

Research purpose

Smart homes, smart buildings and smart cities rely on advanced information systems such as Cyber-physical Systems to deliver more efficient and better public services.

The purpose of this internship is to introduce the fundamental aspects of smart applications in the smart built environment and to cover their full design cycle: distributed wireless sensors, data sensing, data transmission, data collection and data management, data visualisation and user interaction.

Aim

To build a complete prototype of a temperature sensors network combining custom-built sensors, off-the-shelf devices, and close the data management cycle of sensors observations.

Methodology

- Environmental/temperature sensors were deployed in and around the Knowledge Dock building, Docklands campus (Fig.1) at University of East London (UEL).
- The distributed wireless sensors (Fig.2) were digitally connected to a local database located in the Docklands campus.
- Data was stored on a server located in the Docklands campus.
- Collected data was analysed by using data visualisation tools.

Smart Built Environment



Fig. 1 Knowledge Dock building, UEL, where distributed wireless sensors are installed



Fig. 2 Wireless network devices: distributed sensors and gateway

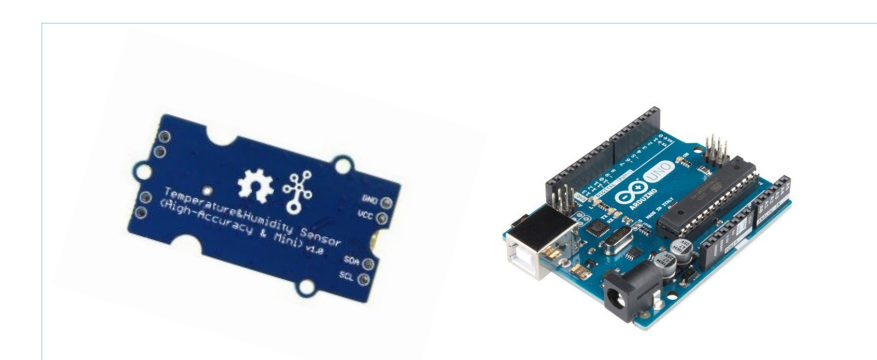


Fig. 3 Wired network devices: Grove and Arduino

Working on a research project alongside an experienced researcher and a PhD student, and being part of a research community, was an excellent opportunity for me to grow professionally, with great positive impact on my student experience! Iuliana



Data collection and analysis

Distributed wireless sensors (Fig.2), Grove and Arduino devices (Fig.3) were used for data collection.

The data collected from sensors was saved in our own MySQL database using Java programming language.

Data was analysed by using visualisation tools such as: iMonnit wireless sensors portal/monitoring software (Fig. 4) and Excel.

Data analysis showed that temperature readings can be influenced by various factors, such as: sun/cloudiness, wind, shade and surroundings.

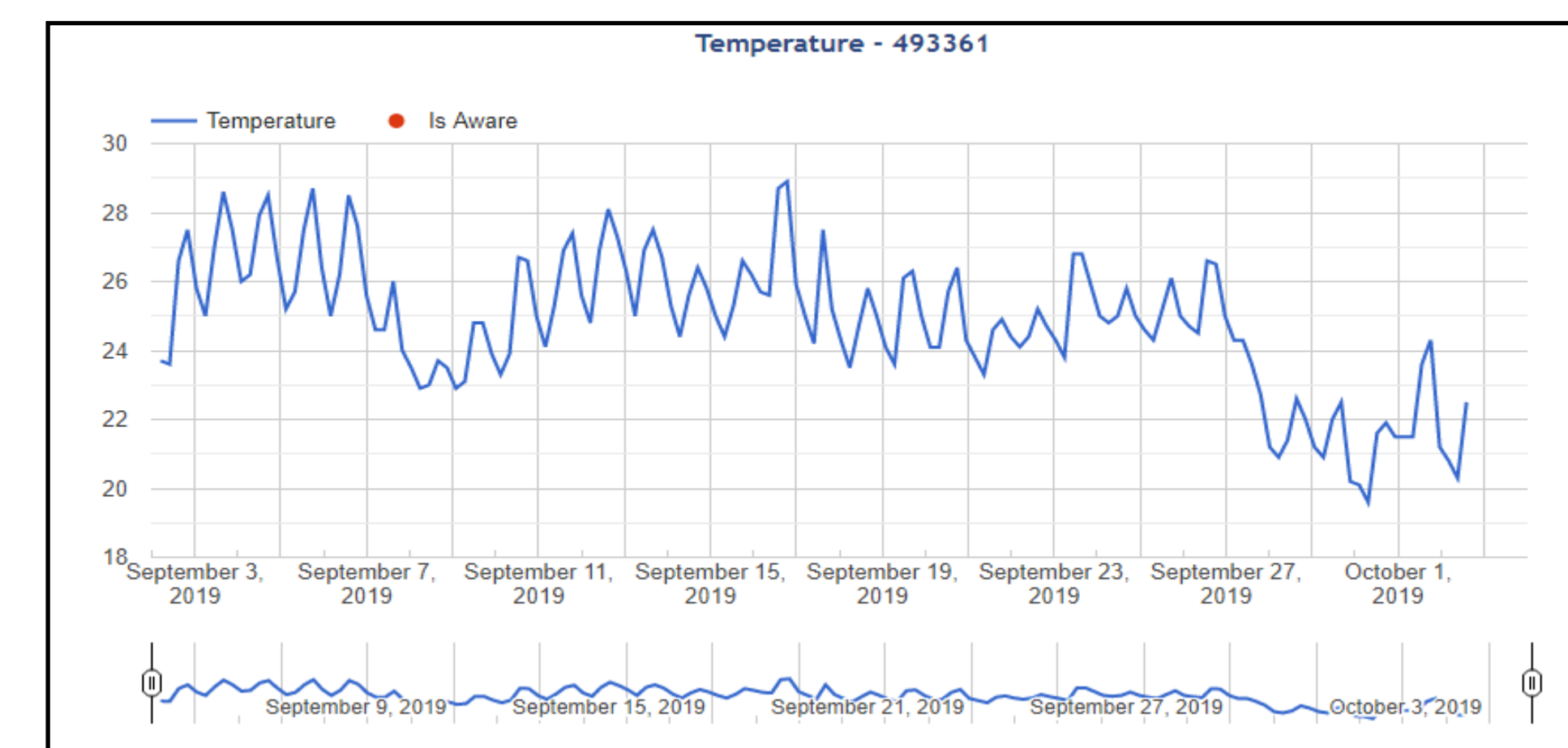


Fig. 4 iMonnit temperature sensor readings

Outcomes/Benefits

Main research outcomes/benefits are:

- I learnt how to connect temperature distributed wireless sensors and Arduino devices, monitor the temperature using the iMonnit wireless sensors portal/monitoring software, and collect temperature data in a MySQL database.
- I learnt how to analyse the data using various visualisation tools, such as iMonnit wireless, Excel software and R programming language.