**Taxi Virtual Queue – Waitlist approach 1/10/2019**

**PROJECT GOALS:**

1. Prioritize Purchased medallions over other types of taxis
2. Significantly reduce the size of the taxi lot
3. Enable taxi drivers to work the city while waiting to pick up at SFO
4. Ensure an adequate supply of taxis during busy times

* **Overview**
  + Drivers must use the TaxiQ app to request authorization to enter the taxi lot.
    - If a slot is available, the driver will receive immediate authorization.
    - Otherwise, the driver will be added to a waitlist and will receive authorization when a slot is available.
    - The number of available slots is determined by the number of empty spots in the lot and the rate of dispatch, such that a slot can be offered before a space is free in the holding lot.
  + Taxi lot coordinator will only grant entry to drivers with authorization or with valid shorts.
* **System logic**
  + Drivers who request authorization to enter the taxi lot will be added to one of two waiting lists:
    - Purchased Medallion taxis
    - Earned Medallion taxis
  + Slots will be released until the lot reaches “target occupancy,” a configurable parameter. Once the lot reaches target occupancy, slots will continue be issued at a rate equal to the estimated dispatch rate in the next 15 minutes. This can result in slots being offered while the lot is still at “target occupancy,” in anticipation that some taxis will be dispatched before the new taxis arrive to claim slots. “Target occupancy” will be set below the true capacity of the lot so there is a buffer in the event the true rate of dispatch is slower than anticipated.
  + For every five spots released in the lot, four will be offered to the driver at the top of the purchased medallion list and the fifth will be offered to the driver at the top of the earned list. This ratio will be adjustable.
  + Taxis who complete a valid short trip will be authorized to reenter the lot without requesting authorization to enter, but once inside the lot will have no special privileges. When a valid short enters the lot, one fewer slot will be issued to the two waiting lists.
  + When a taxi is granted authorization, that driver will have thirty minutes to enter the lot.
* **Driver interface**
  + Driver logs in to their account. Driver must enter the vehicle number and license plate number that they are driving that day. The system must validate that these two numbers match before allowing the logon. Fresh logons are required after more than 4 hours of inactivity.
  + “Trip” screen displays the following:
    - Waitlist status: Number of vehicles on your waitlist; estimated wait time
  + Driver clicks “Request Entry” button to request authorization.
  + If a slot is immediately available, driver is shown message that they have authorization to enter the lot within the next thirty minutes.
  + If there is a waitlist:
    - Screen shows driver’s position on the waitlist and estimated wait time. The position and estimated wait time update automatically as taxis move through the lot.
    - As the estimated wait time decreases, the app sends notifications at pre-defined points (e.g., 30 and 15 minutes remaining).
    - When the driver is called from the waitlist, the app notifies the driver that lot entry is available. Driver then has 5 minutes to respond. Auto-call and text notifications may be offered.
      * If driver clicks the “Request Entry” button, driver is shown message that they have authorization to enter the lot in the next 30 minutes.
      * If driver clicks the “Cancel” button, app returns to the status screen.
      * If driver has not responded after 5 minutes, the app displays “Request missed” and the time at which the request expired. Driver acknowledges this message to return to the status screen. The driver can then request entry again.
  + Once authorized to enter, driver has 30 minutes to enter the lot.
    - Screen displays countdown timer.
    - Driver can click “Cancel Request” button to cancel his/her request.
  + When the driver enters the lot, the coordinator checks him/her in, and then the app displays the normal “waiting for dispatch” message.
    - If the driver is not checked in during the 30-minute entry window, the app displays “Entry missed” and the time at which the entry window expired. Driver acknowledges this message to return to the status screen. The driver can then request entry again.
  + When the driver exits SFO, the app displays the normal “trip in progress” message.
    - For a short trip, the driver returns to SFO and is authorized to enter to the taxi lot if they have a valid short trip.
    - For a long trip, when short trip becomes invalid (i.e., by exiting the geofence, exceeding the 2-hour limit, etc.), the app displays the “long trip” message and returns to the status screen. The driver can then request entry again.
* **Lot Coordinator interface**
  + Coordinator screen displays list of taxis who are authorized or who have valid shorts.
    - List shows taxi vehicle number (e.g., “123”), driver name, and driver A-Card number (e.g., “A-1234”)
    - By default, screen only shows currently authorized taxis, but coordinator has the option to view missed entries or taxis on the waitlist.
  + When an authorized taxi enters the lot, the vehicle is digitally read and the information pushed to the coordinator interface. The interface pushes that taxi to the top of the authorized list and makes the color pulse. The coordinator checks it in by selecting it from the list.
  + When an unauthorized or valid short taxi enters, the vehicle is digitally read and the information pushed to the coordinator interface. The interface automatically creates an entry for that taxi, suggesting a current status for the taxi (e.g., “#3 on waitlist,” “valid short,” “missed entry at 11:35am,” “entry not requested,” etc.).
    - If the coordinator lets in the taxi (such as for a valid short), they click “Check in” on the app, documenting the reason.
    - If the coordinator turns away the taxi, they click “Reject” to document the violation.
    - If the entry was created in error, it can be discarded by the coordinator.
  + All check-ins and rejections are recorded for reporting and auditing purposes.
  + Entering vehicles who did not get automatically registered by a digital system can be manually entered in the coordinator interface.
  + Coordinator screen displays lot status:
    - Configurable figures:
      * Lot capacity – e.g., “400”
      * Target occupancy (lot capacity minus buffer spaces) – e.g., “320”
    - Real-time figures:
      * Number of taxis in lot – e.g., “315”
      * Number of taxis with pending entries by type (ones called from the waitlist) – e.g., “5 Earned”
      * Number of taxis on each waitlist – e.g. “67 Purchased”
  + Coordinator screen provides override capabilities:
    - If the waitlist has not been triggered (threshold not reached) but we need to limit entries, coordinator clicks “Start manual waitlist.” This temporarily lowers the threshold to the current number of taxis in the lot and with pending entries. Coordinator clicks “Resume auto waitlist” to return to the default threshold.
    - If there is a waitlist but we need to temporarily stop taxis being called from it, coordinator clicks “Stop calls from waitlist.” Coordinator clicks “Resume calls from waitlist” to return to normal operations.
    - If there is a waitlist but we need to request more taxis immediately, coordinator clicks “Call taxis from waitlist” and selects the number of taxis to call. [This addresses an edge condition in which dispatch rates spike sharply and more taxis are needed urgently]
* **Notes**
  + Drivers can request entry from any location as long as they are not in the taxi lot or on a valid short trip. This corresponds to the times that the “garage entry required” screen is currently displayed by the app – i.e., the new reservation screen replaces the “garage entry” screen.
  + Both the driver and coordinator apps should show records of missed entries, rejections, and early entries, as enforcement and penalties (issued outside of the app) will be based on these.
  + When a driver requests entry or joins the waitlist, the driver’s GPS coordinates should be saved with the log of the event. This data will be useful for considering future geofence restrictions.