AMC SS2023

Student Project Offers

1. Green Fab Lab Greenhouse window automation and climate control
2. Green Fab Lab Greenhouse water monitoring and irrigation
3. Green Fab Lab Smart irrigation with “Gießwagen”
4. Smart bird house with computer vision (ESP CAM, WiFi, Dashboard)
5. Animal detector with computer vision and AI (WiFi, Dashboard)
6. Smart greenhouse water trolley (WiFi, Dashboard), e.g. https://www.rathmakers.de/project/hgw/
7. Smart metering: gas meter with magnetic sensor (LoRa, WiFi, Dashboard)
8. Smart metering: water meter with computer vision (LoRa, WiFi, Dashboard)
9. Intrusion detection (LoRa, Dashboard).
   Use the Arduino compatible HelTec CubeCell MC board with LoRa (https://heltec.org/project/htcc-ab01-v2/)
   Sensors:
   1. PIR motion detecion (e.g. https://www.youtube.com/watch?v=M4q85neFwjE)
   2. IR laser barrier
   3. Radar (Microwave) proximity sensors (e.g. https://www.youtube.com/watch?v=IJoPkKlxFXA)
   4. Noise (Microphone)
   5. Pressure
   6. etc.

Structure / Methods / Technologies

- Class build around Home Assistant
- Many Features and topics especially in combination with Addons
  - MQTT
  - NodeRed
  - Grafana
  - InfluxDB
  - MariaDB
- Every Group with its own Home Assistant Server
- First half of the class: Get to know the basics of all the systems
- Second half: Working in groups on actual projects (preferably for the greenhouse). Self-teaching in the topic of interest. Class hours = Lab Hours
- 4 Groups (9 possible with seconds cluster)

Class ideas

1. Tasmota
   1. What is an MCU
   2. What protocols are there
   3. What is Tasmota
   4. Integration of one sensor in Tasmota

    5. Task: Find out how to connect a different sensor to Tasmota
2. Introduction to Home Assistant and start with MQTT in Connection with Tasmota
3. Introduction to NodeRed
4. Introduction to InfluxDB and MariaDB
5. Introduction to Grafana and how to combine all the previous stuff

Some Links

- Home Assistant WiFi AccessPoint with RPi

AMC Hardware Boxes

- Esp8266
- Vl53l0x
- Widerstand Set
- 2x Knöpfe
- 3x R/Y/G LED
- RTC
- 2x Poti
- Breadboard
- Mf und mm Kabel
- USB Kabel
- Ds18b20

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