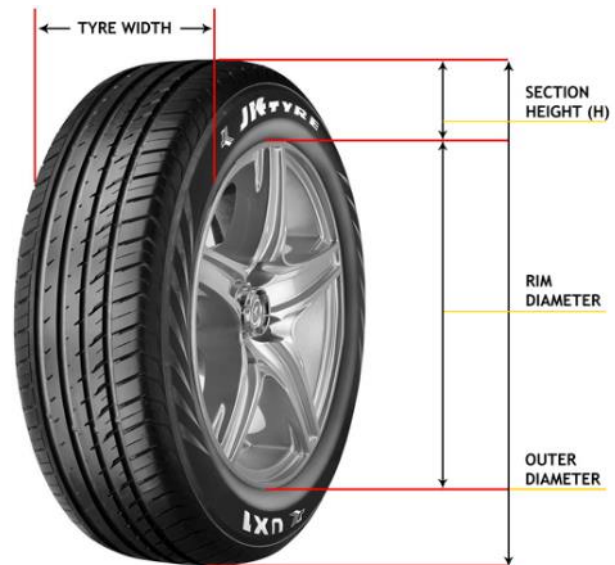


Vision Based Tyre Sorter

Theme: Industrial Automation

Abstract:

In an era of emerging new technologies and automations, the industries look forward to automate all processes that they carry out. Mission of ours is no different. The following problem has been identified by us during our recent visit to a tyre industry. The Core idea of the proposal is to automate the process of tyre sorting in the tyre manufacturing industries which is in the scope of southern region. The tyres being manufactured in tyre manufacturing industries are modelled according to the customer needs (motorcycle companies). Such tyres have different dimensions and tread patterns. The classification of tyres based on these specifications is meant as sorting of tyres. So, the basic objective is to sort the curved tyres for storage and packing sections. Presently, in tyre industries this process of sorting tyres is carried out with Man-Power only. Hence, this proposal emphasizes on automating the process of tyre sorting with the help of image processing techniques.



The proposal is divided into two modules for easier execution named as diameter recognition and pattern recognition. Firstly, the tyres can be classified based on their diameters and to differentiate tyres that have same diameter, tread pattern on the sides of the tyre is recognised and thus classification is being carried out. Upon classification, the tyres can be diverted to their respective bins using conveyor. For the sake of this proposal we are limiting the project to image processing only. Initially, the following algorithm has been designed using a PC with webcam.

