

Design Specifications

Document status	RELEASED
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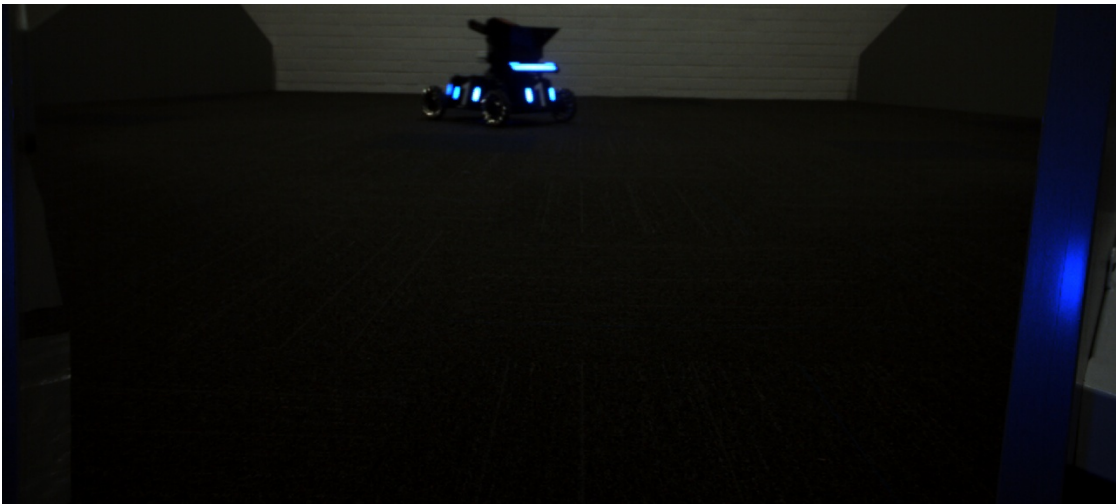
Version	Description	Author	Date (DD/MM/YYYY)
0.0	The first version of the Design Specifications.	Che Hao Chang	28/08/2020
1.0	Some rephrasing and version release.	Isaac Pedroza Aguirre	30/08/2020
1.1	Add examples for input/output section. Attached link revised.	Che Hao Chang	31 Aug 2020

Development Environment

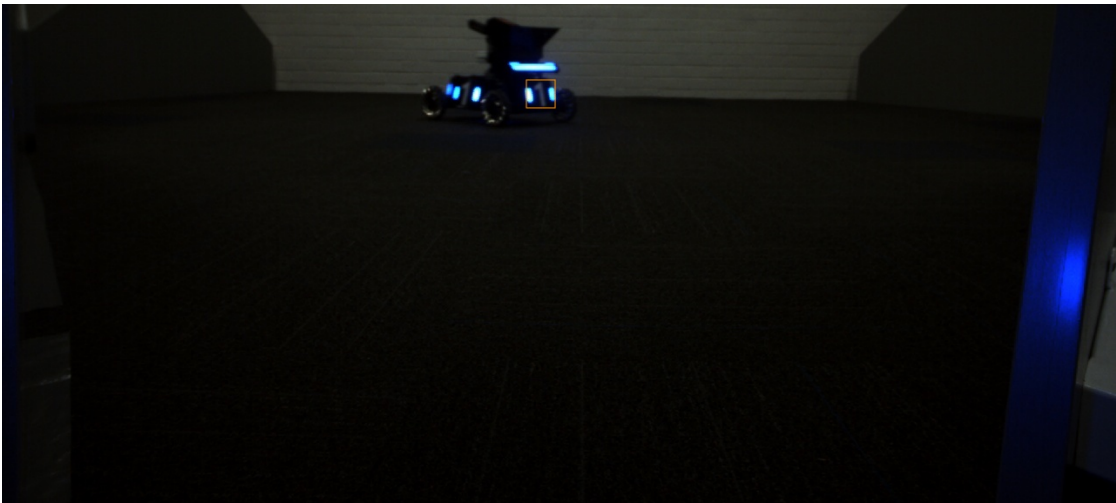
- Language: Python

Input/Output

- Single input/Single output system
- Input/Output format: 1280x574 JPEG file
- Input Example:



- Output Example:
 - Armour Location



- Armour Identification



Algorithm Overview

- Armour Location:
 - Given an input image, highlight the four corners (or a rectangle) of the armour pad in the image (find the biggest if multiple armours exist).
 - The armour pad on robots will be highlighted with two light bar with the team's colour (red or blue).
- Armour Identification:
 - Given an image, decide the armour type of the robot (front, side, rear) in the image.
 - Recognising the facing angle is a plus.

Implementation Note

- Traditional Computer Vision approach:
 - Image filtering and processing
 - Code available in C++ (<https://github.com/guanghuhappysf128/RoboRTS-v2>)
 - Armour Identification will be similar to Armour Location with this approach (considering the robot's light bars positions and orientations).
- You Only Look Once (YOLO) algorithm:
 - Real-time object detection algorithm with a convolutional neural network
 - Locate target in a bounding box (instead of 4 corners)
 - Need Graphics Processing Unit (GPU) for training