Student / Intern project

IoT platform for smart cities

Smart Cities are augmented environments capable of utilizing the Internet of Things (IoT), in which computational intelligence is ubiquitous to provide people with contextual, proactive and personalized services. These environments will provide ubiquitous information and services to promote well-being as well as better management of the city's resources. s

An IoT framework is being developed at AMI-lab to promote better delivery of services in Smart Cities. We mainly target helping aging people to lead an independent and purposeful life, through ambient assistive technologies. The framework includes software components to integrate context from IoT nodes. These components implement diverse protocols for smart houses (e.g., Zwave, Bluetooth Low-Energy, Beacon), and include processes to persist and interchange context.

Nowadays, diverse new technological components (e.g., sensors, actuators, cloud) have been deployed and new protocols are emerging. These protocols facilitate the evolution towards using technology in everyday activities. Therefore, we are currently extending our platform to include various outdoor technologies in order to provide a solution that integrates a large number of IoT objects (i.e., smart objects through gateways and smartphones). Our platform similarly manages emerging protocols providing context outdoor (e.g., LoRa, Bluetooth Low-Energy, Beacon) as well as technologies providing services (e.g., IoT services, cloud computing). All context and services are integrated, pre-processed and kept in a knowledge base (Big data technology), to be consumed through the city. The design incorporates design patterns and optimization of algorithms in order to deploy in nodes through the city, with small computation capacities (i.e., processor, memory).

Keywords

Smart City, Internet of Things, REST API, Sensors & Beacons, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Strong motivation towards challenging projects
- Recommended skills in Web services
- Ease in programming (mainly C++, Python, Java, etc.)
- Recommended skills in Linux, embedded systems

Role of the student/Intern

The student/intern project mainly involves the integration of new protocols in real setting (with real) devices in order to complete the implementation and performing tests. The student/intern will be involved in analyzing emerging technologies and protocols for smart cities. He also will work on the design and development of an extension of our platform to manage heterogeneous technologies.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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Septembre 2020

Student / Intern project

IoT platform to assist mobile users

Smart Cities are augmented environments capable of utilizing the Internet of Things (IoT) and multimodal sensors, in which computational intelligence is ubiquitous to provide contextual, proactive and personalized services to people. The ambient intelligence in these environments will provide ubiquitous information and services to promote well-being and enable supporting people's health and life conditions. These services are introduced into artificial intelligence processes for improving automated reactions in diverse situations.

Although mobile devices facilitate the interaction with ambient intelligence services, they present drawbacks for non-technological people such as seniors, mainly to maintain updated information about health and life conditions. Therefore, we need to explore wearable technologies to complement mobile devices.

Wearable devices are among the new emerging technologies that can be useful to assist users in in smart cities. Diverse wearable devices incorporate interesting sensors (e.g., heart rate monitor) that enable increasing the knowledge about the user. This information is required in the ambient intelligent services to personalize the support. For example, an emergency support system can have an opportune situation before arriving at the person.

Our team have developed a framework to help seniors lead an independent and purposeful life, through ambient assistive technologies. The framework includes software components to integrate context from diverse mobile and IoT devices. Nowadays, divers promising emerging wearable components can be investigated.

Keywords

Smart City, Internet of Things, wearable technology, REST API, Android, Swift Sensors & Beacons, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Strong motivation towards challenging project
- Ease in programming (C++, Java, etc.)
- Ease in programming in Android and/or Swift
- Recommended skills in Web services

Role of the student/Intern

The student/intern project mainly involves the design of software components that enable gather IoT/wearable device data. The design has to incorporate service-oriented architectures and artificial intelligence for the integration of services and reasoning about the situation respectively. The implementation of the prototype will include mobile and smart watch, as well as, Web services and an open source artificial intelligence library. The intern will be asked to integrate the solution in real setting (with real) devices in order to complete the implementation and performing tests.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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Student/Intern project

Big data platform for IoT in smart cities

Smart Cities are augmented environments capable of utilizing the Internet of Things (IoT), in which computational intelligence is ubiquitous to provide people with contextual, proactive and personalized services. These environments will provide ubiquitous information and services to promote well-being as well as better management of the city's resources.

