WINTER 2019

DefectRaptor: Computer Vision System for Quality Inspection of Armrest Upholstery for Motor Vehicles

• Jasen Devasagayam • Atchu Siva • Timothy Wong • Anan Masoud •

FUNDED BY LAB FUND ENGINEERING STUDENTS

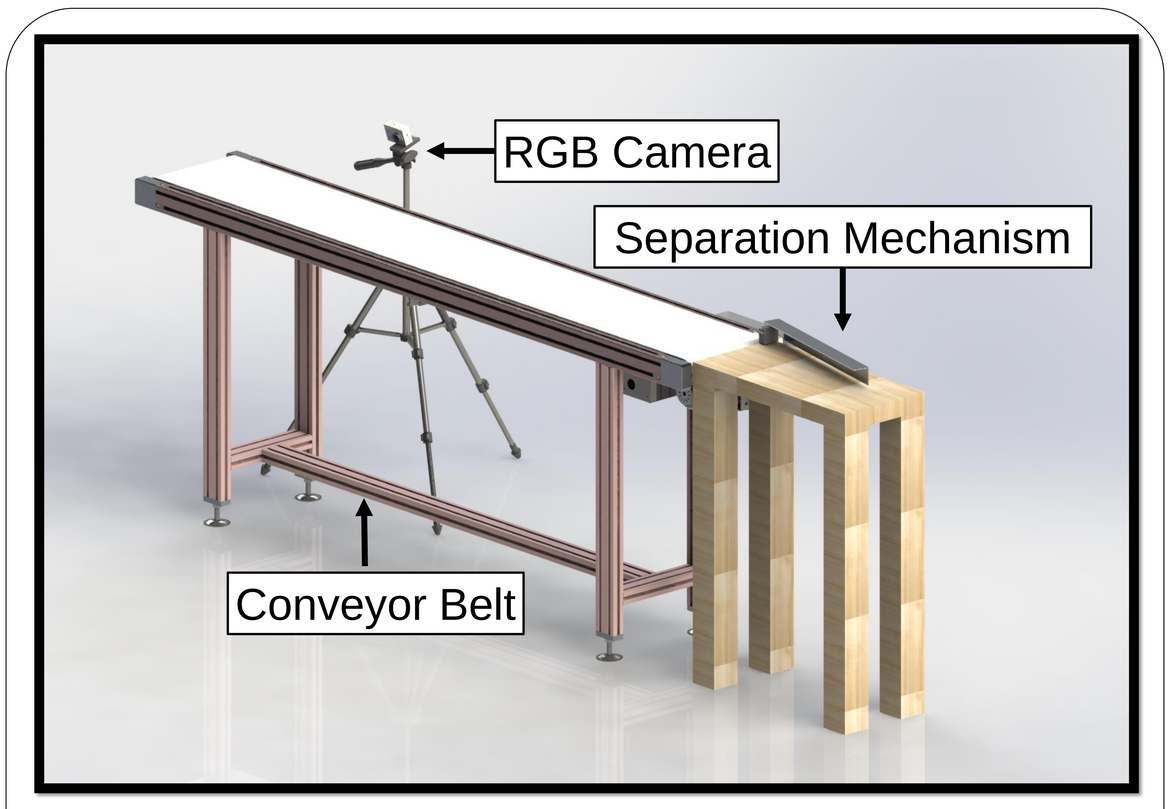
Background

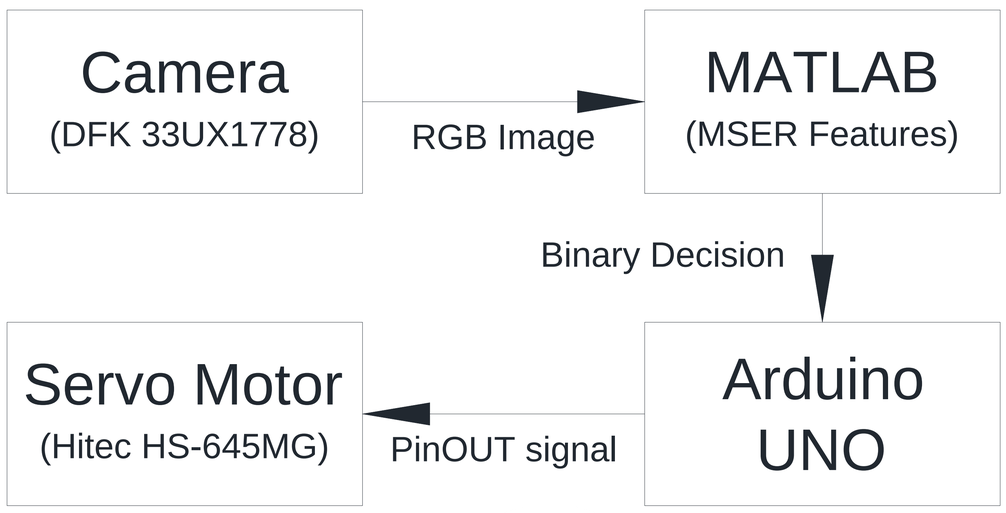
- Current quality inspection is being done using manual labor.
- Human inspection leads to inefficiencies and possible errors, compensating reputation.
- Requires extensive training and experience, which increases overhead costs.

