering the control messages to the lamps reliably and timely.</p>
Durada	Duration: 6 months. Starting time: February/march 2006.
Requisits	<p>* Required skills:</p> <ul style="list-style-type: none"><li>- Knowledge on wireless communications, Wireless LAN (WLAN) is good, WPAN even better.</li><li>- Knowledge on network protocol stacks, network layer tasks (routing, addressing, device discovery etc.) and network dynamics (configuration, changing operating conditions etc.).</li><li>- Ability to analyse standards.</li><li>- Ability to develop new concepts.</li><li>- Experience with ns-2 highly recommended; with other network simulation tools may be of help.</li><li>- Experience with SW programming (C, C++).</li><li>- Experience with graphical software tools (e.g. gnuplot) would be nice.</li><li>- A little bit of HW experience.</li></ul>
Nombre de places	1

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## DLR

### DLR (Alemania-Munich)

Codi	D DLR Mun-11
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>Modelling of Interference between Terrestrial UMTS Systems and UMTS Pico-cells On-board Aircraft</b></p> <p>The work will be part of a DLR study for Airbus GmbH, whose primary goal is to achieve maximum availability of wireless services for passengers during flight without harmful interference on ground systems. A major goal is thereby to model the mutual aircraft to ground interference, with focus to 3G Systems.</p> <p>The student work will mainly consist in:</p> <ul style="list-style-type: none"><li>- Processing measurement data already available to extract statistics of the power flux radiated from an aircraft and derive from it a simplified model.</li><li>- Studying the aircraft-to-ground propagation channel, considering multipath effects due to ground reflections.</li><li>- Studying the far field effects of a radiating cable.</li></ul>
Durada	Duration: 6 months. Starting time: Mid January 2006
Requisits	<ul style="list-style-type: none"><li>- Background in UMTS and WCDMA access techniques.</li><li>- Knowledge/Background in propagation.</li><li>- Fluency in English.</li><li>- Knowledge of Matlab is helpful.</li></ul>
Nombre de places	1

[inici de pàgina](#)

## TILAB

### TILAB (Itàlia-Torino)

Codi	I TILAB Tor-1
Data d'entrada	28/02/05
Tipus d'entrada	PFC
Descripció	<p><b>Implementing Service Delivery Platforms via Web Services</b></p> <p>One of the cornerstones of Web services interoperability is the SOAP (Simple Object Access Protocol). SOAP is essentially a way of performing a synchronous RPC (Remote Procedure Call) across the Internet over an HTTP connection. However, performing a synchronous operation across multiple processes is an all-or-nothing proposition. In contrast, asynchronous messaging allows each communication operation between two processes to be a self-contained, standalone unit of work. The process initiating the original request need only be concerned with initiating the "request", knowing that it will eventually receive a "response" asynchronously.</p> <p>Such asynchronous behavior is particularly relevant when using Web Services to abstract and control Telco resources.</p> <p><i>Macro-Objective:</i></p> <p>The macro objective of the work proposed is to analyse different solutions/emerging standards for asynchronous Web Services and to implement a prototype Web Service (based on a chosen standard) that allows the asynchronous control of a Telco resource.</p>
Durada	The assignment will take between eight to nine months
Requisits	<p>Main Skills:</p> <ul style="list-style-type: none"> <li>- Distributed Applications</li> <li>- Java</li> <li>- Web Services</li> <li>- Telco Control</li> <li>- Fluent English</li> </ul>
Nombre de places	1

#### TILAB (Itàlia-Torino)

Codi	I TILAB Tor-2
Data d'entrada	31/03/05
Tipus d'estada	PFC
Descripció	<p><b>Application-aware control plane in ASON/GMPLS networks</b></p> <p>After a preliminary study about the requirements of an application-aware control plane, master thesis should focus on designing a possible architecture. The implementation of the designed architecture might be integrated in a proprietary ASON test bed.</p>
Durada	The assignment will take nine months, beginning on April/May 2005
Requisits	<ul style="list-style-type: none"> <li>- Excellent knowledge of transport network technologies (SDH, WDM)</li> <li>- Excellent knowledge of TCP/IP protocols</li> <li>- Excellent knowledge of C programming Language</li> <li>- Knowledge of socket programming</li> </ul>
Nombre de places	1

#### TILAB (Itàlia-Torino)

Codi	I TILAB Tor-3
Data d'entrada	15/07/05

Tipus d'estada	PFC
Descripció	<p><b>Context:</b> Today IT business is based on open architectures for a very competitive market. The idea of extending a similar approach to the Telco market has inspired some advanced technological trends such as "Open Signaling", "Programmable Networking" etc. Currently, some R&amp;D activities have been directed to define and demonstrate innovative openness paradigms (such as service-aware programmability) for IP routers, and in general, for the Networking/Switching Layer. This could be seen also from another perspective i.e. the need (dictated by the Telco services market evolution) that Next Generation Service Layer (Service Delivery Platform) will meet, by the very beginning, the emerging network solutions (e.g. NGN).</p> <p><b>Macro-Objective of the Thesis:</b> The macro objective of the work proposed is to define and demonstrate (by developing a prototype) architectural solutions enabling IP router programmability in order to meet flexibly Service Delivery Platforms requirements. The Thesis comprises both theoretical and experimental work (in a Lab).</p>
Durada	9 months.
Requisits	<p><b>Main Skills:</b> -IP/MPLS networking -Programming languages (e.g. C, C++, Java) -Fluent English</p>
Nombre de places	1

