Requirements

Document status	RELEASED

Version	Description	Author	Date (DD/MM/YYYY)
0.0	First version of the Requirements Document.	Isaac Pedroza Aguirre	26/08/2020
0.1	Added initial user story.	Che Hao Chang	27/08/2020
0.2	Edited user story, added story point.	Che Hao Chang , Sejin Kim	27/08/2020
1.0	Organised document, rewrote some sentences and released the first version of the document.	Isaac Pedroza Aguirre	30/08/2020
1.1	Update scope, desirable and optional features, and assumptions.	Isaac Pedroza Aguirre	02 Sep 2020

Background and Motivation

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Goal

Locate and identify the opponent robot's armour automatically.

Scope

- Implement an algorithm able to locate the position of the opponent robot's armour in the given picture.
- Implement an algorithm able to identify to which armour (front, side or back) the robot is aiming in the given picture.
- The algorithms should work for pictures coming from the robot's camera and outpost camera.
- The algorithms should work for both types of targets. The target is the lighted (blue or red) armour board on the body of the robot.
- The armour location algorithm should select the exact area (by pixel) in the given picture. The algorithm should return 4 points (pixels' locations) which correspond to the edges of the polygon that contains the robot armour.
- The area delimited by the 4 points returned by the armour location algorithm needs to contain at least two lights (2 blues or 2 reds).
- Reach at least 70% accuracy in armour location and identification.
- Reach at least 1fps in armour location and identification.
- The algorithms should locate and identify just the biggest robot armour in the given picture.

Out of the scope

- Transplant the algorithms to the robot computing device.
- Test using real-time input from the camera.
- Compare different algorithms.
- Design experiments.
- Analyse the performance of the algorithms.
- Locate the relative position between the robot's armour and the camera.
- The algorithms need to be convertible to Ubuntu 18.04 (arm64) and C++.
- The algorithms need to be able to run on the onboard computing device (Jetson AGX Xavier Developer Kit), with robot camera (whose resolution is 1280*720 px).

Desirable features

- Implement a GUI to run the armour location and identification algorithms.
- Integrate armour location and armour identification algorithms.

Optional features

- Implement a second algorithm for armour location.
- Implement a second algorithm for armour identification.
- Implement an algorithm able to locate multiple armours.
- Implement an algorithm able to identify multiple armours.

Assumptions

- The algorithms can be implemented with any programming language.
- The robot's images to be processed are provided by the client.
- The client will access the developed software through a command line or a user interface.
- The given pictures provide just one robot.

Design Specifications

[Design Specifications](#)

Page Change History

Version	Published	Changed By	Comment
CURRENT (v. 28)	**28 Sep, 2020 03:29**	Isaac Pedroza Aguirre	
v. 27	04 Sep, 2020 12:30	Isaac Pedroza Aguirre	
v. 26	02 Sep, 2020 13:22	Isaac Pedroza Aguirre	
v. 25	31 Aug, 2020 04:47	Isaac Pedroza Aguirre	
v. 24	28 Aug, 2020 13:57	Isaac Pedroza Aguirre	

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