Project 1: Pneumatic Cylinder
Mechatronics 282 778

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Abstract

Pneumatic actuation controlled project involving the projection of tennis balls. The projectiles are deployed from the actuation controlled device at fixed intervals and have an optional override to deploy manually.

The project involves constructing the frame in which will enclose and secure all parts in an orderly safe fashion; designing and building the PCB circuit with the consideration of controlling the solenoid and reading and displaying the extension of the actuator.

In this process acquired Mechatronics skills are tested to build a devices which has mechanical, electrical and programming components with consideration of materials properties. To utilise all of the skills on a basic level of which can measure the performance and aptitude of converging these skills, and how things are done individually. While there are many methods consisting of different professional approaches is key for performance on an industry level.

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1 INTRODUCTION

You are required to build a mechatronic device that makes use of your mechatronic actuation and sensing sub-systems, and their respective control interface, to time the ejection of a part from a hopper. The part to be ejected is a tennis ball. You will need to design the hopper, which should hold three tennis balls. The tennis balls will be pre-loaded into the hopper. The time between the balls being ejected is up to you (approximately two to three seconds per ball would be ideal; 20 to 30 seconds per ball not as ideal).

1.1 Aims & Objectives

To build a mechatronic device, integrating actuation, sensing, and control sub-systems.

- To design a mechatronic sub-system that effects extension and contraction of a pneumatic cylinder.
- To design a mechatronic sub-system that measures the extension and contraction of a pneumatic cylinder.
- To integrate your mechatronic actuation, sensor, and control sub-systems in order to eject a part from a hopper with a fixed period between ejection of subsequent parts.
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There are no constraints at which the design is to be achieved leaving the best found method determinded by

2 METHOD

Considerations of this, and analysis are done such as FEA strain tests and

2.1 BGR to HSV conversion

2.2 Gaussian Blur

2.3 Canny edge detection

2.4 Dilation & Erosion

2.5 Contours

2.6 Bounding Rectangles & Approximate Contours to Polygons

5 CONCLUSIONS

5.1 Critical Evaluation and Methodology

5.2 Discussion

References

[1] https://github.com/alex1v1a/Mechatrnoics/, "Alex github repo," 2017.

APPENDIX