Objectives

- The DefectRaptor will reduce time by eliminating the manual quality inspection process
- The system will be able to automate the decision making and separation process
- The product is a one time investment that will help buyers save money in the future

System Overview

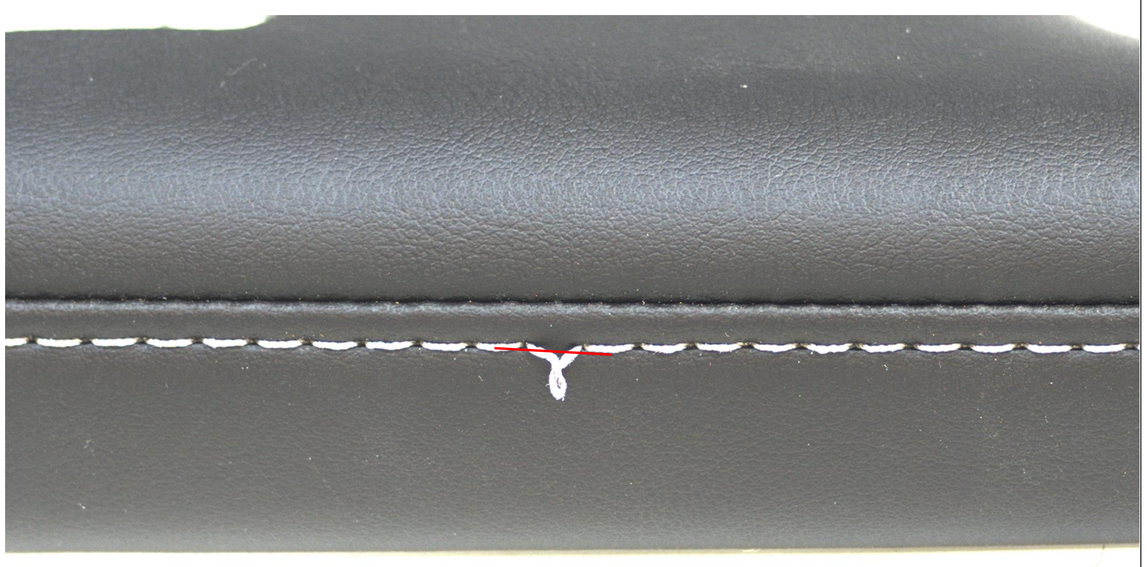




Design Outcomes

- The DefectRaptor is a reliable system which identifies defects and separates armrests based on their quality.
- The system is able to identify and display errors, using a **computer vision**-based algorithm and then separate defective armrests, from effective.
- The built-in MATLAB function, "MSER Features" identifies stitching from leather.
- An algorithm is then implemented to detect uniformity of the stitching pattern
- The final cost of the prototype unit is **$923.45.**

Armrest with Defects Identified



Armrest is 2.63% Defective

Future Recommendations

- Another approach for image processing would be deep learning which can eliminate the task specific portion of the project and give the system a general algorithm that can work for a much larger sample
- The purpose of using Arduino as the microcontroller is to eventually introduce a wireless feature via Bluetooth
- The team is looking to advance the progression of the DefectRaptor by developing a single unit comprised with all the components (camera, conveyor belt, separation system) along with a built in monitor to control and display various parameters

UNIVERSITY of GUELPH
ENGINEERING
Faculty Advisor: Manickavasagan Annamalai, Ph.D., P. Eng.
Mechanical
Biomedical