Vision Based Quality inspection of medicine packages using 3 DOF SCARA Robot

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Problem statement

Vision Based Quality inspection of medicine integrity package using 3 DOF SCARA Robot

Fig 1.Example of medicine boxes.

Objectives

1. The system's primary goals include the reduction of manual labor, and precise sorting of defective(non sealed) and non-defective(sealed) packages based on packaging integrity using the versatile and precise movements of the 3 DOF SCARA Robot.
2. To enhance Quality Assurance.
3. To Automate Inspection Processes.
4. To Optimize Production Quality.
5. To Enhance Patient Safety.

Methodology

Fig 2 . QUALITY INSPECTION SYSTEM.

Integrating a 3 DOF SCARA Robot and deep learning techniques for efficient detection and sorting of defective(non sealed) and non-defective(sealed) packages. The system initiates by capturing images of medicine boxes using a camera, and the acquired dataset is utilized to train a deep learning model. This model is designed to recognize and classify defects in the packaging. Once trained, the model is integrated into the inspection system. During the inspection process, the camera captures real-time images of medicine boxes. The deep learning model analyzes these images, swiftly identifying any defects based on learned patterns. When a defective box is detected, the system triggers the 3 DOF SCARA Robot to actuate and precisely place defective packages on their respective places. The 3 DOF SCARA Robot, equipped with its precision and flexibility, ensures accurate and rapid handling of the packages. Its three degrees of freedom allow for precise positioning of defective and non defective medicine packages.
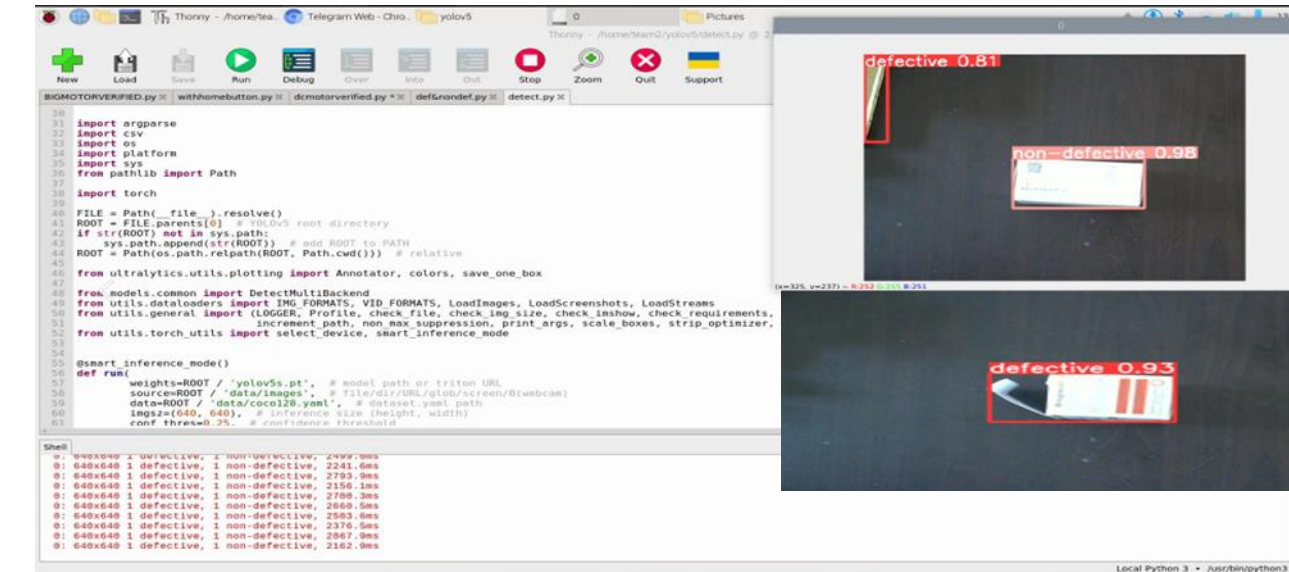
Results

Fig 3.Results of defective and non defective boxes.

The image illustrates a setup where medicine boxes are captured by a camera for quality inspection, showcasing the integration of visual data into a computer vision system, employing deep learning algorithms for automated assessment in quality inspection. Deep learning model classify medicine boxes with accuracy around 95%, the system triggers the 3 DOF SCARA Robot to actuate and precisely place defective and non defective packages on their respective places

Conclusions

In conclusion, the Vision-Based Quality Inspection of medicine packages using a 3 DOF SCARA Robot presents a forward-thinking solution that integrates cutting-edge technology, including deep learning, to revolutionize pharmaceutical quality control. By harnessing the power of computer vision, the precision of a 3 DOF SCARA Robot, and the capabilities of a deep learning model, this system aims to elevate standards of quality assurance in medicine packaging. The outlined goals, including the reduction of manual labor, intelligent detection of defects, collectively contribute to ensuring the delivery of high-quality pharmaceutical products.