Flying Drone – Anomaly Detection

Submitted By

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Under Guidance Of

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Project Summary

The aim of the project is to detect anomaly in flight path of a drone and issue corrections so the drone can arrive its target location. In an anomaly detected scenario, the new path was calculated and followed by drone to reach safely at its destination. The new path is machine learnt and saved in multi-level data structure to ensure time complexity of O (1) for retrieval.

Instruction to run the project

Import the folder("AnomalyDetection") to NetBeans IDE and run it. It is a Swing application. Press start button on the screen that pops up.
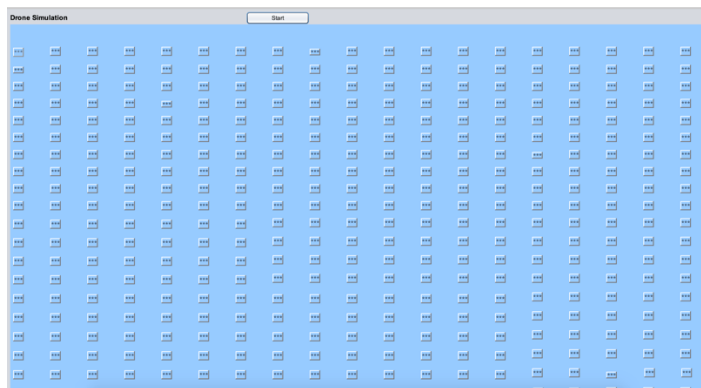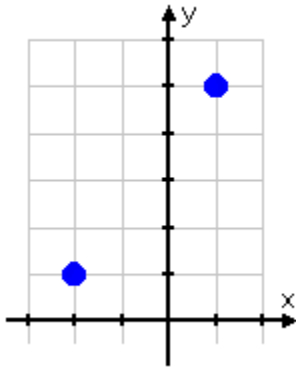

The blue path tracked is the path followed by Drone after avoiding the anomalies.
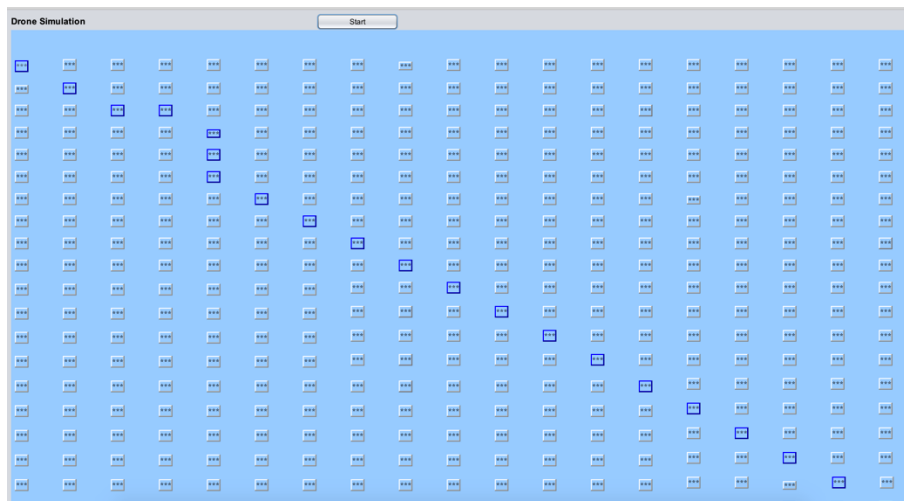
1) Calculating Distance from Source and Destination

The distance can be calculated using a formula, which is a variant of Pythagorean Theorem

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

- ◆ *Where x1 and x2 are x-node of source and destination respectively.*
- ◆ *Where y1 and y2 are y-node of source and destination respectively.*

This formula gives the distance, which is compared with the distance from other adjacent nodes and minimum distance is calculated.

2) Nearest Node Algorithm

a. The next nearest node in the path is found using this algorithm
b. The distance to its destination is found from all adjacent nodes, and the node with minimum distance is considered to be the nearest node.
c. This node is stored in the path and drone moves ahead using this path.

3) Timer's Process (Every second)

a. Checking anomaly status of the next node in the path. If anomaly status is high intensity, finding for new path from dataset.
b. If machine has learnt such path before then using that path, else making machine learn that path and storing it in the dataset.
c. Following the 'Nearest-node algorithm' to find next node and storing it in the set while machine is learning.
d. Once, drone reaches the destination calculating the confidence factor of that path and storing it.
e. When we have multiple paths to choose from, we choose the one with more confidence factor.
f. Confidence factor is calculated based on fuel consumed and number of times that path is followed by the drone