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## NEC

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-10
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>VoIP Security and Management</b></p> <p>The most important factor inhibiting VoIP deployments has changed from a lack of budget to concerns about security and its manageability. Security attacks in the VoIP environment are an increasing concern as VoIP developments are growing dynamically around the globe. Most solutions are starting deploying simple Intrusion Detection/Prevention Systems able to counter VoIP attacks (SPIT, DoS, Call re-routing, Call hijacking, etc.). Therefore it is important to study, design and implement advanced features and related algorithm able to face evolving VoIP security threats. At the same time the management of such devices should be addressed in order to facilitate system administrators in configuring and administrating their deployments. The student will focus on studying, designing and developing VoIP Security systems and its management in the context of preventing VoIP systems to be broken by intruders and misbehaving users. Validation of results is expected to be done either on simulation or on real implementation (or a combination of both).</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- TCP/IP knowledge.</li> <li>- Linux/Unix OS knowledge.</li> <li>- GNU toolchain (gcc, make, etc.).</li> <li>- VoIP (SIP) protocols/architecture knowledge.</li> <li>- C/C++.</li> <li>- Java.</li> <li>- Scripting languages.</li> </ul>
Nombre de places	1

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-11
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Management and Control of WiMax/802.16 Networks</b></p> <p>WiMax/802.16 networks promise to offer a low cost solution for fixed</p>

	<p>broadband access and solve the well known "last mile" problem. Besides, the upcoming 802.16e extensions will add mobility features to the current standard. However, the performance of WiMax/802.16 networks is yet very unclear and it can largely depend on the effectiveness of management and control functionalities applied to them. The work to be carried out in this thesis is meant to investigate, design and possibly prototype functionalities to be included in a Network Control and Management System (NCMS), as defined by the IEEE 802.16g upcoming standard. Particular interest will be devoted to Quality of Service provisioning aspects, load balancing issues, and cooperation with other access networks (e.g WLANs). The above activities might be supported by results obtained on an operative WiMax network. Results will be evaluated through either simulations or experiments on prototype implementations or a combination of both.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- TCP/IP knowledge.</li> <li>- Basic knowledge of radio TLC systems.</li> <li>- Experience with Linux/Unix OS.</li> <li>- At least one of the following programming languages: C/C++/Java.</li> </ul>
Nombre de places	1

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-12
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Next Generation Mobile Networks</b></p> <p>In the context of the European Research project Ambient Networks various projects are available for final projects, thesis, term projects, or internships. The topics of the work at NEC are on overlay networks, on new mobile network architectures, and on self-managing networks.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- Programming in C and C++.</li> <li>- Good knowledge about network programming (socket library).</li> <li>- Motivation to perform the thesis in an international environment (good English language skills).</li> </ul>
Nombre de places	1

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-13
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>NEC Dual-Mode Terminals Project</b></p> <p>Future 3G mobile terminals will include Wireless LAN capabilities due to its popularity and the success of this technology in offering high data rates at a low cost. The upcoming IEEE standard 802.11e defines mechanisms to provide Quality of Service which are required to guarantee a proper service to some applications, e.g., VoIP. However, the proper configuration of these mechanisms as well as the design of some of the algorithms that are left open to implementors is required for delivering the desired services. The student will get involved in a project which pursues to design and configure the necessary traffic engineering mechanisms for 802.11e to provide the desired levels of QoS in the particular case of 3G terminals. The project will be performed in the framework of the next generation NEC's 3G/WLAN terminal development. The results of the research work are expected to be summarized in a paper to be submitted to a technical international conference.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- Analytical skills.</li> <li>- Fluent English.</li> <li>- Previous experience with network simulators and/or knowledge of the 802.16 technology will be valued.</li> <li>- C coding knowledge.</li> </ul>
Nombre de places	1

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-14
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>WiMAX QoS Traffic Engineering</b></p> <p>The IEEE 802.16 technology (WiMAX) is a promising alternative to 3G or wireless LAN for providing last-mile connectivity by radio link due to its large coverage area, low cost of deployment and high speed data rates. However, in order to compete with already well-established wireless technologies, WiMAX has to show that it outperforms legacy wireless technologies significantly. The student will get involved in a project which will evaluate the potential of the 802.16 technology, qualitatively and quantitatively, to improve the performance of the already existing technologies. Some of the task that will be performed during the project are: design of QoS scheduling schemes, proposal of enhancement ideas and performance evaluation of 802.16 using the OPNET simulator. The results of the research work are expected to be summarized in a paper to be submitted to a technical international conference.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- Analytical skills.</li> <li>- Fluent English.</li> <li>- Previous experience with network simulators and/or knowledge of the 802.16 technology will be valued.</li> <li>- C coding knowledge.</li> </ul>
Nombre de places	1

#### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-15
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>TCP Improvements for Connectivity Disruption Tolerance</b></p> <p>Depending on the specific path between two nodes in the Internet, disruptions in connectivity may be frequent; especially if one or both nodes are mobile devices. When hosts communicate with the Transmission Control Protocol (TCP), their connections may either abort during periods of disrupted connectivity or exhibit significant performance reduction compared to permanently connected paths. This thesis will drive the design, implementation and IETF standardization of TCP modifications that improve TCP behavior in such scenarios.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<p>Strong experience in:</p> <ul style="list-style-type: none"> <li>- The TCP and IP protocols.</li> <li>- C programming language.</li> <li>- Unix socket API.</li> </ul> <p>- Unix kernel programming experience is a plus. - Strong verbal and written command of the English language is a necessity.</p>
Nombre de places	1

#### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-16
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>TurfNet Evolution</b></p> <p>TurfNet is a novel internetworking architecture that enables communication among autonomous and heterogeneous network domains. The architecture uses a global identity namespace and does not require global addressing or a shared internetworking protocol. It integrates the new concept of dynamic network composition with other recent architectural concepts, such as decoupling locators from identifiers. This thesis focuses on the continued evolution of TurfNet, including such features as mobility, multi-homing, intermittent connectivity and service quality. The thesis encompasses design of these mechanisms, implementation within the TurfNet prototype and experimentation to validate performance and scalability.</p>

Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	Strong experience in: <ul style="list-style-type: none"> <li>- the TCP and IP protocols.</li> <li>- C programming language.</li> <li>- Unix socket API.</li> </ul> <ul style="list-style-type: none"> <li>- Unix kernel programming experience is a plus.</li> <li>- Strong verbal and written command of the English language is a necessity.</li> </ul>
Nombre de places	1

#### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-17
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Cross-Layer Handshake Parallelization</b></p> <p>The increasingly layered nature of current networking architectures increases connection setup delays, due to the need to perform successive, repeated message exchanges ("handshakes") at different layers before applications can communicate. These delays can significantly impact communication, especially for realtime or interactive traffic. This thesis investigates protocol extensions that allow speculative parallelization of handshake exchanges across different network layers. For example, speculatively transmit the first packet of a SSL handshake in the SYN of the TCP handshake which in turn is speculatively transmitted in the payload of the first packet of the HIP base exchange.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	Strong experience in: <ul style="list-style-type: none"> <li>- the TCP and IP protocols.</li> <li>- C programming language.</li> <li>- Unix socket API.</li> </ul> <ul style="list-style-type: none"> <li>- Experience with the ns2 network simulator is a plus.</li> <li>- Strong verbal and written command of the English language is a necessity.</li> </ul>
Nombre de places	1

#### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-18
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Context information discovery and distribution</b></p> <p>Context Awareness and Mobile Services are part of the activities within our Internet Services Group. Here we are investigating context gathering and communication, context inference, group context, context aware services, context based service recommendation and adaptation, etc. The research covers Beyond-3G networks as well as local networks (BAN/PAN/WAN). Targeted mobile devices are PDAs and mobile phones. In this area we offer internship thesis projects. The thesis work is typically embedded in ongoing research processes within international projects.</p> <p>On one hand context information is often gathered through the user's end device (e.g. from locally attached sensors, from RFID reader, or from Bluetooth devices). This can imply different network types (BAN/PAN/WLAN) and different technologies (e.g. Bluetooth). On the other hand the usage of context will mainly be located outside the user's end-device by smart services in the network, which aggregate context information from different sources to perform their service. The thesis shall cover investigations into context information discovery mechanisms in the local environment as well as how to distribute this information across network borders in a scalable manner. A prototype implementation to be integrated into an existing environment is required.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- Internet protocols .</li> <li>- Programming in Java (advanced skills).</li> <li>- Knowledge in telecommunication and computer networks.</li> <li>- Ontologies and Ontology languages.</li> </ul>

	<ul style="list-style-type: none"> <li>- Context awareness.</li> <li>- Service and Session management.</li> <li>- BAN/PAN network technologies.</li> <li>- Privacy and Security.</li> <li>- Good English (required!).</li> <li>- The working environment is in English, and so, good knowledge in the language is necessary. Basic German knowledge is helpful, but not required.</li> </ul>
Nombre de places	1

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-19
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Mechanisms to enable service extensibility</b></p> <p>Context Awareness and Mobile Services are part of the activities within our Internet Services Group. Here we are investigating context gathering and communication, context inference, group context, context aware services, context based service recommendation and adaptation, etc. The research covers Beyond-3G networks as well as local networks (BAN/PAN/WAN). Targeted mobile devices are PDAs and mobile phones. In this area we offer internship thesis projects. The thesis work is typically embedded in ongoing research processes within international projects.</p> <p>Context awareness is seen as a driver for new, context aware, services. However, the opportunities to make existing application and services smarter are often overlooked. This thesis shall investigate mechanisms to integrate live context information into existing services. One option here could be to make use of an information-push infrastructure. As target services both, well-known end-user services as well as network based services (like OMA/IMS: Push-to-Talk) will be considered. A prototype implementation to be integrated into an existing environment is required.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- Internet protocols.</li> <li>- Programming in Java (advanced skills).</li> <li>- Knowledge in telecommunication and computer networks.</li> <li>- Ontologies and Ontology languages.</li> <li>- Context awareness.</li> <li>- Service and Session management.</li> <li>- BAN/PAN network technologies.</li> <li>- Privacy and Security.</li> <li>- Good English (required!).</li> <li>- The working environment is in English, and so, good knowledge in the language is necessary. Basic German knowledge is helpful, but not required.</li> </ul>
Nombre de places	1

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-20
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Utilizing resources in the local environment</b></p> <p>Context Awareness and Mobile Services are part of the activities within our Internet Services Group. Here we are investigating context gathering and communication, context inference, group context, context aware services, context based service recommendation and adaptation, etc. The research covers Beyond-3G networks as well as local networks (BAN/PAN/WAN). Targeted mobile devices are PDAs and mobile phones. In this area we offer internship thesis projects. The thesis work is typically embedded in ongoing research processes within international projects.</p> <p>Future mobile devices will enable presence in different networks with different technologies (UMTS, Bluetooth, WLAN). In all these networks a number of resources are available. One example is a collection of different media input/output resources like TV set, home/car HiFi system. In utilizing these resources, a smart multi-modal interface environment can be set up dynamically which provides the most sophisticated input/output technologies possible in the user's situation and environment. This set-up then can be applied to any</p>

	(media) service which is accessed via the mobile device. Subject of the thesis is to develop mechanisms that facilitate automatic support for use of other resources/devices in the environment, which includes suitable mechanisms for session management. A prototype implementation to be integrated into an existing environment is required.
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- Internet protocols.</li> <li>- Programming in Java (advanced skills).</li> <li>- Knowledge in telecommunication and computer networks.</li> <li>- Ontologies and Ontology languages.</li> <li>- Context awareness.</li> <li>- Service and Session management.</li> <li>- BAN/PAN network technologies.</li> <li>- Privacy and Security.</li> <li>- Good English (required!).</li> </ul> <p>The working environment is in English, and so, good knowledge in the language is necessary. Basic German knowledge is helpful, but not required.</p>
Nombre de places	1

