1st Weekly Report

Report Date: 01/12/2023

To: include all managers (e.g., ematson@purdue.edu, ahsmith@purdue.edu, lhiday@purdue.edu and lee3450@purdue.edu)

From: GO duck

- Gwangyeok Kim (kim4174@purdue.edu)

- Keonwoo Lim (lim409@purdue.edu)

- Sujee Noh (noh29@purdue.edu)

- Younguk Maeng (TBD)

1 Summary

- Made a 5 minute presentation on Jan 9.

- ClusterDuck: Set up a Mamaduck on Jan 11.

- Created a Notion page, github README.md file for the project on Jan 12.

- Read up on related research papers throughout the week.

- Went through the Overleaf tutorial. Wrote this very weekly report in LaTeX.

- Came into contact with the new member, Younguk Maeng. All of the information concerning the project was shared with him via Kakaotalk and Notion.

2 What GO duck completed this week

- Made a 5 minute presentation on Jan 9 that briefly outlined the project we plan to work on - goTenna vs ClusterDuck: performance evaluation. The presenter was Sujee Noh, chosen by Wheel of Names. Received some feedback after the presentation and changed one of the testing environments to a more reasonable distance (0.1 mile indoor).

- Gwangyeok Kim:

  - Wrote a draft for Research Problem Statement in README.md.
  - Searched for related research papers.

- ClusterDuck: set up a ESP32 board

Trouble:
The board not recognized by Arduino IDE. The port menu *Tools | Port* was missing, Window's device manager showed an issue on CP2102 USB to UART Bridge Controller.

Solution:
Manually downloading / installing the necessary driver from the according manufacturer [1] resolved the issue.

- ClusterDuck: set up a Mamaduck

Trouble:
The official setup guide [2] referred to the master branch, but it did not contain the necessary folder called Libraries. The pr-284-2 branch with the latest update, however, contained the said folder. There were no files directly uploaded to the Libraries folder, only submodules. Cloning the pr-284-2 branch left empty folders with the name of each submodules.

Solution:
Manually downloading each submodules as in .zip files, then adding the files via *Sketch | Include Library | ADD .ZIP LIBRARY* in Arduino IDE were necessary. The pr-284-2 branch, however, contained code files causing conflicts in variable names in src folder. Using the master branch and manually adding .zip files from pr-284-2 branch resolved the issue.

- Keonwoo Lim:
  - Completed a github readme file.
  - Researched articles related to goTenna, ClusterDuck, mesh networking, LoRa, and protocols used in goTenna.
  - Summarized all the related works that have been found.
  LoRa Mesh Networking(Connectivity, Off-grid Emergency Communications), ClusterDuck Protocol, VINE:Zero-Control-Packet Routing, ECHO: Efficient Zero-Control-Packet
  - Installed arduino and tried to set up Mamaduck.

- Sujee Noh:
  - Made presentations to Purdue student and professors.
  - Has Gained a good grasp of the overleaf basics.
  - Made team notion page to organize materials and schedule.
  - Searched related work supporting research statement.
  - Figured out methodology to evaluate devices's performance.
  - Investigated LoRa packet, LoRa packet sniffing.
  - Read the IEEE guide line closely.

3   Things to do by next week

- To write a first draft of the introduction chapter for the paper by next Friday.

- To further read up on related papers.

