AI-BASED SORTING ROBOT ARM

Group Members

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OVERVIEW

INTRODUCTION

- Robotics control and programming is an essential field of focus in the industrial revolution. It aids in industrial automation especially in carrying out repetitive or heavy workload.
- Developers implement artificial intelligence for tasks that require computer vision and object recognition.

PROBLEM STATEMENT

With recent technological advancements, the industrial automation market has grown significantly. However, exisitng robots lack the intelligent component therefore making accuracy in robot positioning and control a major challenge.

Therefore, there exists the need to equip robots with the vision aspect to maximize on the precision and robot accuracy.

Main objective

- The aim of the project is to achieve AI-based pick and place sorting operation using a robot arm.

Current objectives

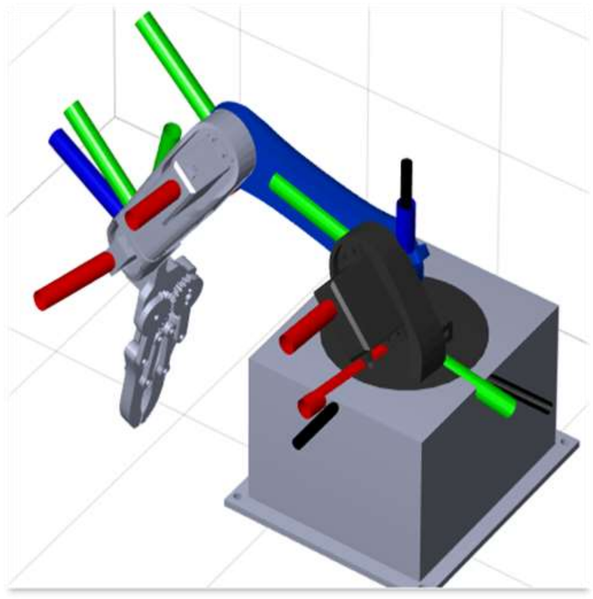
- Accurate control of the servo motors
- GUI development
- PCB fabrication
- Hardware improvements (including 3D printed workpieces)
- Path programming & control
- Object detection and recognition

Improvement From The Previous Group

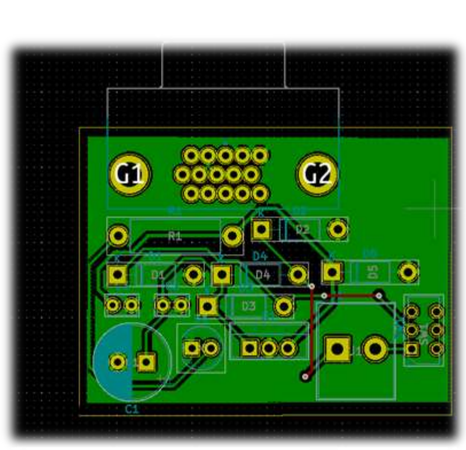
- Improvement of circuit and wiring
- Object recognition
- Addition of a conveyor belt
- Development of a graphical user interface

EXPERIMENTAL WORK

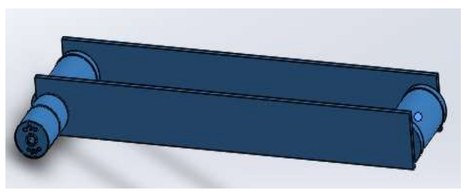
Solidworks model of the robot arm.



Matlab Model

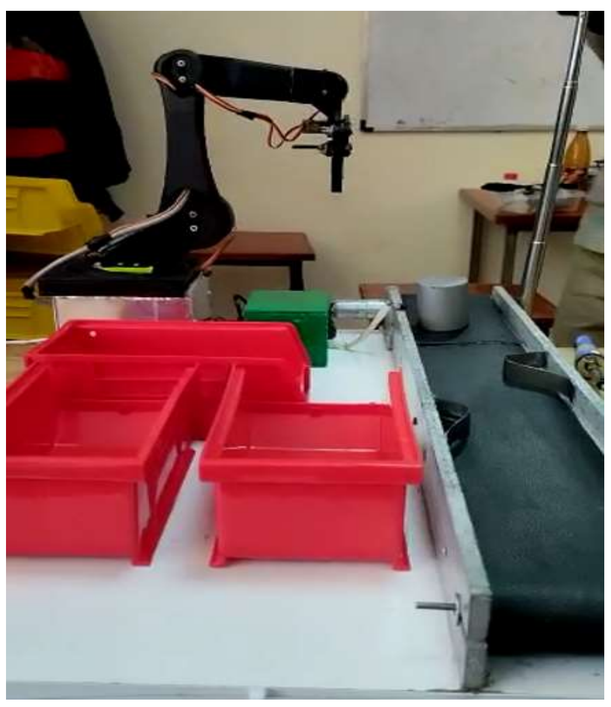


PCB design

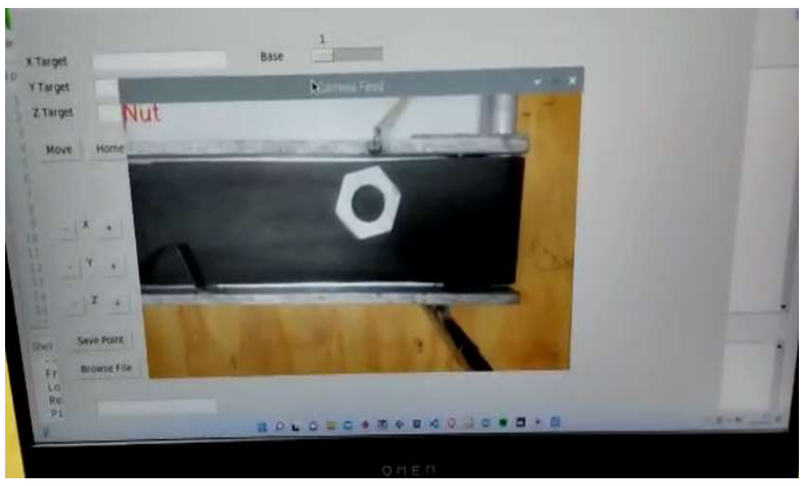


Conveyor model

RESULTS



Set up of the project



Graphical User Interface

Robot arm in the sorting process

CONCLUSION

Conclusion

Use of vision enabled robots in the industries is advantageous in that, it eliminates use of expensive fixtures, increases the accuracy of the robots, and speeds up the production process.

Our robot therefore, if well implemented, can have numerous applications in various industries.

Challenges Encountered

Some challenges encountered during the implementation of this project include:

- Inaccuracy in the object recognition model
- Inaccuracies in the robot joints.

Recommendations

- Using motors that provide feedback
- Redesigning the 3D model to improve the compactness of the design
- Adding sensors such as the gripper sensor to improve the robot's efficiency