An IoT framework is being developed at AMI-lab to promote better delivery of services in Smart Cities. We mainly target helping aging people to lead an independent and purposeful life, through ambient assistive technologies. The framework includes software components to integrate context from IoT devices (sensors and actuators). These components implement diverse protocols (e.g., Zwave, Bluetooth Low-Energy, Beacon), and include processes to persist and interchange context.

Our team has deployed diverse IoT components in the city of Sherbrooke. We are currently extending our platform to include various outdoor technologies in order to provide a solution that integrates a large number of IoT objects (i.e., smart objects through kiosks and smartphones). All context and services are integrated, pre-processed and kept in a knowledge base (NoSQL), to be consumed through the city. Nowadays, we are extending our platform to include a Big data solution.

Keywords

Smart City, Internet of Things, Big data, REST API, Android, Swift Sensors & Beacons, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Strong motivation towards challenging projects
- Ease in programming (C++, Java, etc.)
- Recommended skills in Linux and embedded systems
- Recommended skills in NoSQL databases and Big data solutions
- Recommended skills in Web services

Role of the student/Intern

The student/intern project mainly involves the development of new Big data components that enable better management of IoT data. The student/intern will be asked to integrate the solution in real settings (with real data) in order to complete the implementation and performing tests. The student/intern will be involved in analyzing emerging Big data technologies for smart cities. He also will work on the design and development of an extension of our platform to manage the heterogeneous data.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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Student/Intern project

Context-Aware Social Activity Recommendation for Active Aging in Smart Cities

Smart Cities are augmented environments capable of utilizing the Internet of Things (IoT) and multimodal sensors, in which computational intelligence is ubiquitous to provide contextual, proactive and personalized services to people. IoT is an emerging technology that provides diverse capacities to incorporate everyday objects into computational support for user activities. These IoT objects are "smart" components interact and provide information that complements artificial intelligence algorithms in order to better address user requirements.

Active lifestyle in smart cities promotes healthy aging, and participation in social and physical activities improves aging people well-being. IoT diverse and Media sources can advertise large number of activities and for all age categories. This media, however, are not adapted to the aging population.

QueFaire is an IoT based system developed in AMI-Lab to help seniors lead an independent and purposeful life, through ambient assistive technologies. QueFaire is a context-aware in-person social activity recommendation system for seniors. QueFaire interprets natural language descriptions of activities in social media and proposes suitable activities to aging people, taking in consideration user-profile and contextual information. Moreover, the system is intended to provide support to help reach the location of a social activity (*More details in the AMI-Lab publications*).

Keywords

Smart City, Internet of Things, Dynamic and adaptable systems, Context aware services, REST API.

Required skills/background

- Strong motivation towards this challenging project
- Ease in programming (mainly C++, Python, Java, etc.)
- Ease in programming in Android and/or Swift
- Skills in Linux, embedded systems (Raspberry PI, Arduino, etc.)
- Skills in Web services

Role of the student/Intern

Students/Interns will be involved in the following tasks:

- Design and develop new components that enable better management of IoT and User data.
- Design and develop advanced interaction mediums
- Design and develop an algorithm to analyze activities description in social media networks.
- Design and develop a reasoning engine to recommend activities for an aging person according to his preferences and profile.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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Student/Intern project

IoT feedback platform for smart cities

Smart Houses and Cities are augmented environments capable of utilizing the Internet of Things (IoT) and multimodal sensors, in which computational intelligence is ubiquitous to provide contextual, proactive and personalized services to people. IoT is an emerging technology that provides diverse capacities to incorporate everyday objects into computational support for user activities. These IoT objects are "smart" components interact and provide information that complements artificial intelligence algorithms in order to better address user requirements. E.g., a "smart" mirror in the bathroom interacts with a user's agenda, being aware of the next activity and showing automatically the best route to reach the activity.

Combined with IoT technologies in smart environments, health telematics can radically transform the way health-related services (diagnosis, therapy and assistance) are conceived and delivered. At our lab, a framework is being developed to help the elderly people lead an independent and purposeful life, through ambient assistive technologies. The framework includes software components to integrate context from sensors. These components implement diverse protocols for smart houses (e.g., Zwave, Bluetooth Low-Energy, Beacon), and include processes to persist and interchange context.