- To set up a weekly meeting with Prof. Smith and Minji Lee.
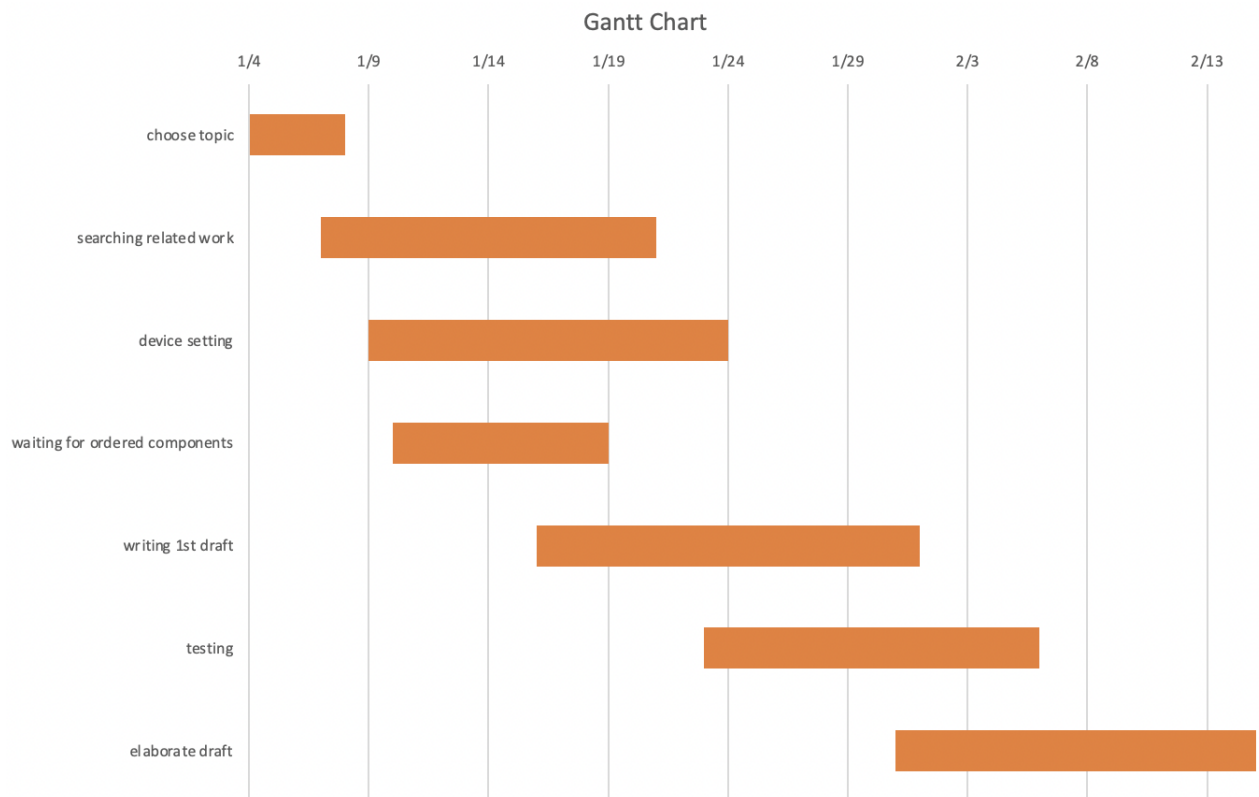
- To help Younguk get on track.

4 Problems or challenges

- ClusterDuck: Failed to set up a Papaduck. It appeared as if a token from IBM cloud was required to complete the set up process. Compiling the Papaduck sketch was not an issue, although uploading to the board was. Arduino IDE showed the following error:

```
A fatal error occurred: Timed out waiting for packet header
Failed uploading: uploading error: exit status 2
```

- Little research found on ClusterDuck. The methodology in performance evaluation is still ambiguous.

5 Gantt Chart

Gantt Chart

| | 1/4 | 1/9 | 1/14 | 1/19 | 1/24 | 1/29 | 2/3 | 2/8 | 2/13 |

- choose topic
- searching related work
- device setting
- waiting for ordered components
- writing 1st draft
- testing
- elaborate draft

6 References

[1] Jan. 10, 2023. [Online]. Available: https:// www.silabs.com/ developers/ usb-to-uart-bridge-vcp-drivers?tab=downloads.

[2] Jan. 9, 2023. [Online]. Available: https:// github.com/ Call-for-Code/ ClusterDuck-Protocol/ wiki