Lab0: Discovering IoT in Daily Life

Submission Deadline: 23:59 pm, Feb 15, 2025

Note 1: Lab0 is an optional lab, weighting 1-point bonus in your final grade.

Note 2: Lab0 is completely different from other labs and projects. Lab0 does not necessarily need programming, while all others are (small) programming assignments.

Objective:

The purpose of this lab assignment is to encourage students to explore the world of IoT (Internet of Things) in their daily lives, identify an IoT system or signal, and conduct observations or measurements of the identified system or signal. Students will then write a one-page report describing their findings.

Instructions:

Step 1. *Choose an IoT system or signal*: Begin by identifying an IoT system or signal that you encounter in your everyday life. This could be a smart home device, a wearable technology, a sensor network, or any other connected system that collects, processes, or transmits data. For example, many smartphones have a built-in barometer that measures atmospheric pressure.

Step 2. *Observe and measure*: Spend some time observing the chosen IoT system or signal. Take note of its features, functionality, and purpose. If possible, perform measurements or collect data related to the system or signal. You can leverage existing Apps, tools, open-source codes for this purpose, and do not necessarily need to develop your own measurement tool for this lab. In the barometer example, you could measure the atmospheric pressure at different times of the day or in different locations.

Step 3. *Identify a problem or research question*: Based on your observations and measurements, identify a problem or research question related to the IoT system or signal. This could be a challenge faced by the system, an area for improvement, or a question about how the system works or could be optimized. For instance, you might investigate how the barometer's readings are affected by temperature or humidity. Or you may find it inaccurate in estimating the absolute altitude. You only need to *ask* the question, but don't worry whether you have a solution or not.

Step 4. *Write a one-page report:* Compile your findings into a ***one-page report in two-column format using 10-pt font size***, including the following sections:

0) <u>Abstract</u>: 100-words summary of the report.

1) <u>Introduction</u>: Briefly introduce the IoT system or signal you have chosen (e.g., the barometer in a smartphone) and explain its relevance to daily life.

2) <u>Observation and measurement</u>: Describe your observations and any measurements you made related to the IoT system or signal. Include any relevant data or figures that support your findings. In the barometer example, you could present a table or chart showing the atmospheric pressure readings in different conditions.

3) <u>Problem or research question</u>: Present the problem or research question you identified based on your observations and measurements. Explain why this problem or question is significant and how it relates to the IoT system or signal. In the barometer case, discuss how understanding the impact of environmental factors on the readings could improve the accuracy of the device.

4) <u>Conclusion</u>: Summarize your findings and discuss the potential implications of your work. Consider how addressing the identified problem or research question could enhance the IoT system or signal's performance, functionality, or usability. In the barometer example, you might suggest ways to improve the device's design or calibration to account for environmental factors; or you might suggest using relative height change rather than the absolute altitude for further applications.

Submission:

Submit your one-page report in PDF format via Moodle by **23:59 pm, Feb 15, 2025**.

Grading:

Your report will be graded based on the clarity and quality of your writing, the relevance and accuracy of your observations and measurements, and your ability to identify a meaningful problem or research question related to the IoT system or signal. We love to see interesting facts that we don't know from your report!

Remember to think critically and creatively as you explore the world of IoT in your daily life. Good luck, and have fun discovering IoT systems and signals!