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-21
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Ensuring privacy in context aware environments</b></p> <p>Context Awareness and Mobile Services are part of the activities within our Internet Services Group. Here we are investigating context gathering and communication, context inference, group context, context aware services, context based service recommendation and adaptation, etc. The research covers Beyond-3G networks as well as local networks (BAN/PAN/WAN). Targeted mobile devices are PDAs and mobile phones. In this area we offer internship thesis projects. The thesis work is typically embedded in ongoing research processes within international projects.</p> <p>Collecting and providing context information tackles the very sensitive area of user privacy. The user needs to keep control about if and how his information is used. However sometimes the wish for keeping his privacy contradicts with the wish of getting a service provided, which needs personal context information. One solution for this dilemma could be e.g. to anonymize the service access by applying virtual (anonymous) user identifications to the service session. Another way could be to blur the preciseness/correctness of the provided context information, e.g. a weather service does not require the position accuracy of a few meters provided by a GPS, it can be fed by just the county name (preciseness: a few 100km) in which the user is to perform its service. By decreasing the precision the weather service provider never has the chance to infer the user's behaviour by analysing his movements. This thesis shall investigate and evaluate privacy enabling mechanisms like the mentioned ones.</p>
Durada	Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.
Requisits	<ul style="list-style-type: none"> <li>- Internet protocols.</li> <li>- Programming in Java (advanced skills).</li> <li>- Knowledge in telecommunication and computer networks.</li> <li>- Ontologies and Ontology languages.</li> <li>- Context awareness.</li> <li>- Service and Session management.</li> <li>- BAN/PAN network technologies.</li> <li>- Privacy and Security.</li> <li>- Good English (required!).</li> </ul> <p>The working environment is in English, and so, good knowledge in the language is necessary. Basic German knowledge is helpful, but not required.</p>
Nombre de places	1

### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-22
Data d'entrada	11/11/05
Tipus d'estada	PFC

	<p><b>Group context</b></p> <p>Context Awareness and Mobile Services are part of the activities within our Internet Services Group. Here we are investigating context gathering and communication, context inference, group context, context aware services, context based service recommendation and adaptation, etc. The research covers Beyond-3G networks as well as local networks (BAN/PAN/WAN). Targeted mobile devices are PDAs and mobile phones. In this area we offer internship thesis projects. The thesis work is typically embedded in ongoing research processes within international projects.</p>
Descripció	<p>Context-awareness is a hot new research topic with a broad application area. Current research has mainly focused on context of single persons and their current situation. In comparison, group context describes the situation of a group of persons. Furthermore, users are part of different groups and frequently changing their group association. Therefore, it needs to be examined, which group context is valid and how it influences the services used by users. This thesis shall examine mechanisms to compute group context from the individual context of group members. Various mechanisms for aggregating information need to be examined, implemented and tested. Multiple groups need to be considered and ways to use the group context need to be examined. A prototype implementation to be integrated into an existing environment is required.</p>
Durada	<p>Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.</p>
Requisits	<ul style="list-style-type: none"> <li>- Internet protocols.</li> <li>- Programming in Java (advanced skills).</li> <li>- Knowledge in telecommunication and computer networks.</li> <li>- Ontologies and Ontology languages.</li> <li>- Context awareness.</li> <li>- Service and Session management.</li> <li>- BAN/PAN network technologies.</li> <li>- Privacy and Security.</li> <li>- Good English (required!).</li> <li>- The working environment is in English, and so, good knowledge in the language is necessary. Basic German knowledge is helpful, but not required.</li> </ul>
Nombre de places	1

#### NEC (Alemania-Heidelberg)

Codi	D NEC Hei-23
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Mobile Social Networking Services (SNS)</b></p> <p>Context Awareness and Mobile Services are part of the activities within our Internet Services Group. Here we are investigating context gathering and communication, context inference, group context, context aware services, context based service recommendation and adaptation, etc. The research covers Beyond-3G networks as well as local networks (BAN/PAN/WAN). Targeted mobile devices are PDAs and mobile phones. In this area we offer internship thesis projects. The thesis work is typically embedded in ongoing research processes within international projects.</p> <p>Social Networking is a fast emerging new paradigm in the Internet world. Blog, podcasting, online communities, or image exchange sites are just the tip of the iceberg. Several existing systems are already multi-access services- meaning they can be accessed using different communication means, e.g. Web, eMail, mobile access, etc. But when looking at SNS, they are mainly targeted at issues of personal interest. Very rarely SNS directly support mobile users. Examples would be: providing information about his current location, a joint information gathering approach to compare prices, support for the local community, having ad-hoc local communication means, or supporting meeting of friends This thesis will examine existing approaches like geo-tagged blogs, local community services. Its main goal is to define and implement an SNS architecture that supports mobile users. A prototype implementation is required.</p>
Durada	<p>Duration: a minimum of 6 months, up to 9months. Starting date: Around February or March of 2006.</p>
Requisits	<ul style="list-style-type: none"> <li>- Internet protocols.</li> <li>- Programming in Java (advanced skills).</li> <li>- Knowledge in telecommunication and computer networks.</li> <li>- Ontologies and Ontology languages.</li> <li>- Context awareness.</li> </ul>

	<ul style="list-style-type: none"> <li>- Service and Session management.</li> <li>- BAN/PAN network technologies.</li> <li>- Privacy and Security.</li> <li>- Good English (required!).</li> <li>- The working environment is in English, and so, good knowledge in the language is necessary. Basic German knowledge is helpful, but not required.</li> </ul>
Nombre de places	1