Keywords

Smart City, Internet of Things, REST API, Android, Swift Sensors & Beacons, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Skills in Android
- Skills in Linux, embedded systems (Raspberry PI, Arduino, etc.)
- Skills in Web services
- Ease in programming
- Strong motivation towards this challenging project

Role of the student/Intern

We packaged our system in a gateway in order to (1) send sensor data to a server-based platform where it is processed, (2) provide necessary subscriptions and configuration tools to access assistive services, and (3) enable advanced user interaction via diverse actuators. The implementation of the framework involves C++, Web services, distributed systems and communication protocols.

The student/intern will be involved in exploring mechanisms that augment human activities using feedback options, such as showing video, producing sounds, generating vibration, virtual reality, augmented reality. She/he will also be involved in the design and development of an API to manage heterogeneous actuators, as well as in the implementation of a prototype scenario for testing purposes. The scenario will include mobile devices; therefore, mobile development is also required.

Application

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Septembre 2020

Interoperability of IoT components in smart cities

Smart Cities are augmented environments capable of utilizing Internet of Things (IoT), in which computational intelligence is ubiquitous to provide people with contextual, proactive and personalized services. These environments will provide ubiquitous information and services to promote well-being as well as better management of the city's resources.

An IoT framework is being developed at the AMI-Lab to promote better delivery of services in Smart Cities. We mainly target helping aging people to lead an independent and purposeful life, through ambient assistive technologies. The framework includes software components to integrate context from IoT devices. These components implement diverse protocols (e.g., Zwave), and include processes to persist and interchange context. Our platform similarly manages emerging protocols providing context outdoor (e.g., Bluetooth low energy) as well as technologies providing services (e.g., IoT services, cloud computing). All context and services are integrated, pre-processed and kept in a knowledge base, to be consumed through the city. The design incorporates design patterns and optimization of algorithms to deploy in kiosks through the city, with small computation capacities (i.e., processor, memory).

Our team has also deployed diverse IoT devices in the city of Sherbrooke (e.g., sensors, actuators). We are also currently extending our platform to include various outdoor technologies to provide a solution that integrates many IoT objects (i.e., smart objects through kiosks and smartphones). These IoT objects involve diverse interfaces, inputs/outputs, services, and data formats to interoperate (i.e., sharing resources and services). The IoT interoperability is challenging because every day new services are available on the Internet to automatize user activities (e.g., social network services, smart home services, health services, environment services). The diversity of services brings the necessity of a service-IoT standardization for interoperability.

Keywords

Interoperability, Smart City, Internet of Things, REST API, Android, Swift Sensors & Beacons, Dynamic and adaptable systems, Context aware services.

Required skills/background

- Strong motivation towards challenging projects
- Ease in programming
- Knowledge of Web services + Recommended knowledge of software design patterns
- Recommended skills in Linux, embedded systems

Role of the student/Intern

The student/Intern project involves analyzing the diverse types of services for a subsequent design of an application programming interface (API) to standardize the service access (publish and consume). The types of services are useful services for IoT, e.g., services with authentication (e.g., Facebook, mail and calendar), services with calls over the internet with a key (e.g., OpenWeatherMap), services with calls over the internet without a key (e.g., reading RSS), smart home/smart city services (e.g., cloud services, services provided by our framework). Afterward, the student must develop a prototype to demonstrate the functionality of the API. The API and components should be developed in C++ and deployed on a Raspberry PI platform (Linux).

Application

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Septembre 2020

Student/Intern project

IoT Proximity solution in smart cities

Smart Cities are augmented environments capable of utilizing the Internet of Things (IoT), in which computational intelligence is ubiquitous to provide people with contextual, proactive and personalized services. These environments will provide ubiquitous information and services to promote well-being as well as better management of the city's resources.

An IoT framework is being developed at the AMI-Lab to promote better delivery of services in Smart Cities. We mainly target helping aging people to lead an independent and purposeful life, through ambient assistive technologies. The framework includes software components to integrate context from sensors. These components implement diverse protocols (e.g., Zwave), and include processes to persist and interchange context.

Our team has deployed diverse IoT components in the city of Sherbrooke (e.g., sensors, actuators). We are also currently extending our platform to include various outdoor technologies in order to provide a solution that integrates a large number of IoT objects (i.e., smart objects through kiosks and smartphones). All context and services are integrated, pre-processed and kept in a knowledge base, to be consumed through the city. To provide a personalized service providing, our platform requires a solution to detect users and evaluate their proximity to IoT objects. Nowadays, Beacons/Bluetooth low energy are among the permission solutions to investigate.

