**DSSG 2015 Paratransit Group’s King County Metro Access Bus Rescheduler:**

**Use Cases:**

1. The bus breakdown: the user may input a bus run number (alpha-numeric such as “502R”, “302”, etc.) and an “initial time” representing the time *after* which all passengers that were originally scheduled to be serviced by the requested bus will be placed on to other Access bus schedules. For example, if bus 502R changes from functional to “out of service” at 12:00 PM, there may be any number of passengers who were supposed to be picked up and dropped off by this bus later in the day. The rescheduling application treats these clients as “unhandled requests” and will try to present alternative routing options for each client. These alternative options will include between 0 and 3 buses on to which each client can be rescheduled. Those alternative buses are the ones with the shortest “inconvenience time” relative to their original schedules. The new schedule of the alternative bus with the absolute shortest inconvenience time is presented to the user, that is, it has the unhandled request inserted into the alternative bus’s schedule. The estimated cost of a taxi, along with the estimated costs of dispatching a new Access bus to service all remaining unhandled requests, are also presented.
   1. It is important to note that, currently, any clients who are scheduled to be riding the bus at the “initial time” will not be rescheduled, because we do not have the ability to access any bus’s exact geospatial information continuously in time. Only those clients who have an estimated pick-up time after the initial time will be rerouted.
2. Individual unhandled requests: the user may input the individual BookingID of any number of clients present in the schedule data. The rescheduler will try to move each BookingID onto a suitable alternative bus, in the same fashion as the first use case. The user should note that the first use case is actually a subset of the second use case: the user could potentially enter all of the BookingID’s of the clients with estimated pick-up times after the “initial time” and reschedule the remaining broken run’s rides for the day.

**Instructions for use:**

1. Schedule data acquisition: The user must supply the application with a day’s full schedule of Access bus routes. There are two options for accomplishing this: the user can use a demo schedule file or obtain semi-real-time streaming data. The demo file should be pre-processed for “useless data”, i.e. for rides with missing locational data or for rides that never leave the garage, etc. To access the streaming data, the user needs to supply the correct access key and secret key to the Amazon Web Services’s S3 bucket that currently receives the streaming data supplied by KCM.
2. Use case specification:

**Possible improvements to the application:**

* Regarding the second use case, it may be particularly useful for KCM dispatchers to be able to change the pick-up and/or drop-off time for each unhandled request. For example, if a client’s appointment time was changed at the last minute, or if a client is running late, the dispatcher might enter the client’s estimated pick-up and/or drop-off time and subsequently use the rescheduling algorithm to place the client onto a bus more appropriate for the client’s new time restrictions. In particular, it would be helpful to juxtapose the “inconvenience times” of the alternative buses to the cost of placing the client in taxi. Being able to change a client’s new time restrictions would not be extremely difficult to implement and may add large value to the application for KCM users.