K-MAKS Protocol for Data Transfer

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Introduction

K-Maks is a project that has been initially developed by Rowing Canada Aviron. It seeks to produce an educational tool for rowers to assist in improving overall technique and performance.

- The device is an on-board data logger that utilizes multiple sensors to log the stroke quality based on motion of the boat [1].
- An accelerometer and GPS log the acceleration an position of the boat.

Project Goals

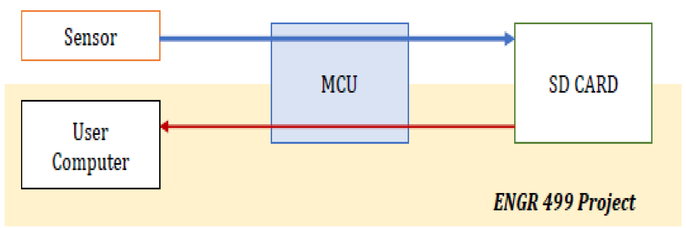

Figure 1.The flow of information[1]

The goal of this project is to develop the internal protocol to allow for easy transfer off data via USB connection onto secondary computer as shown in Figure 1. the project will be undertaken with the following goals:

- The **front-end software** must be easy to install and to use for the primary user base
- The software will cross-platform and usable on computer with different operating system
- **Data transfer** between the MCU and host computer must be reliable; information should not be lost or corrupted during the transfer process
- The users should have ability to remove files from the SD card, and if the storage space on the card is depleted, the oldest files should be automatically erased to create space for new files.

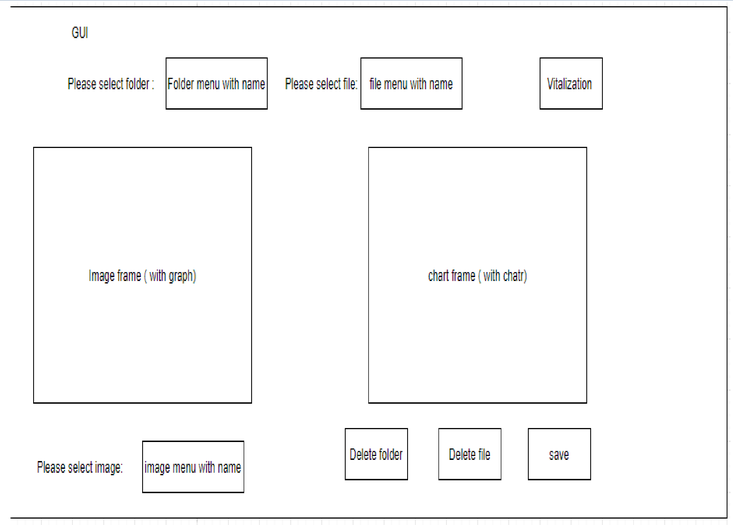

Figure 2. Draft Diagram of GUI

Methodology

- **Storage Library: SD library** is a standard library that comes with Arduino IDE. The library provides a simple to use interface for SD card initialization, reading to and writing from files.
- **Serial Communication:** the actual serial communication aspect is already provided by the Arduino library.
- **Graphical User Interface (GUI):** the user interface is designed to convenience non technical people who can modify and download the SD card contents. The diagram of GUI shown in Figure 2.
- **Data Format:** the data should be pre-read and standardize the format according to the data uploaded from the device to the host.

Discussion

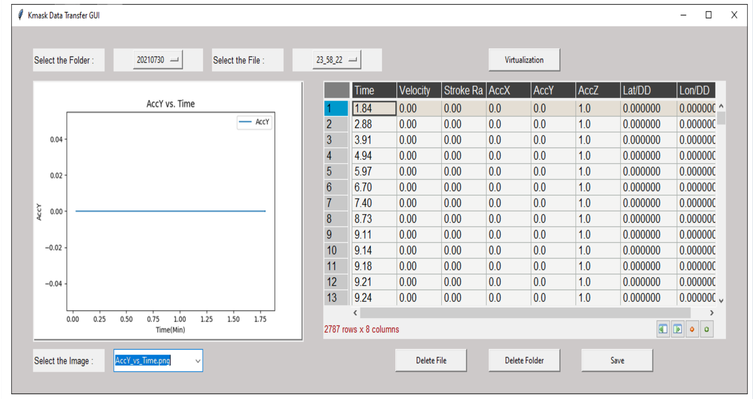

Figure 3. GUI Window for Users

- **MCU**: Error handling condition reported to user; argument buffer handling; having valid command with invalid arguments.
- **GUI**: The window will shown if users do not plug in the device correctly; the system will show the initial window and users can chose files from MCU; users can chose the file and click “Virtualization” button to generate related graphs; users can chose “save” file to local address, “delete” file in the SD card. The users will also get reminder if they do not chose folder or files.

Conclusion

The software system for interacting with the device was developed successfully. Users able to plug the device in PC and review, save and delate data. The graph the generated from the data file is more intuitive to users.

Reference

[1] Rowing Canada Aviron, “K-Maks Protocol for Data Transfer”. [Accessed: 30-July-2021]