Keywords

Interoperability, Smart City, Internet of Things, REST API, Android, Swift Sensors & Beacons, Dynamic and adaptable systems, Context aware services.

Required skills/background

- Strong motivation towards challenging projects
- Ease in programming (C++, Java, etc.)
- Recommended skills in Linux, embedded systems (Raspberry PI, Arduino, etc.)
- Recommended skills in Web services
- Recommended skills in Beacons and Bluetooth low energy

Role of the student/Intern

The student / Intern project mainly involves the evaluation and deployment of Beacons that allows integrating proximity context to improve end-user localization. The student / Intern will be working on the use of the proximity context for combining with GPS information (outdoor in the city) or spatial information (indoor in a home) to infer the best location. The student / Intern will be involved in the implementation of a prototype to evaluate diverse use cases, including mobility from the smart home to the smart city, i.e., automatic inferring the best available service based on proximity.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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MSc student/Intern project

IoT based Learning from activities in smart cities

Smart Cities are augmented environments capable of utilizing the Internet of Things (IoT), in which computational intelligence is ubiquitous to provide people with contextual, proactive and personalized services. These environments will provide ubiquitous information and services to promote well-being as well as better management of the city's resources.

Ambient intelligence services have been successfully deployed in smart cities for providing computational support in pre-defined people activities (e.g., a guided museum visit). For unknown situations, the available support differs from pre-defined ones, and the support reaches a high level of uncertainty in the computational system. Then, diverse user interventions are required by the system to determine the appropriate correlation between situation and activity. As a result, ambient intelligence systems require an approach to update pre-defined activities in order to minimize user interventions.

In our research work, we are developing applications for supporting non-technical users (i.e., elderly people) in everyday activities. These users demand ambient intelligence support with a minimal interface because they cannot configure a computational system as a technical user. Furthermore, we need to address unknown situations of pre-defined activities by correlating with similar situations, past experiences and current context. Therefore, we need to provide the means for learning from successful tasks (i.e., goal-achieved tasks belonging to an activity). The aim of the project is to minimize user interventions in everyday activities by using machine learning mechanisms.

Keywords

Smart City, Internet of Things, Big data, REST API, Sensors, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Strong motivation towards challenging projects
- Skills in Android
- Skills in Linux, embedded systems (Raspberry PI, Arduino, etc.)
- Skills in machine learning
- Skills in Web services
- Ease in programming

Role of the student/Intern

The student/intern will research available machine learning mechanisms and select appropriate algorithms that enable an incremental learning from tasks. Subsequently, the student/intern has to implement a prototype which includes the selected algorithms and interchange data with our applications in order to correlate situations. For testing purposes, the student/intern will configure a scenario and generate multiple cases with variant tasks of an activity. Finally, the student/intern has to provide a paper-style report of the challenges in the proposed approach.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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Unobtrusive monitoring of vital signs

Description of the research project

Unobtrusive monitoring of vital signs is an increasing requirement from the medical community. Biomedical sensors have to be in operation 24/7 in institutions of long-term care (e.g., nursing homes) and in elderly people home.

We propose designing and developing a system for remotely collecting vital signs unobtrusively from patients. The topic of the project is on the analysis and validation of signals received from several IoT based body sensors to continuously monitoring heart rate and breathing rate. It will involve biomedical signal processing to remove noise and then to extract the characteristic points for determining the heart rate and breathing rate. The system will be tested in real-world environment, for example in nursing homes.

Keywords

Internet of Things, Vital signs, Health care, REST API, Android, Swift Sensors, Dynamic and adaptable systems, Real life deployment.

Required skills/background

- Strong motivation towards this challenging project
- Ease in programming (mainly C++, Python, Java, etc.)
- Ease in programming in Android and/or Swift
- Skills in Linux, embedded systems (Raspberry PI, Arduino, etc.)
- Skills in Web services

Role of the student/Intern

This student/intern will be involved in the following tasks:
- Design and implement sensory data acquisition algorithms.
- Development of signal processing algorithms to analyze data from biomedical sensors.
- Design and implementation of a reasoning engine to detect dangerous health situations.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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Septembre 2020

Student/Intern project

Fault Tolerance Analysis of IoT devices in smart cities

Smart Cities are augmented environments capable of utilizing the Internet of Things (IoT), in which computational intelligence is ubiquitous to provide people with contextual, proactive and personalized services. These environments will provide ubiquitous information and services to promote well-being as well as better management of the city's resources.

