Università
della
Svizzera
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Facoltà
di
scienze
informatiche

Edge Computing in the IoT

Course Project Rules and Proposals

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About Course Projects

- Course projects will be accounted for 40% of your final grade
- Course projects are to be developed in groups of 3-4 students
- Every project should include the design and the implementation of a complete IoT system
  - **Emphasis should be on the the design and on the edge components**
  - Possibly including machine learning
  - In the project you are supposed to apply in practice the knowledge acquired during the course
- Some time for the projects allocated during classes, but most of the project should be developed outside class time
  - Suggestion: use the time in class to discuss ideas and problems with the instructors
  - **Even though we start the projects at the beginning of the course, you are not asked to work on it for the whole period of the course**
    - We need time to plan and purchase missing components

Expected Results

- A working prototype of the system
  - Nodes + gateway (if required) + cloud
- A 10-page (single column) report including
  - System design
  - Description of system implementation
  - Results
- A 20-minute (+5 for questions) presentation
  - A live demo is welcome, but not strictly required

- **All these three elements will be considered in evaluating the project**

Timing

- Projects must be chosen by Monday the 2nd of October
  - Send an e-mail to alberto.ferrante@usi.ch specifying
    - **“[ECIoT Project]” in the subject**
    - Group components
    - Project topic of choice
- Based on the specification, we will define the required equipment and purchase it if necessary
  - Requirements and specification will be discussed with the instructors
  - Equipment to be used will be decided along with the instructors
- Final project presentations: Dec the 22nd
  - **The final project report, the presentation slides, and all the developed code must be uploaded on iCorsi by December the 21st at 23:59**

Project Ideas – Lake Water Monitoring

- Mobile system for monitoring lake water quality
  - Installed on multiple boats or deployed in fixed locations
- Can report water quality
  - Water temperature
  - Presence of dangerous chemicals
  - ...
- If many boats are used, it is possible to build/update a map of the water quality

Project Ideas – Precision Agriculture

- Collect data on the local environment
  - Air temperature
  - Air humidity
  - Soil humidity
  - Weather forecasts
  - ...
- Collect data on crops
  - Height
  - Presence of flowers
  - ...
- Plan (and actuate) optimal watering of crops
- Plan fertilizers and other products

Project Ideas – Bus Monitoring

- Collect data on position of buses
  - Position
  - Position w.r.t. timetable
  - Speed
- Derive data on city traffic
- Monitor occupancy of buses

Project Ideas – Gesture-based Home Automation Control

- Hand gestures is used to control smart devices for home automation. E.g.,
  - A certain gesture switches on or off the light in a specific room
  - Another gesture opens/closes the window