**BusBuddy**

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**Project Proposal to CSC 6930**

**Fall 2021**

## **1.** **Introduction**

### **1.1 Motivation**

Many people in the Gainesville area use the RTS bus system to get to class, work, or home on a regular basis. However, it is not always easy to know what route to take or when the next bus comes that will take a rider to a desired destination. To solve this problem, mobile apps were deployed and large monitors showing bus routes were installed on campus to help Gainesville residents and UF students figure out what bus to take and when the next one is coming. Unfortunately, these map-based interfaces can be confusing and students still miss buses and arrive late to class. We propose a spoken dialog system that allows Gainesville RTS bus riders to talk to a digital agent that can answer questions such as what bus route to take to get to a stop/location or when is the next bus coming and can verbally remind users that they need to catch the bus. This would provide a natural, hands free solution to access bus information that reduces stress and eliminates distractions while preparing to leave.

### **1.2 Description of System**

Our team proposes a spoken dialog system that will be able to answer questions related to Gainesville RTS bus routes and arrival times. Users will be able to verbally select a stop to inquire about what routes service this stop and when the next bus of a given route will arrive at the stop. Users will also be able to give a destination stop and receive information on what routes serve that destination and the nearest stop to go to in order to reach that destination. We imagine our system’s persona to be a friendly and efficient guide that helps you get to your destination quickly.

**1.3 Example Dialogue**

Let U be the user and let S be the system.

U: I want to go to the hub.

S: [recognizes destination as “hub”] Alright. Where do you want to leave from?

U: The Reitz.

S: [recognizes departure point as “reitz”] Sounds good. When do you want to leave?

U: In the next half hour.

S: [uses current time to determine bounds of departure time; queries database] Ok, I’ve found two buses that you might be interested in. The first leaves at 11:24 and the second departs at 11:36.

U: Is one faster than the other?

S: [recognizes that the user is asking about the options it just gave the user and selects the pertinent information (arrival time - departure time)] Yes, the bus that leaves at 11:24 is 4 minutes faster. The total ride time is 10 minutes.

U: Alright, I’ll go with that one.

S: Ok. You are looking for bus 20 and it departs from the Reitz at 11:24. You should get to the Hub by 11:34am. Do you need help with anything else?

U: No thanks.

S: [recognizes that the user is done with the application]

## **2.** **Development Plan and Goals**

### **2.1 Minimal Goals**

* **Goal #1** - We plan to use Google DialogFlow as the speech recognition framework and to complete the speech recognition synthesis.
* **Goal #2** - Get acquainted with inline editor, node.js, and Firebase.
* **Goal #3** - Figure out how to transfer our system to Google Home or to a phone.
* **Goal #4** - Be able to correctly transcribe a statement and grab the correct intentions, as well as the associated response.
* **Testing** - We plan to test our minimal functionality by checking whether we are able to transcribe a statement and access the correct intentions. We also plan to check if the correct response can be grabbed.

### **2.2 Basic Goals**

* **Goal #1** - Access the database to figure out basic schedule information such as when a bus is supposed to be where at which time, and communicate that with the user.
* **Goal #2** - Access the database to figure out which bus routes service which stops, and communicate that with the user.
* **Goal #3** - Have a user give a planned start and end bus stop, accessing the database about which routes will service those stops without any transfers. Communicate the route options with the user, and allow them to choose a route, if multiple are presented.
* **Goal #4** - Determine the user’s geographical location to assist with finding the nearest bus stop to their current location.
* **Goal #5** - Follow up with users for unknown commands and locations, or incompatible bus stops for the bus route.
* **Testing**. We will run short tests with users every week in order to determine whether the system is able to do what it is supposed to. Testing weekly will enable us to quickly determine any problems that may arise. We will also make sure to test in noisy environments as it is possible that users will be “out and about” when they try to access our system.

### **2.3 Stretch Goals**

* **Goal #1** - Access the capacity of the bus. (e.g. how full the bus is).
* **Goal #2** - Track the real-time location of the bus. (e.g. users can ask for updates on bus estimates)
* **Goal #3** - Bring up a map of a route. (e.g., users can ask for the route map for bus 20)
* **Goal #4** - Notify the user when they are likely to miss a bus. (e.g. “The bus comes in 5 minutes, don’t miss it!”, using data from past missed busses/close calls)
* **Goal #5** - Map out the route from walking to stop, to bus stop and time of bus, to travel time to destination.
* **Goal #6** - Handle trip plans where transfers are necessary.
* **Goal #7** - Set a reminder for when the bus is nearby so that the user knows when to leave.

## **3.** **Collaboration Plan**

* **Meetings.** We will meet on Tuesdays from 1-2pm in person. If additional meetings are needed in a week, that will be communicated over the team’s GroupMe and scheduled at an appropriate time.
* **Time Allocation.** We each plan to be able to spend at least 3-4 hours per week on this project. We plan to meet for 1 hours per week, so we will each spend 2-3 hours per week individually working on this project. If more time is needed to complete certain tasks, more time will be required during that week from each individual.
* **Source Code Management.** We are using git for the code. The code will be hosted in a repository on GitHub that all the group members will have access to. Emma will request and initially configure the source code repository. She will also be responsible for merging changes into the main branch once new features or bug fixes are finalized in other branches. For additional files and notes (such as presentation slides), they will be hosted on Google Drive for ease of access and editing.
* **Task Management.** We plan to use Trello to help us keep track of who has what task and the description of the task. Additionally, we will be able to plan out which tasks will be assigned and finished by. We will also use GroupMe to keep in touch with everyone when not meeting in person, using it to ask for help on a task if needed.

Suggest brainstorming user stories during next meeting, maybe we want to have people interview users to determine stories before next meeting?

User stories & acceptance criteria:

* As a user, I want the system to tell me how to get from point A to point B.
  + The user can input a point they want to go to.
  + The user can input a point they are coming from.
  + The user can input a departure time.
  + The system outputs a bus number.
  + The system outputs a estimated departure time and arrival time.
  + The user can input a
* As a user, I want to know which bus I need to get on.
  + The user can input a point they want to go to.
  + The user can input a point they are coming from.
* As a user, I want to know when the bus is coming.
* As the user, I want to be able to save common routes.

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| Date |  |
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| September 27-28 | Present slides, figure out how we will attach the voice to the database, contact the transloc people |
| October 5 |  |
| October 12 |  |
| October 19 |  |