

Pervasive Systems

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Lecture 2:
Course Overview



Goal of Course

- ▶ Introduce emerging application scenarios
- ▶ Study characteristic design approaches of Pervasive systems and networks
- ▶ Examine essential distributed algorithms and protocols
- ▶ Engineer algorithms in open-design
- ▶ Conduct real-world experimentation.



Part 1: Internet of Things

1. Embedded Programming
 - ▶ STM Nucleo Platform
2. Large scale experimentation
 - ▶ IOT-Lab facilities
3. Operating system for the Internet of Things
4. Machine-to-Machine Communication
 - ▶ IPv6LoWPAN (RPL, COAP), MQTT
5. Low-Power Wide-Area Networks
 - ▶ LoRA, TheThingsNetwork
6. Security and Cryptography



Part 2: Intelligent Environments

1. Interaction Design for Pervasive & Ubiquitous Computing
2. End-user driven development
3. Participatory Sensing
4. Smart Cities
 - ▶ Social Smart Cities



Part 3: Programming Tools

1. Operating Systems and Embedded Solutions
2. Back-end Infrastructure and Middleware
3. Cloud Services
4. Hardware Prototyping Platforms
5. NFC Beacon Technologies
6. Wearables and Other devices



Projects & Exams

1. Personal Mini-project
 - ▶ Technology oriented (hardware or software)
 - ▶ Presentation of technology in class
 - ▶ Demonstration
2. Group Project
 - ▶ 2 people per project
 - ▶ Design a Pervasive system
 - ▶ Develop the system using appropriate technologies
 - ▶ Test & Evaluate in real-world conditions
 - ▶ Open-source – Open-design



Projects & Exams

1. Personal Mini-project
 - ▶ Technology oriented (hardware or software)
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2. Group Project
 - ▶ 2-3 people per project
 - ▶ Design a Pervasive system
 - ▶ Develop the system using appropriate technologies
 - ▶ Test & Evaluate in real-world conditions
3. Involvement in already established Open-source project
 - ▶ Earn bonus points
 - ▶ Contribute code



Personal Mini-project

1. Operating Systems and Embedded Solutions
 - ▶ AWS FreeRTOS
 - ▶ Arm Mbed
 - ▶ Zerynth
2. Back-end Infrastructure and Middleware
 - ▶ VerneMQ
 - ▶ InfluxDB
 - ▶ API.AI
3. Cloud Services
 - ▶ AWS IoT
 - ▶ IBM Watson Internet of Things
 - ▶ NodeRED
 - ▶ Blynk



Personal Mini-project (cont)

1. Hardware Prototyping Platforms
 - ▶ Genuino 101
 - ▶ Particle
2. NFC Beacon Technologies
 - ▶ Estimote
 - ▶ Sensoro
 - ▶ AltBeacon
3. Wearables and Other devices
 - ▶ miBand
 - ▶ ELM326 OBD



Personal Mini-project Timeline

1. Topic Assignment
 - ▶ Friday, March 9, 2018
2. Presentations
 - ▶ Wednesday, May 9, 2017
 - ▶ Friday, May 11, 2017
 - ▶ Wednesday, May 16, 2017
 - ▶ Wednesday, May 23, 2017



Group Project Topics

1. Group Formation
 - ▶ Friday, March 9, 2018
2. Topic Selection
 - ▶ Friday, April 13, 2017
3. End-user Driven Design
 - ▶ Friday, May 4, 2017
4. Evaluation / Trial
 - ▶ Friday, May 18, 2017
5. Final Presentation / Demo
 - ▶ Friday, June 1, 2017