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## ACCENTURE

### ACCENTURE (França-Sophia-Antipolis(Niça))

Codi	F ACCENTURE Niç-2
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Mobile Robotics for Intelligent Home Services</b></p> <p>Accenture Technology Labs is the technology research and development organization within Accenture, global consulting and IT services company. Its goal is to explore technologies three to five years out from maturity and develop compelling prototypes that demonstrate the business implications of these technologies to Accenture clients. The Intelligent Home Services initiative started within ATL focuses more specifically on the area of smart homes and services for the elderly.</p> <p>In most industrialized countries, where information and communication technologies are widespread, population is ageing. By the year 2050 the percentage of people aged over 60 will surpass 30%. Along with this social trend we observe that mobile robotics becomes cheaper by the day. It is hence important to understand if tomorrow's mobile robots will be able to play an important role in assisting elderly people living at home. Also, it is somewhat important to understand how elderly will deal with such disruptive technologies in the far future. Already in Japan, mobile or pet robotics is nowadays proving being a viable technology to alleviate isolation and entertaining a vast segment of population across ages.</p> <p>Based on this motivation, Accenture Technology Labs in Sophia Antipolis intend to build a demonstration on how mobile robots can accomplish simple but effective tasks in the everyday life at the service of the aged.</p> <p>In this project, there will be three distinct phases. In the first phase the intern will get acquainted with a mobile robot of Activmedia Robotics Inc. (Pioneer 2DX) and with suitable robot development software. At the end of this process, a brainstorming activity will follow to select a viable demo scenario. In the second phase of the project, the implementation of the scenario will be accomplished. This will require extensive C++ and possibly Windows programming skills. The third and final phase will be dedicated to wrap up and set up of the demo in Accenture Technology Labs Workshop facilities in Sophia Antipolis.</p>
Durada	Duration: 6 to 7 months. Starting date: January 2006.
Requisits	<ul style="list-style-type: none"> <li>- Minimum 3 years of higher education in Computer Science or Engineering.</li> <li>- High proficiency in C++.</li> <li>- Fluent English.</li> <li>- Experience with robotics is a plus.</li> </ul>
Nombre de places	1

### ACCENTURE (França-Sophia-Antipolis(Niça))

Codi	F ACCENTURE Niç-3
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Activity Prediction for Intelligent Home Services</b></p> <p>Accenture Technology Labs (ATL) is the technology research and development organization within Accenture, a global consulting and IT services company. Its goal is to explore technologies three to five years from maturity and develop compelling prototypes that demonstrate the business implications of these technologies to Accenture clients. The Intelligent Home Services initiative started within ATL focuses more specifically on the area of smart homes and services for the elderly.</p> <p>In the context of the Intelligent Home Services initiative, we are working on a passive surveillance system capable of recognizing, learning and analyzing daily activities performed by a person. There are several areas of application for such a system, including healthcare (e.g. in-home observation gives a better assessment of mobility than an out-of-context hospital visit), home assistance (e.g. offering prompts for completing complex tasks or issuing context-relevant reminders), or motivation for healthy living (e.g. using computerized persuasion to encourage a balanced diet).</p> <p>Technological challenges in activity recognition include multitasking (performing several activities simultaneously), false starts (activities abandoned or forgotten), periodic variations (e.g. time taken for breakfast weekday vs. weekend), or location (e.g. cleaning a bathroom is different than cleaning a kitchen). In our system, we focus on computer vision techniques to infer activity information from ambient cameras.</p> <p>Typical datasets include large amount of noisy data. The goal of the internships is to develop a stochastic model that extract recurrent patterns of behavior of a person (habits), predict possible future actions and detect unusual activities. The student</p>

	will then integrate this module in the existing Intelligent Home Services platform.
Durada	Duration: 6 to 7 months. Starting date: January 2006.
Requisits	<ul style="list-style-type: none"> <li>- Minimum 3 years of higher education in Computer Science, Physics or Engineering.</li> <li>- Proficiency in C, C++ and Matlab.</li> <li>- Fluent English.</li> <li>- Experience with stochastic modeling, machine learning or data mining is a plus.</li> </ul>
Nombre de places	1

#### ACCENTURE (França-Sophia-Antipolis(Niça))

Codi	F ACCENTURE Niç-4
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Smart Energy Management</b></p> <p>Accenture Technology Labs (ATL) is the technology research and development organization within Accenture, a global consulting and IT services company. Its goal is to explore technologies three to five years from maturity and develop compelling prototypes that demonstrate the business implications of these technologies to Accenture clients.</p> <p>With the progressive opening-up of the natural gas and electricity markets in Europe by 2007, the landscape in the area of energy is undergoing profound changes and restructuring. Moreover an increasing awareness is emerging that the current energy system is not sustainable. This translates for example into programs and incentives to produce electricity from reduced CO2 emissions sources.</p> <p>At the same time, the emergence of new IT platforms in homes and businesses, combined with advances in energy technologies such as small scale generation, storage and metering are enabling new services like real-time prices or automated demand response programs and are offering new options to consumer for power and economical savings.</p> <p>Accenture technology labs are currently developing a smart energy management system focusing on helping a user (home, commercial building, large site ...) equipped with on-site electricity generation and storage capabilities to balance his options and optimize its resource use based on information such as energy price, weather forecasts, predicted loads, user preferences, equipment performance, thermal model of the building...</p> <p>Challenges in the considered optimization problem include several non-linearities (e.g. equipment performance and tariff structures), uncertainty about the future (e.g. load, tariffs), and the fact that it involves some "soft" notions such as <i>Comfort</i>.</p> <p>The intern will contribute, under the supervision of an Accenture Technology Labs researcher, to developing parts of the system described above, and to build a simulation framework to test and show the system.</p>
Durada	6 to 7 months between January and September 2005.
Requisits	<ul style="list-style-type: none"> <li>- Minimum 3 years of higher education in Computer Science, Physics or Engineering.</li> <li>- Proficiency in C, C++ and Matlab.</li> <li>- Fluent English.</li> <li>- Experience with stochastic modeling or optimization problems is a plus.</li> </ul>
Nombre de places	1

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#### EPFL

#### EPFL (Suisse-Lausanne)

Codi	CH EPFL Lau-10
Data d'entrada	26/10/05
Tipus d'estada	PFC
Descripció	<p><b>Project 1 - Electronics and software for gas viscosity, heat conductivity and pressure sensor</b></p> <p>Recently, we have developed thermal techniques for measuring viscosity, heat conductivity and low pressures in gases. This project aims at developing the corresponding electronics and software for driving and measuring these sensors. Applications are the measurement of very low gas pressures in building air conditioning systems, and the optimisation of natural gas combustion in heating systems through determination of its composition based on its viscosity and heat conductivity.</p>
Durada	Preferably: February to end of June / mid July (ca. 5 months).
Requisits	<ul style="list-style-type: none"> <li>- Knowledge of data acquisition and sensor technology.</li> <li>- Preferably some knowledge of analog electronics.</li> <li>- Good mastery of basic physics of mechanics and heat transport.</li> <li>- Capacity for teamwork in multidisciplinary projects.</li> <li>- Good knowledge of at least English or French.</li> </ul>

