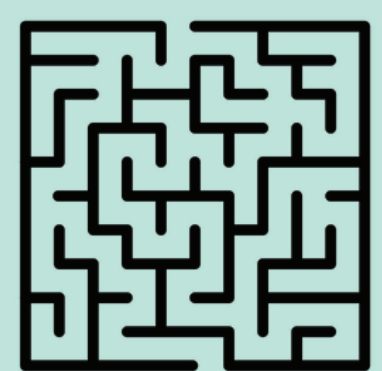


AUTONOMOUS DRONES

BACKGROUND

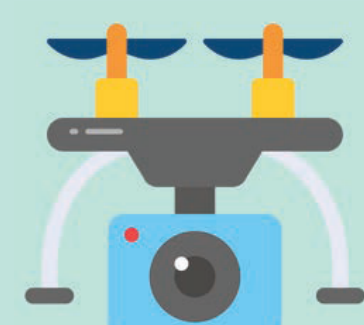


Explore and complete a maze while recognising medical boxes and mission pads for extra points



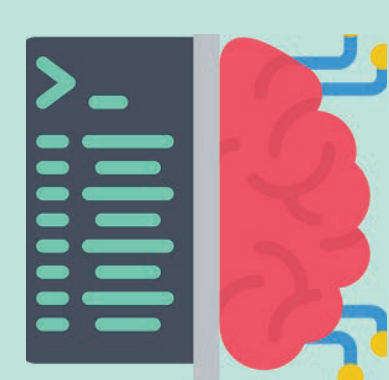
Points are given for completing the maze, doing so within a short time, as well as recognising medical boxes and mission pads for extra points groups are then ranked on overall performance based on points

OUR STRATEGY



1. Prioritise recognising medical boxes
2. Finish the maze in a reasonable time
3. Pick up as many points as possible on the way

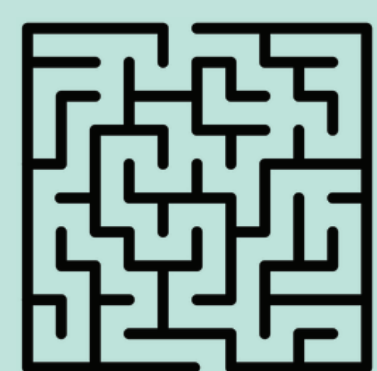
METHODOLOGY



Computer vision models and machine learning frameworks to accurately detect and position drone beside medical boxes using repeated position checking to ensure accuracy

CODE

EXPLORATION



- Attempted maze solving with maze-routing algorithm (Manhattan distance), breadth-first search (BFS), depth-first search (DFS), A* algorithm (heuristic approach)
- Found DFS to be the overall best due to its ability to pick up points along the way with the medical boxes and mission pads while not wasting substantial time, allowing us to still finish the maze in a relatively short amount of time which helps us gain points

SOLUTION



- Used drone's inbuilt camera to detect distance from objects to solve the maze, with repeated checks to ensure accuracy of measurements
- Trained a computer vision framework and linked it to the camera for it to identify medical boxes accurately. We chose a lower confidence threshold to counter camera quality which helped improve our results tremendously

RESULTS



We were able to attain the Best Computer Vision award for the accuracy of our computer vision and machine learning framework in identifying medical boxes.



This was mostly due to our decision to choose the lower confidence threshold, and also the fact that our training dataset was robust enough with pictures varying in angle and lighting which ensures that our drone camera was able to identify the medical box in any situation.

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