Brief

Behind the scenes in the e-commerce industry lies a sophisticated system of automation and robotics to help bring down costs and deliver goods to customers at the fastest speeds possible. Our current upcoming facility - expected to be one of the largest in Asia, has a throughput of over 40,000 units/hour. We are constantly looking for ways to increase our scale and speed while trying to minimize cost. That brings us to a problem that we have solved but looking at ways in which you can innovate. You can visit https://stories.flipkart.com/bots-agv-ecommerce/ to see what we are working on.

Objective

This competition aims to test 2 main capabilities in contestants

1. A central monitoring/navigation system (such as a camera or multiple cameras) should be used to understand the arena and the position of the robots and instruct robots on actions to be taken.

   Note: Arrangement of robot tracking via central monitoring system is "Flipkart Patent Pending".
2. Swarm algorithms for maximizing the throughput of the given systems

The participants are expected to build their own robot (both hardware and software) which is able to meet the above objective. In case any third-party hardware kit/software is being used, participants must declare it.

Team Criteria

1. All team members who participated in Round 1, will be considered as part of the Round 2 team.

Bot Specifications

- Each bot is to fit within 6x6 inch square
- Each bot has a tray on top to carry 20x20x20 mm cube (approximate size)
- Tray has the ability to flip to drop items in chute
- No sensors for navigation/object detection to be mounted on the robot

The robot can only be touched by the operator when it is in the Induction zone

Round II

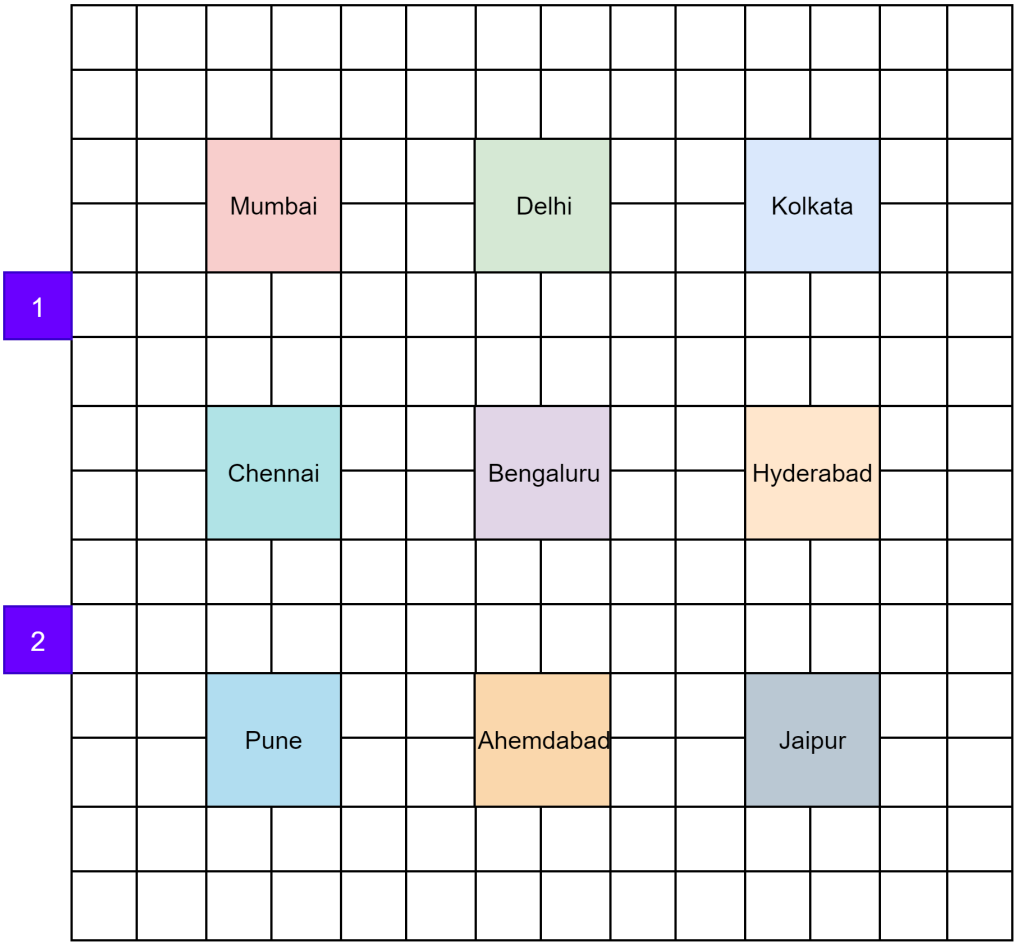
Package Sortation

1. A list of packages will be given as part of the competition (Sample List)

2. The list will have a randomized list of Package ID - Induct Station - Destinations
3. Packages to the same destination must be colored with the same color
4. Only one package to be loaded on the Robot at a time
5. Two operators are needed - One at each induct zone
6. You can decide the number of robots you plan to use
7. Packages can be loaded onto bots only once bots are within the induct zones (1 & 2).
8. Bots need to move and drop off packages inside the chutes
9. Competition is over when all packages are delivered or when 10 mins are up

Robots can't be changed once the competition starts. If a robot stops working mid-round, then other robots have to navigate around it.

Round II Arena



- Overall Arena size is 7 x 7ft - Excluding induct points.
- Each block is 6x6in
- The grid is 1 cm tape / marking
- Each purple box is an induct point
- Each yellow box is chute - 1-inch height wall around the chute

- Arena (Grid + Induction points) has 1-inch height wall around it
- The models for the arena can be found **here**.

Judging Criteria for Round II

Winning metric - Number of Packages sorted in **10 mins**

In case two teams are within 5 parcels of each other, the team with the lower number of robots would be ranked higher. Top **10** teams will make it to the finals.

Deliverables for Round II

1. Uninterrupted Video of the Package Sortation - with Timer overlayed to indicate start and end of race - This can be shot with a handheld or phone camera
2. Uninterrupted Video of Live Image Processing - with Timer overlayed to show how robots are being tracked in real-time with Package IDs tagged to robots when packages are on top of it

Sample Sheet - Link

Package ID	Induct Station	Destination
FKMP0001	1	Destination 1
FKMP0002	2	Destination 2
FKMP0003	1	Destination 3
FKMP0004	2	Destination 4

There would be a random distribution of

- Packages to destinations
- Packages to induct stations