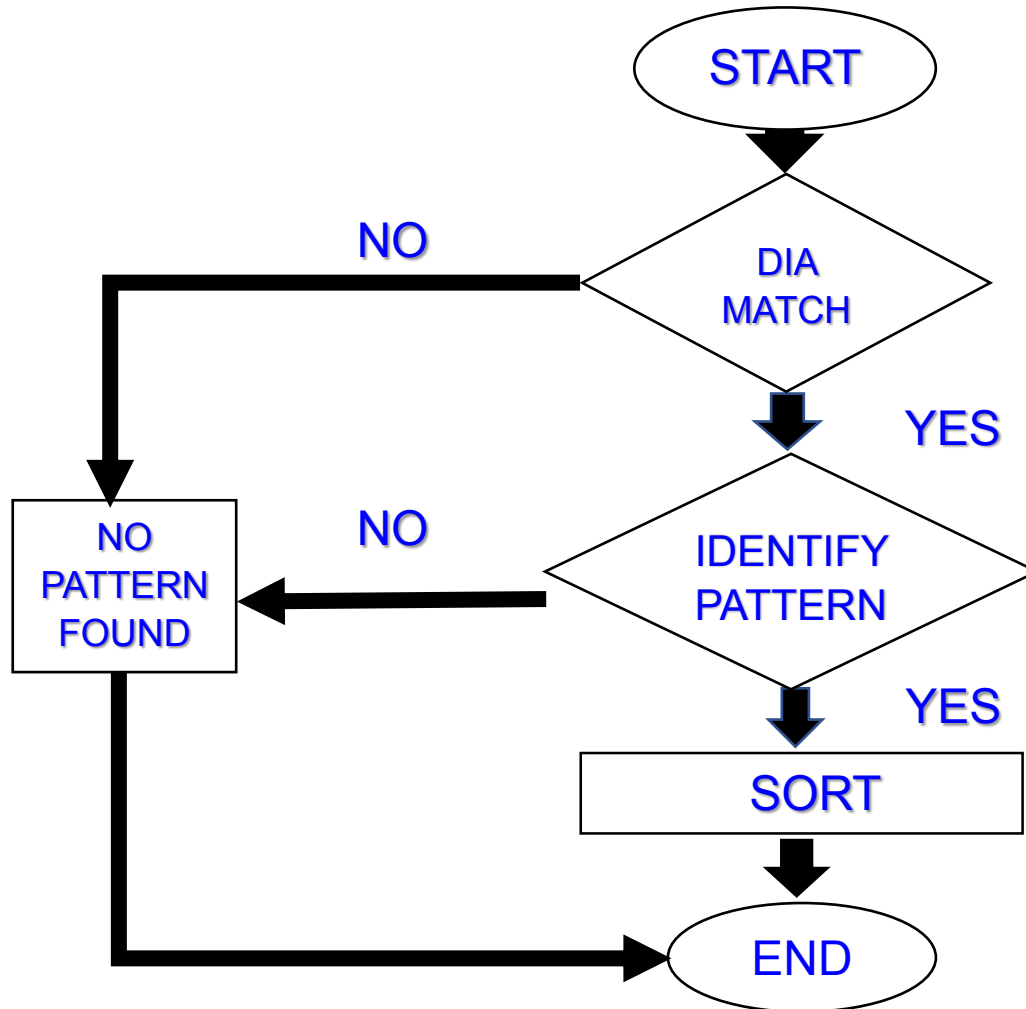
Module - 1 (Diameter Recognition)

- Step 1: Capture Image
- Step 2: Grayscale conversion
- Step 3: Blur and Threshold.
- Step 4: Identifying Contours

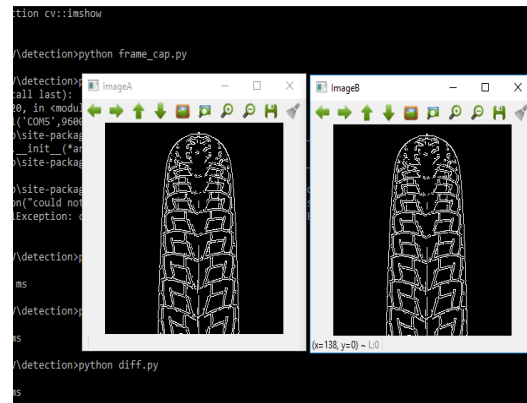
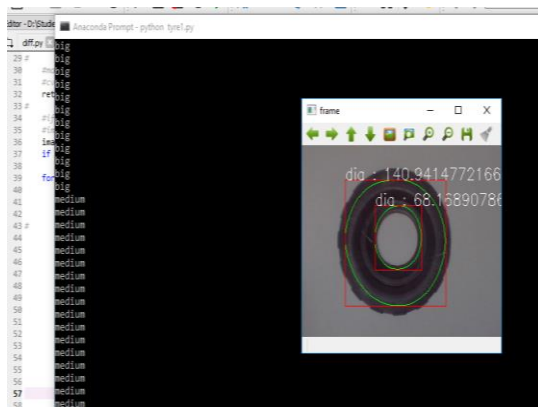
Module – 2 (Pattern Recognition)

- Step 5: Capture Image
- Step 6: Grayscale conversion
- Step 7: Edge detection.
- Step 8: Threshold.
- Step 9: Sort

FLOW CHART:



Results on PC:



Why GR LYCHEE?

On limiting ourselves to image processing, the hardware hardly necessitated is a camera and a dedicated processor that could run OpenCV(python) code. Both of these features are embedded in the GR LYCHEE. Thereby, the ARM cortex equipped device reduces cost and adds portability to our system. Additionally, on extending the functionality of the project, the conveyor can be controlled by trigger signals generated programmatically by GR LYCHEE IO pins.