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ECE 4564, Assignment 3

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Section 1 – Objectives

The purpose of Assignment 3 is to use a Raspberry Pi as an Event Gateway, which would notify users of when particular satellite viewings are. The user would pass in arguments into the command prompt: zip code and a satellite’s NORAD ID. With these arguments, the Pi would make RESTful queries to a weather API and compare the received forecast information with satellite data, obtained through *ephem*, to determine if the said satellite is viewable in the provided zip code. The next five viewings for a satellite should be printed out, as well as its TLE and the weather forecast for the next 16 days. When a viewable date approaches, the user should be notified 15 minutes in advance via SMS, sound, and a flashing LED.

To provide a break-down of each step, the Pi would first read in the zip code and NORAD ID arguments. With those arguments, it makes queries to obtain satellite passes in the sky, over the provided zip code. The Pi then makes queries to the *OpenWeatherMap* API and processes the 16-day forecast it receives. It processes the forecasts by comparing it with the satellite information it received to determine if it is viewable. The conditions that make it viewable in the requested area are:

1. Dark sky (an hour before sunrise and an hour after sunset).
2. The sun’s height is between 10 and 25 degrees before the horizon.
3. The satellite is illuminated. This is assumed due to the other conditions.
4. The satellite’s elevation angle is at least 25 degrees above the horizon.
5. The weather API indicates that the sky is clear.

After bypassing the challenge of integrating various API’s in the code, an algorithm was developed to process the information, using the listed criteria. Based on the criteria, when a viewing event is upcoming, notifications are invoked.

Section 2 – Team Member Responsibilities

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Section 3 – Conclusions

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