An IoT framework is being developed at AMI-lab to promote better delivery of services in Smart Cities. We mainly target helping aging people to lead an independent and purposeful life, through ambient assistive technologies. The framework includes software components to integrate context from IoT devices. These components implement diverse protocols (e.g., Zwave), and include processes to persist and interchange context. Our platform similarly manages emerging protocols providing context outdoor (e.g., Bluetooth low energy, Beacon) as well as technologies providing services (e.g., IoT services, cloud computing). All context and services are integrated, pre-processed and kept in a knowledge base (NoSQL/big data technologies), to be consumed through the city.

Our team has also deployed diverse IoT devices in the city of Sherbrooke (e.g., sensors, actuators). We are also currently extending our platform to include various outdoor technologies in order to provide a solution that integrates a large number of IoT objects (i.e., smart objects through kiosks and smartphones). Therefore, a tool that enables automatic processing of the IoT devices is required for efficient analysis. Recent advances in language technologies/machine learning are promising and enable to gain useful insights from the IoT gathered data.

Keywords

Smart City, Internet of Things, Big data, REST API, Android, Swift Sensors & Beacons, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Strong motivation towards challenging projects
- Skills in machine learning
- Ease in programming
- Recommended skills in Linux, embedded systems (Raspberry PI, Arduino, etc.)
- Recommended skills in Web services
- Recommended skills in Android

Role of the student/Intern

The student/intern project mainly involves the design of a fault tolerance analysis solution that enable managing remote IoT devices. The student/intern will be working on the implementation of a prototype that ensures a follow-up of real remote IoT devices we deployed in our city. The student/intern may use algorithms of machine learning to automatically provision, configure, detect failure in our devices.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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Student/Intern project

IoT based Service provisioning for Active Aging in Smart Cities

The Internet of Things (IoT), smart-phone, wearable technologies are emerging technologies that provide diverse capacities to incorporate everyday objects into computational support for user activities in Smart Cities. These environments will provide ubiquitous information and services to promote active aging and well-being.

An IoT framework is being developed at the AMI-Lab to promote better delivery of services in Smart Cities as well as providing technological solutions that help overcome the challenges raised by the evolution of dependency and support aging people in having a kind quality of life. AMI-Lab have deployed the framework with diverse IoT devices in the city of Sherbrooke (e.g., sensors, actuators). The team is currently extending our platform to include various outdoor technologies in order to provide a solution that integrates a large number of IoT objects (i.e., smart objects through kiosks and smartphones). Our team is also working on a platform for service provisioning that ensure the continuity of services (assistance) from individual houses to Smart Cities. The goal is to extend the period of service coverage (i.e., independent living) and ensure a rapid response when needed.

Keywords

Smart City, Internet of Things, Big data, REST API, Android, Swift Sensors & Beacons, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Skills in Android
- Skills in Linux, embedded systems (Raspberry PI, Arduino, etc.)
- Skills in Web services
- Ease in programming (mainly C++)
- Strong motivation towards this challenging project

Role of the student/Intern

The student/intern project mainly involves the design of a service provisioning software solution that enables continuity of services. The solution is based on diffuse/ubiquitous technologies (e.g., motion sensors, vibration sensors, contact sensors), mobile technologies (e.g., smartphones, smart-watch) or technologies deployed in the city (e.g., proximity technologies) to monitor the situation of the elderly and intervene when necessary. The student/intern is asked to:

1) manage the data acquisition from smartphones/IoT deployed technologies in smart-cities;
2) Propose a data processing and a reasoning process on the server side in order to infer the situations of users in smart-cities. A model is needed to represent user's environment and context;
3) Define an interaction and intervention protocol to be used to interact with users and their caregivers/family members; and
4) develop services on smarphones/IoT to assist users in smart-cities.
5) validate his results through real world deployments.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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MSc student/Intern project

Execution plan of complex tasks in Smart cities

Smart Cities are augmented environments capable of utilizing Internet of Things (IoT) and multimodal sensors, in which computational intelligence is ubiquitous to provide contextual, proactive and personalized services to people. The ambient intelligence in these environments will provide ubiquitous information and services to promote well-being and enable supporting people's health and life conditions.