Nombre de places	1
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### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-11
Data d'entrada	26/10/05
Tipus d'estada	PFC
Descripció	<p><b>Project 2- Electronics and management of a calorimetric chemical microreactor</b></p> <p>In our laboratory, we have developed a ceramic chemical microreactor module that integrates sensing of the flow of reactants and the heat evolved by the chemical reaction. This project concerns the management of this device: temperature control, measurement of reactant flow and determination of the heat of chemical reaction.</p>
Durada	Preferably: February to end of June / mid July (ca. 5 months).
Requisits	<ul style="list-style-type: none"> <li>- Knowledge of data acquisition and sensor technology.</li> <li>- Preferably some knowledge of analog electronics.</li> <li>- Good mastery of basic physics of mechanics and heat transport.</li> <li>- Capacity for teamwork in multidisciplinary projects.</li> <li>- Good knowledge of at least English or French.</li> </ul>
Nombre de places	1

### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-12
Data d'entrada	26/10/05
Tipus d'estada	PFC
Descripció	<p><b>Project 3- Electronics and software for gas viscosity, heat conductivity and pressure sensor</b></p> <p>In the frame of an industrial collaboration, we aim to develop an integrated microfluidic platform for small factory automation systems. The goal of this project is to develop the corresponding electronics and sensing algorithms, as well as to characterise their performance.</p>
Durada	Preferably: February to end of June / mid July (ca. 5 months).
Requisits	<ul style="list-style-type: none"> <li>- Knowledge of data acquisition and sensor technology.</li> <li>- Preferably some knowledge of analog electronics.</li> <li>- Good mastery of basic physics of mechanics and heat transport.</li> <li>- Capacity for teamwork in multidisciplinary projects.</li> <li>- Good knowledge of at least English or French.</li> </ul>
Nombre de places	1

### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-13
Data d'entrada	26/10/05
Tipus d'estada	PFC
Descripció	<p><b>Real-time obstacle detection in automotive environment:</b></p> <p>In order to improve vehicle safety, automotive industries are presently strongly focusing on new security devices. The proposed work will be conducted in the frame of the European project SPARC (<a href="http://www.sparc-eu.net/">http://www.sparc-eu.net/</a>) involving several industrial partners. Our goal is to develop an embedded camera aiming at detecting potential obstacles by analysing in real-time the road situation.</p> <p>The first goal of this masters work is to test and validate an existing solution, and to propose and validate several improvements (as for instance time-to-contact). Although, the algorithm development and validation will be achieved in C on a desktop computer, the final implementation should be performed on an embedded platform.</p> <p>Thus, during the second phase, the student will implement the resulting algorithm onto a specific hardware based on TI's C64 architecture (DM 64X).</p>
Durada	Preferably: February to end of June / mid July (ca. 5 months).
Requisits	<ul style="list-style-type: none"> <li>- Good knowledge of C programming.</li> <li>- Basic knowledge in image processing.</li> <li>- Skills for communication and teamwork.</li> <li>- Practice of English and/or French.</li> </ul>

Nombre de places	1
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#### EPFL (Suisse-Lausanne)

Codi	CH EPFL Lau-14
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Extraction of meaningful audiovisual structures</b></p> <p>It is relatively easy for a human to correctly interpret a scene consisting on a combination of acoustic and visual stimuli and to take profit of both the information to experience a richer perception of the world. On the contrary, computer systems have considerable difficulties when having to deal with multimodal signals, and the information that each component contains about the others is usually discarded.</p> <p>In our research work we are exploring the capabilities of redundant parametric decompositions in describing audiovisual sequences. These techniques allow to interpret signals in terms of their most salient structures, preserving good representational properties thanks to the use of redundant, well designed, dictionaries. In this way, it is possible to combine audio and video representations using simple and intuitive, but effective, criteria.</p> <p>The project will consist of 3 main parts:</p> <ul style="list-style-type: none"> <li>- The student will be asked to become familiar with the audio and video decomposition techniques used in our algorithm, as well as with multimodal fusion techniques and source separation algorithms.</li> <li>- We will ask the candidate to integrate an existing source separation method into our system. The code is made available by researchers of INRIA-Rennes (F), with whom this project will be coordinated.</li> <li>- We finally expect the student to evaluate and discuss the obtained results.</li> </ul>
Durada	Duration: 6 months. Starting time: mid February (preferably)
Requisits	Programming skills: Matlab, C/C++. Languages: English, French is a plus.
Nombre de places	1

#### EPFL (Suisse-Lausanne)

Codi	CH EPFL Lau-15
Data d'entrada	11/11/05
Tipus d'estada	PFC
Descripció	<p><b>Sparse Signature</b></p> <p>Using non-orthogonal bases to approximate signals/images permits to represent sparsely the information and, thus is particularly suited for signal/image analysis and even for compression. There is a total freedom in the design of the redundant set of functions to use. In particular, the overcomplete basis can be tailored to closely match features present in the signal, leading to a more meaningful representation than traditional methods as wavelets for example. Searching in large databases needs for short term representations of the data and could benefit from the recent advances in the field of sparse approximation.</p> <p>The aim of this project is to use sparse approximations to perform searches in large sets of high dimensional data.</p> <p>The project will consist of 3 main parts:</p> <ul style="list-style-type: none"> <li>- The student will be asked to become familiar with the concepts and algorithms relative to sparse approximation.</li> <li>- The student will have to explore different ways to compute distances between to signals given their sparse signature.</li> <li>- We finally expect the student to evaluate and discuss the obtained results.</li> </ul>
Durada	Duration: 6 months. Starting time: mid February (preferably)
Requisits	Programming skills: Matlab. Languages: English, French is a plus.
Nombre de places	1

