Info 206 - Group B
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Project Proposal: NextBus SlackBot

Submit a problem statement in which the team identifies the issue that it seeks to address through a computer program. In this document, you can write an overview of the computer program you want to write. The statement should be 1-2 pages. A final version of your problem statement is due via your team GitHub project folder by due September 12, 2017.

Problem Statement

Logistics planning is never easy. Trying to schedule events and make it to them on time means being constantly aware of when you need to depart one place to get to the next. This is difficult enough when you're walking, bicycling, or using other modes of travel that are consistent in the time they take to travel from point A to point B; but when you must also take into account the movements of buses and trains, it becomes a downright headache.

Luckily, we live in an era where public transit is equipped with GPS trackers, and precise data about their timing is available. However, accessing this data usually means going to a specific application or website, and communicating it to others often means typing things out from memory. **We believe that there are better ways to access and share public transit data in order to enable people to plan logistics without juggling applications.**

Program Overview

Slack is a communications technology already used by members of the I School. A common use is to discuss logistics for events and meetings. For members coming or going off-campus by public transit, bus and train times often come up in such discussions; yet accessing and sharing that data via Slack is cumbersome. Fortunately, Slack has automated agents known as Slackbots that can make doing so easier.

To create a Slackbot, we will first follow Matt Makai's tutorial on building Slackbots in Python. This will let us create a Slackbot that runs as a Python program and interacts with Slack's Real Time Messaging API. The program will subscribe to Slack's services via RTM protocol and be notified when a user sends a message to the bot. Default bot functionality includes responding to direct messages and posting in channels when certain keywords are entered.

We will then modify the Slackbot to allow it to import data from NextBus and BART APIs regarding bus and train departure and arrival information. The user will be able to access this data by sending a direct message to the bot, or by inviting the bot to one of their channels, thereby enabling everyone in the channel to publicly access the data.

Our initial goal is to allow users to look up upcoming departure information for a specific BART station or bus stop and share it using Slack. Our reach goals include:

- Letting the user specify a future time of arrival in addition to accessing present information.
- Integrating with Google Maps to provide personalized directions to the user based on their location.
- Notifying the user of the best time to leave in order to catch the next BART train or bus.
- Notifying the user if the schedule of a bus or BART train they looked up changes.

Appendix: Benchmarking/Resources

- Tutorials
    - Build a Slack Bot on fullstackpython - This will be the base on which we will implement new features: https://www.fullstackpython.com/blog/build-first-slack-bot-python.html
- Core APIs
    - Nextbus API - Using this, we will have the potential to make predictions of when buses will arrive and where they currently are: https://www.nextbus.com/xmlFeedDocs/NextBusXMLFeed.pdf
    - BART API - Using this API, we will have the potential to obtain station and schedule information for each BART train : http://api.bart.gov/
    - Slack API - We will use this in order to create a slack bot with the capability to inform you of public transportation: https://api.slack.com/
- Example Slackbots/Data Aggregators
    - Moovel - Using the "/moovel location A to location B" command, users can call up local public transport connections from A to B: https://moovel-group.com/en/press/moovel-starts-first-messenger-bot-on-slack
    - Realtime departure slack bot - This will be used to see incoming BART trains and the time estimate for each one: https://open.blockspring.com/jtokoph/bart-times
    - Satori bike sharing channels - This is a reach goal for us. We may choose to implement this API later on: https://www.satori.com/opendata/channels