CS Capstone Progress Report

April 16, 2019

Slide Sentinel

Prepared for

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Group 29
The Slide Sentinel

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Abstract

This document provides an overview of the Slide Sentinel capstone teams work over the past term. This includes an overview of what was accomplished each week as well how the current situation stands.

Contents

1 Purpose

The Slide Sentinel projects purpose is to provide a means for users to monitor land slides through the use of radio sensors and a central hub. When a change in position is detected, sensors will transmit positional data to the central which in turn sends this data to some remote repository over cellular 4G or satellite communication. The data will be collected and shown in map visualization where data such as status, position, and orientation can be seen for each individual sensors from multiple arrays.

The senior capstone team will also be working on the ONE Hub, a unifying hub for the LOOM sensor ecosystem. The hub will be able to communicate with other LOOM sensors over nRF, LoRa, or WiFi. Data collected by the ONE hub will be send over either cellular 4G, WiFi or satellite communication to a remote repository of their users choosing.

2 Goals

The senior capstone team for Slide Sentinel is focused on implementing the software to go into both hubs to handle incoming and outgoing communication. We will also be constructing the enclosure for the Slide Sentinel hub as well as a mapping visualization for the data. For the ONE hub, the capstone team will also be responsible for integrating the ONE hub software into the LOOM library. Additionally, we will be assisting in any of the software related needs on other parts of the project such as the accelerometer sensor.

3 Current Situation

We are currently transitioning from writing documentation to focusing on the project parts.

- (Kevin) I am currently working on getting NB-IoT functionality working on the Pycom devices to be used in the ONE hub. My goal is to be able to demo a https post from the Pycom device through 4G NB-IoT.
- (James) Is currently working on setting up the online client, including researching how to move data into our data repository and how the visualizer will be implemented.
- (Lucas) I am beginning work on the 3D printed enclosure. We don't know final dimensions right now, so I am starting to learn about 3D Modeling software.

4 Problems

- (Kevin) NB-IoT is very new to Pycom devices and some additional firmware updates were needed. Currently I am not able to get the modem to attach to the network but I suspect this is due to my APN settings being incorrect.
- (James) In order to actually finalize the online client more information is needed about how the data will be pushed from the hub.
- (Lucas) In order to begin work on the 3D printed enclosure, I need to know how to build and prepare 3D models for printing. To begin work on LOOM integration, I need to know other sensors integrate with LOOM.

5 Retrospective

Each row is one week starting from the week since the projects were assigned.

Week	Positives	Deltas	Actions
4	Met with group to discuss problem statement.	Need to contact client.	First contact email was sent to client.
5	Met with client and ECE team to discuss details of the project.	Requirements of project are a bit different what was expected based off the project Description. We are rather far behind schedule but have the time needed to catch up. Requirements document needs to be planned.	Reviewed over new information with group.
6	Successfully connected to Pycom board and am able to interact with it through Pymakr. Group meeting to discuss how we will approach the requirements document.	The requirements for the requirements document is much different from anything any of us are used to. Need to plan out how we'll work on it.	Work on requirements document and tech reviews well underway.
7	Some progress was made on the requirements document.	At the request of Gray, Kevin will do a section in his tech review on radio transceivers.	Work on requirements document still well underway. Tech review work is also underway.
8	Requirements document finished and submitted for client verification.	The NB-IoT SIM card arrived this week but it was the incorrect size of our Pycom devices. Need to plan on work for the design document.	New SIM card was ordered, time to arrive is unknown and likely not for a long while. Considering possibility of trying to trim down the SIM card ourselves but we're worried it may damage the Pycom device with the sharp edges. Group met briefly to discuss the design document.
9	New SIM card came way sooner than expected. No need to trim old SIM card.	Connecting to SIM card was unsuccessful, current software for Pycom devices is lacking for NB-IoT functionality. Need to begin working on progress report and accompanying presentation.	Will be updating modem and device firmware on the Pycom device. Recent firmware updates were focused on NB-IoT functionality and should eliminate some of the current problems with them on Pycom devices as well as making connecting to 4G NB-IoT simpler. Group met to discuss plans working on the design document and the progress report.
10	Tech reviews close to completion. Work on progress report almost done. More work needed for the design document.	Need to meet to do the progress report presentation.	Plans for meeting in the middle of this week to complete the presentation.