#### EPFL (Suisse-Lausanne)

Codi	CH EPFL Lau-16
Data d'entrada	11/11/05
Tipus d'estada	PFC

Descripció	<p><b>Interpolation using geometric transforms</b></p> <p>Given a limited number of camera recording different views of a given scene, it is in theory possible to recreate artificially a different view from the same scene or even to create a 3D representation. Generally, the used approaches incorporate geometric information about the scene and the objects present.</p> <p>During the last decade, the emergence of dictionary approaches for image approximation permits to use geometrical basis elements (edges for example) to decompose an image. We believe that using a geometrical meaningful basis could also be used for image interpolation. Thus, instead of using a-priori geometric information directly on the image, the task could be done as follows:</p> <ol style="list-style-type: none"> <li>decompose image using geometrical meaningful overcomplete dictionary.</li> <li>interpolation on each individual element.</li> <li>recreate artificial view.</li> </ol> <p>The aim of the project is to explore this approach.</p> <p>The project will consist of 3 main parts:</p> <ul style="list-style-type: none"> <li>The student will be asked to become familiar with the concepts and algorithms relative to sparse approximation of images.</li> <li>The student will have to define the geometric transforms of the individual basis elements (analytically defined) for given global transformation (zoom, rotation, translation) of an image.</li> <li>Application. Given the personal interests of the student, different applications could be possible as: recreation of a view from a virtual camera, object extraction from scenes, reconstruction of a high resolution image from a set of low resolution images of a scene (Super resolution).</li> </ul>
Durada	Duration: 6 months. Starting time: mid February (preferably)
Requisits	Programming skills: Matlab. Languages: English, French is a plus
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-17
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>Brain Fibers Extraction with Global Active Contours</b></p> <p>Identification of fiber tracts in diffusion tensor magnetic resonance images gives us an analysis tool toward the understanding of brain mechanisms [1].</p> <p>In order to extract fibers in brain images, the image segmentation model of active contours will be used. This well-known and successful segmentation model has been recently, theoretically and numerically, improved in [2].</p> <p>Thus, the objective of this work will be to apply this new enhanced segmentation model to solve the problem of fibers extraction.</p> <p>[1] P. Hagmann "From Diffusion MRI to Brain Connectomics" - EPFL PhD Thesis [2] X. Bresson "Image Segmentation with Variational Active Contours" - EPFL PhD Thesis</p>
Durada	Duration: 6 months. Starting time: February 2006
Requisits	- (Pendent d'actualitzar) -
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-18
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>Multimodal speaker detection</b></p> <p>In the context of building a smart videoconferencing room, we want to be able to automatically detect and focus on the current speaker. Since speech production gives rise to both audio and video signals, it has been shown that these two modalities can be advantageously combined to perform the detection of the speaking source. Instead of just "putting together" detection methods developed independently for both signals, the approach we follow fuses the information common to the two modalities directly at the feature level. Such a multimodal approach is at the bleeding edge in the field of speaker detection. Promising results have already been obtained with a multimodal speech model we have developed [1], where audio features were selected with respect to motion features in the mouth region. Starting from the analysis of the results obtained with the present model, this project aims to develop and train a robust classifier (Bayes, SVM,...) of speaker audio-video features so that real-time speaker detection can be performed.</p>

	[1] P. Besson, M. Kunt, T. Butz and J. Thiran, "A multimodal approach to extract optimized audio features for speaker detection", Proceedings of European Signal Processing Conference (EUSIPCO), Antalya, Turkey, September 2005
Durada	Duration: 6 months. Starting time: February 2006
Requisits	- ( <i>Pendent d'actualitzar</i> ) -
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-19
Data d'entrada	14/11/05
Tipus d'estada	PFC
Descripció	<p><b>Analysis of audio and video speech signals</b></p> <p>A speaker or speech detection/recognition step is required as a starting point for many multimedia applications. In this context, a better knowledge of the speech signal is of prime interest. In particular, we are interested in better understanding the relationship between the audio and video signals that are jointly emitted during speech. Indeed, it is well known that both modalities are used by a human listener to improve the speech perception, particularly in noisy environments. The purpose of this project is to study the relationship between these audio and video signals that are jointly emitted during speech and to build a bimodal predictive model.</p>
Durada	Duration: 6 months. Starting time: February 2006
Requisits	- ( <i>Pendent d'actualitzar</i> ) -
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-20
Data d'entrada	15/11/05
Tipus d'estada	PFC
Descripció	<p><b>Distributed Media Streaming in Large Scale Networks</b></p> <p>Distributed or peer-to-peer systems become more and more popular over the internet, as they represent a scalable alternative to the common client-server architecture, for heavy data transfers. Due to this particular feature, they represent an attractive solution for multimedia streaming.</p> <p>However, the specific stringent requirements of real-time streaming applications (namely long-lasting high aggregated bandwidth, low tolerance for rate variations, homogenous, constant network delays), make the implementation of such an application on top of a peer-to-peer system far from trivial.</p> <p>The goal of this project is to explore the feasibility of a streaming application in a distributed network context. Initially, network parameter prediction techniques should be employed at the receiver in order to estimate the state of the available network. Multiple network paths should be discovered and computed to the various peers possessing the requested media. Then an adaptive election mechanism should decide which peers should forward the media information and finally a distributed scheduling mechanism should coordinate the overall streaming process. Robustness against changing network conditions can be achieved by building safe-guard mechanisms like route change, adaptive peer selection, conservative playback delay and scalable video layout. The entire setup can be simulated in Matlab or implemented with the help of the ns2 network simulator.</p>
Durada	Duration: 6 months. Starting time: February 2006
Requisits	- Matlab - C/C++ programming - Basic knowledge about video coding network protocols and p2p paradigms
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-21
Data d'entrada	15/11/05
Tipus d'estada	PFC