One of the challenging aspects of smart cities is to provide computational support considering the dynamicity of people activities in these smart cities. People activities involve diverse tasks that are performed based on a goal. Achieving a goal that involves complex tasks requires that a person organizes these tasks and perform them based on an execution profile (i.e., the context of needs, desires, motivations, available resources). Nevertheless, there exist behavior-based approaches that facilitate the execution of complex tasks in non-human activities, e.g., characters in video games, missions in drones.

AMI-lab is developing a framework for integrating context and services to support user activities. Furthermore, we require creating a behavior knowledge base for user activities that enable to control the execution of dynamic tasks. As an example, in video games, creating characters demands a behavior designer who is in charge of defining the behavior of each character to be natural for the user. The outcome of the behavior designer is a knowledge base of behaviors that are the basis for diverse artificial intelligence algorithms for programming video game cycles.

Keywords

Smart City, Internet of Things, wearable technology, REST API, Android, Swift Sensors & Beacons, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Strong motivation towards challenging project
- Ease in programming (C++, Java, etc.)
- Ease in programming in Android and/or Swift
- Skills in Linux, embedded systems (Raspberry PI, Arduino, etc.)
- Recommended skills in Web services

Role of the student/Intern

The student/intern project involves the design and implementation of a tool for generating a knowledge base of behavior that allows monitoring everyday activities. The tool considers the formation of baseline behaviors of activities for a subsequent classification of behavior. Finally, the student/intern will be invited to create a prototype application that maintains the knowledge base of activities and implements a classification algorithm.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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Septembre 2020

MSc Student/Intern project

Sensing Environment from Social Media Networks

Description of the research project

Social media users are likely to commonly share observations that may be useful for the monitoring of environment, health and several issues. For example, a Tweet, accompanied with a photograph, reports a cleanliness problem in a city.

This project aims to develop a prototype system for the discovery and fusion of information from social media for the early detection and monitoring of environment including several issues (e.g., health, safety, security). In the second part of the project we study the proactive sensing and monitoring by means of crowd sourcing. We aim to design and develop a mobile application that allows users to post and tag environmental information to dedicated social media streams.

Keywords

Smart City, Big data, REST API, Android, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Strong motivation towards this challenging project
- Skills in data mining, artificial intelligence, Android, and programming C++

Role of the student/Intern

The student/intern will be involved in the following tasks:

- Design a model and techniques to sense environmental information from social media networks.
- Implementation of environmental sensing models.
- Design and implement a reasoning engine based on data mining and artificial intelligence techniques to analyze data gathered from environmental sensing.
- Design and implement a tool to detect specific issues (e.g., health, safety, security threats)

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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MSc student/Intern project
Learning from activities of daily living

Description of the research project

Ambient intelligence services have been successfully deployed for providing computational support in pre-defined people activities (e.g., for cooking, for a guided museum visit). For unknown situations, the available support differs from pre-defined ones, and the support reaches a high level of uncertainty in the computational system. Then, diverse user interventions are required by the system to determine the appropriate correlation between situation and activity. As a result, ambient intelligence systems require an approach to update pre-defined activities in order to minimize user interventions.

In our research work, we are developing applications for supporting non-technical users (i.e., elderly people) in everyday activities. These users demand ambient intelligence support with a minimal interface because they cannot configure a computational system as a technical user. Furthermore, we need to address unknown situations of pre-defined activities by correlating with similar situations, past experiences and current context. Therefore, we need to provide the means for learning from successful tasks (i.e., goal-achieved tasks belonging to an activity). The aim of the project is to minimize user interventions in everyday activities by using machine learning mechanisms.

Keywords

Smart City, Big data, REST API, Android, Dynamic and adaptable systems, Context aware services, Real life deployment.

Required skills/background

- Strong motivation towards this challenging project
- Skills in data mining, artificial intelligence, Android, and programming C++

Role of the student/Intern

The student/intern will research available machine learning mechanisms and select appropriate algorithms that enable an incremental learning from tasks. Subsequently, the student/intern has to implement a prototype which includes the selected algorithms and interchange data with our applications in order to correlate situations. For testing purposes, the student/intern will configure a scenario and generate multiple cases with variant tasks of an activity. Finally, the student/intern has to provide a paper-style report of the challenges in the proposed approach.

Application

Interested applicants email a detailed CV, transcripts and motivation letter to the lab director. The successful candidate will be contacted shortly after processing the received applications.

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