Technical Project Proposal

(Due Feb 16th 2021, 11.59pm) (Max 2 pages)

Your Name: Pavel Koprov

Give a Project Name: Object shape and position recognition for robotic-arm grip decision

PROJECT DESCRIPTION (< 250 words)

There are cases in manufacturing processes when the parts on conveyer line or inside batches are not properly aligned or mixed which makes the robotic arm impossible to choose the correct grip and adequately load the part to CNC machine or assemble correctly. I would like to develop an object recognizing system that will not only recognize the object, but also define its shape, position and give ques for the robotic arm to choose correct grip. In order to implement this I will be using low-cost camera, Raspberry PI and UR5e robot. This also will have corollary in subsequent projects on creating a universal assembly cell that can assemble the product from given design and available parts.

SOLUTION (Deliverables). Write a bullet point list of what your technical project will deliver

1. Object recognition ML model
2. Recognizing position and shape of parts
3. Robot will define where to put the object depending on its shape
4. Robot will choose the correct grip to lift the part

Data Generation and/or Existing Datasets (if any):

Data will be generated from making pictures by low-cost camera and Raspberry PI. Those part will be different Lego blocks.

Expected Hardware tools, Python Libraries to be used (if any)

Raspberry PI, Raspberry Pi Camera Module V2-8 Megapixel,1080p (RPI-CAM-V2), UR5e robot, KerasRL, Tensorforce

Proposed Timeline of Activities (from Feb 16th – April 30th)

1. Literature review 02/16..03/07
2. Creating dataset and building the model 03/07…03/30
3. Attaching the camera to a robot and testing the app 03/30..04/19
4. Reporting results 04/30