DT582D
Internet of Things

Lab Tasks Description

For details, read the IoT lab instruction manual
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Introduction

- In the duration of this course, you shall work on a number of inter-related lab activities.

- The objectives of the labs are to familiarize you with the different layers of IoT systems, namely:

  - Devices (sensors and controllers/actuators)

  - Connectivity (from device to Cloud)

  - Cloud services for IoT (data storage, analysis, security)

  - IoT application development

- You shall work in groups (will be formed today)

Equipment List

- Student's computer: needed for application development, testing, documentation, etc.

- Raspberry Pi: used as a thing or to connect things to our IoT environment.

  - Each group will have one unit.

  - Additionally, monitor, HDMI cable, Keyboard and Mouse (to use the Pi)

Equipment List (cont'd)

- Nordic Thingy52: this is the thing (device with 52 different sensors on it)

  – Each group will have one unit

- TP-link HS100 smart plug (also one per group)

Equipment List (cont'd)

The following components are shared by all groups

- Philips Hue Light

- Netio4 smart plug

- Bluetooth 4.0 adapter

- ASUS WiFi Router

- Touch Screen (accessory to Pi)

- Camera (accessory to Pi)

- PIR sensor (accessory to Pi)

You need to make an arrangement or agreement among the groups on the effective use of this units in rotation.

Software Environment

- You need to install Node.js on your Pi (and also on your computer for testing purposes).

- Cloud storage: Google's Firebase.

    – It is also possible to use other products if you are already familiar with one.

- IFTTT (a platform specifically built to support IoT development projects)

- You shall find some details in the appendices.

Network Environment

- It is recommended that you connect to our own lab SSID (***IoT_Lab***) for all WiFi connections (including Pi, TP link smart plugs, etc.).

- For the TP link smart plug, only 2.4 GHz WLAN works.

- The password to connect to the SSID IoT_Lab is: "*HKR_IoT_Labb*".

- For more details on the network configuration, read the lab instruction document.

Tasks to Accomplish

In this course, you are expected to build certain IoT functionalities of smart homes such as the following:

- Remote control of a smart plug (turn on/off a plug wirelessly)

- Web based access to sensor data (real-time)

- Web based control of things (including Cloud)

- Automation and control with IoT

* Detailed descriptions of the tasks are available in the lab instruction manual.

Additional Tasks on the Cloud

- You shall experiment with Qwiklabs modules on the Google Cloud Platform (GCP).

- This modules help you to understand the services and application side of IoT using GCP.

- You shall learn the following:

  – how to build IoT workflow on GCP

  – How to analyze sensor data

  – How to build a simple website (application)

- You have been granted access to GCP.

Qwiklabs Modules

You shall complete the following modules:

- *Creating a Virtual Machine*
- *Google Cloud Storage*
- *Internet of Things: Qwik Start*
- *Google Cloud IoT Core Commands*
- *A Tour of Cloud IoT Core*
- *Building a Website on the Google Cloud*
- *Streaming IoT Data to Cloud Storage*
- *Streaming IoT Core Data to Dataprep*
- *Building an IoT Analytics Pipeline on Google Cloud*