	<p><b>Per-flow rate allocation in video streaming architectures</b></p> <p>Media streaming over wired or wireless time-varying channels from one or more sources to one or more clients poses a challenging problem: given a media encoding, how do we allocate the sending rates to each media flow in order to satisfy the user experience at the client end, and in the same time to keep the network stable?</p> <p>Using stochastic channel and source models, we will pose an optimization problem which should yield optimal per-flow rate allocation, in the sense that quality of service for users throughout the network is maximized, while avoiding network congestions. Channel state information will be extracted from client feedback.</p> <p>The results of this optimization, under various network conditions and client request patterns, will be simulated in order to validate the proposed solution. This centralized solution should be used as a benchmark performance measure for future distributed rate allocation algorithms</p>
Durada	Duration: 6 months. Starting time: February 2006
Requisits	- Skills: networking basics, operations research, basic image processing, basic stochastic processes, programming. - Skills Gained insights: state-of the art media streaming architectures, ns-2.
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-22
Data d'entrada	15/11/05
Tipus d'estada	PFC
Descripció	<p><b>Content-aware buffering for enhanced streaming performance</b></p> <p>The percentage of multimedia content sent over the Internet is continuously on the increase. It is expected that this trend will only continue in the near future. Therefore, as more and more media packets traverse the Internet, the likelihood that at least some of them may encounter at some point a congested network is also increasing. In the event of congestion, network routers simply drop packets from their queue without consideration for the specific content of the packets, i.e., whether they contain multimedia content or regular data.</p> <p>In this project, we propose to consider sending side information along with the media stream that will help routers determine which media packets to preferentially drop in the event of congestion. For example, it is well known that intra-coded frames (so called I-frames) are more important for the reconstruction quality of the video than predictively encoded frames (denoted P-frames). Therefore, one type of side information might be to tag the video packets with the type of video frames that the packets are carrying. In addition, we would like to design appropriate decision algorithms for dropping media packets at the routers that would exploit the side information in the most efficient way. It is likely that the design of the side information and the decision algorithms should be performed jointly in order to ensure that the reconstruction quality of the video stream at the receiver is maximized.</p> <p>The inherent trade-offs between the amount of side information, the improvement in end-to-end performance and the complexity of the decision algorithms for preferential packet dropping at the network routers should all be carefully investigated.</p>
Durada	Duration: 6 months. Starting time: February 2006
Requisits	- Matlab or/and C programming. - Some knowledge of optimization theory and of video codecs (H.264, H.263+).
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-23
Data d'entrada	15/11/05
Tipus d'estada	PFC
Descripció	<p><b>Image similarity metrics based on MP decomposition</b></p> <p>Atomic decompositions, like those provided by Matching Pursuit, provide meaningful geometric representations of images into visual primitives. The most important information provided by atomic Matching Pursuit image representation is the parameters of the atoms which can be effectively used for defining new image similarity metrics. Traditional pixel-based image similarity metrics fail to represent the perceptual similarity between images due to different illumination conditions and distortions including a combination of translations, rotations and scalings.</p> <p>This project proposes to investigate the use of redundant signal expansions like those based on Matching Pursuit, in order to introduce new meaningful similarity metrics which capture the perceptual similarity among images. The similarity metrics will be tested and evaluated in the context of image recognition.</p>
Durada	Duration: 6 months. Starting time: February 2006

Requisits	- Image processing basics. - Matlab. - Programming skills.
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-24
Data d'entrada	15/11/05
Tipus d'estada	PFC
Descripció	<p><b>Multiple description video coding with drift compensation</b></p> <p>Multiple Description Coding (MDC) has recently gained quite a lot of interest from the research community, since it represents an efficient way to fight against losses in streaming applications. It basically consists in building several descriptions of the same information, in order to increase the probability to get a minimal quality of service at the receiver. This minimal quality is reached when the receiver only gets one of the descriptions, and the quality generally increases gracefully with the number of received descriptions. Although the concept of MDC was successfully applied to images, incorporating MDC for video is still not a trivial task.</p> <p>The reason is that all common video coding schemes use a predictive coding technique and encoding the prediction error using multiple descriptions is not straightforward, since it may generate a problem of de-synchronization between encoder and decoder. This is known as the drift problem, which is due to a mismatch between the prediction loops at the encoder and decoder, due to transmission losses. One way to solve this problem is to have <math>2^N-1</math> loops at the encoder for N video descriptions, each of which would mimic one of the possible situations at the decoder. However, such a naive solution would significantly increase the system complexity. Alternatively, one can advantageously use a side information channel to combat error propagation, and avoid the drift problem. This project proposes to combine Multiple Description Scalar Quantization, with properly designed side information coding, in order to build an efficient system capable of generating any number of video descriptions, without suffering from the drift problem.</p>
Durada	Duration: 6 months. Starting time: February 2006
Requisits	- Video coding basics and programming skills (C++, Matlab)
Nombre de places	1

#### EPFL (Suïssa-Lausanne)

Codi	CH EPFL Lau-25
Data d'entrada	15/11/05
Tipus d'estada	PFC
Descripció	<p><b>Coding of omnidirectional images</b></p> <p>Spherical or omnidirectional images generally provide a full 360 x 360 degrees view of a 3-dimensional scene. They describe the light field in its natural radial form, and allow to avoid Euclidian approximations which generally introduce distortion problems in computer vision algorithms.</p> <p>Whether they are natural images, acquired by an omnidirectional camera, or synthetic images, they however generally carry a huge amount of information, creating a necessity for an efficient compression scheme for transmission and storage.</p> <p>This project aims at exploring the structure of multiresolutional representations of spherical data (Spherical Laplacian pyramid, Spherical frames) and proposing a progressive and efficient coding scheme which exploits not only correlation of data within a resolution. but also between successive resolution in hierarchical decompositions.</p>
Durada	Duration: 6 months. Starting time: February 2006
Requisits	- Image processing and information theory basics. - Programming skills.
Nombre de places	1