QUALITAS TECHNOLOGIES

CASE STUDY

INSPECTING LABEL USING OCR TO REMOVE MANUAL DATA ENTRY OF CIGARETTE PACKET DETAILS

CLIENT/INDUSTRY BACKGROUND

Our client is an Indian multinational conglomerate company headquartered in Kolkata, West Bengal and was established in the early 1900s. With over 27,000 employees our client had a turnover of over 1.9 Billion in the year 2019.

CLIENT'S PROBLEMS

1. During the testing of random cigarettes, the lab maintains data of unique codes printed on the cigarette packs. There was no automation in place to record all codes.
2. Errors were found during the manual entry of the codes into the system as it is as lengthy as 13 characters in one code.
3. An operator with a computer would make the entry of the unique codes by seeing them. It would take more than 1.5 hours to manually enter the unique codes for 900 packs each day.

PROBLEM IMPLICATIONS

1. Each character, in the printed code, has valuable information such as factory location, time of manufacturing, factory ID, etc. Inaccuracy in such critical data led to incorrect tracking and tracing.
2. If the manually recorded data was incorrect, the corresponding batches would not be supplied to the market and would be rejected instead.

3. Printed codes and manufacturing dates are considered critical information to ensure the safety of the end-users.
4. Unable to find the root cause of any defect in the product due to incorrect track and trace. As a result, eradication of defects would not be possible.

CLIENT REQUIREMENTS

To automate the process of detecting and recording the printed details on the cigarette packs such as mfg. date, and unique code.

MANUAL DATA ENTRY

CURRENT PROCESS

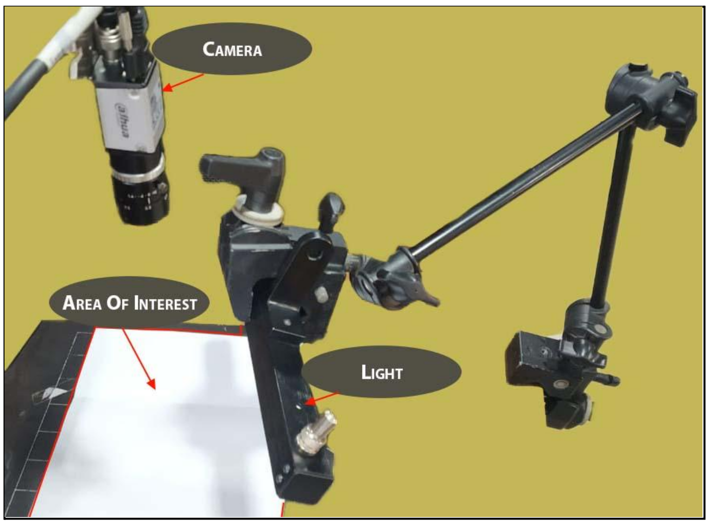
From visually detecting to entering the details into the database was being done manually by an operator. The operator picks up the pack check for the details (mfg date and serial code) printed at the top of it. While seeing the details the operator enters the details in their own data management application manually by typing the characters from the computer keyboard. Subsequently, he picks up another pack and starts repeating the same procedure again. More than 900 packs were to be inspected everyday. The average inspection cycle time was 6-7 seconds for each pack.

BUSINESS IMPACT

1. Due to incorrect tracking and tracing, bulk recall rates were observed, which led to the loss of revenue.
2. Employing skilled manpower for such critical operations increased the cost of labor, training and operation.

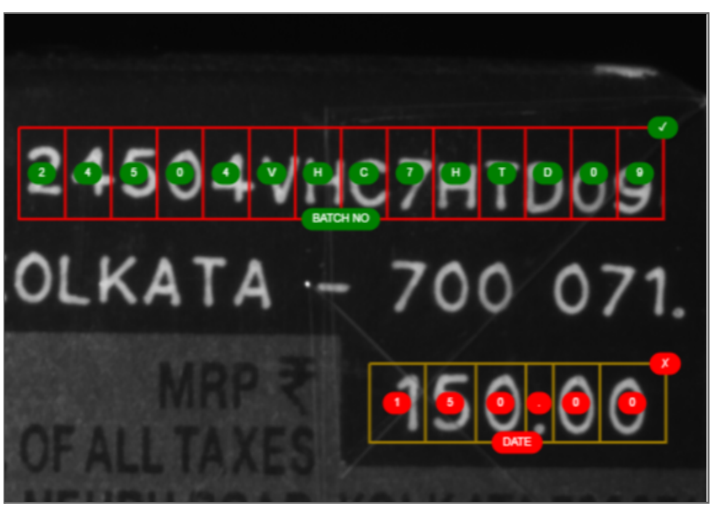
SOLUTION USING MACHINE VISION

A machine vision system was set up at the inspection station. A 4I (Install, Instruct, Inspect and Improve) methodology is used with the above configuration for the deployment of the machine vision system. The 4I method is discussed as follows -



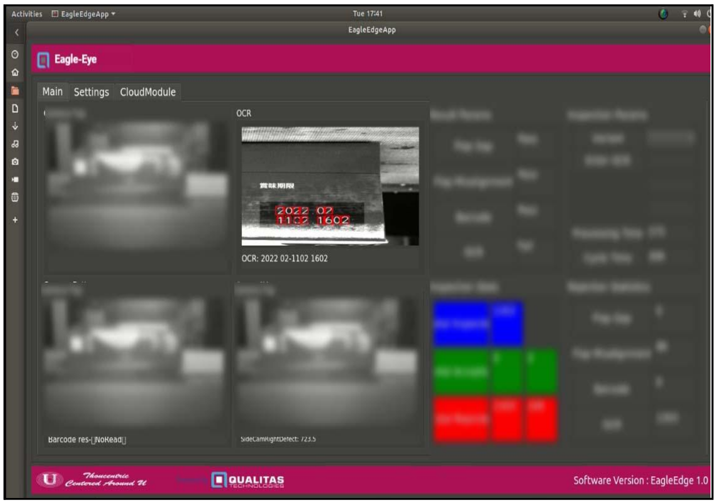
Install:

An EagleEye camera facing towards the area of interest was fixed along with the lights. White bar lights were used to illuminate the area of interest. Light and camera setup were enclosed in a fiber frame in order to prevent the reflection of the lights on the cigarette packs. A 16mm lens was used in the image acquisition of the printed characters for FOV (Field Of View) of 100 mm x 100 mm. The distance between the camera and the object (to be inspected) i.e. working distance is 130 mm.



Instruct:

Using the **AI-based OCR Module** from the Qualitas Library, the acquired images were trained for each character and font by performing annotation in Qualitas EagleEye® Software.



Inspect:

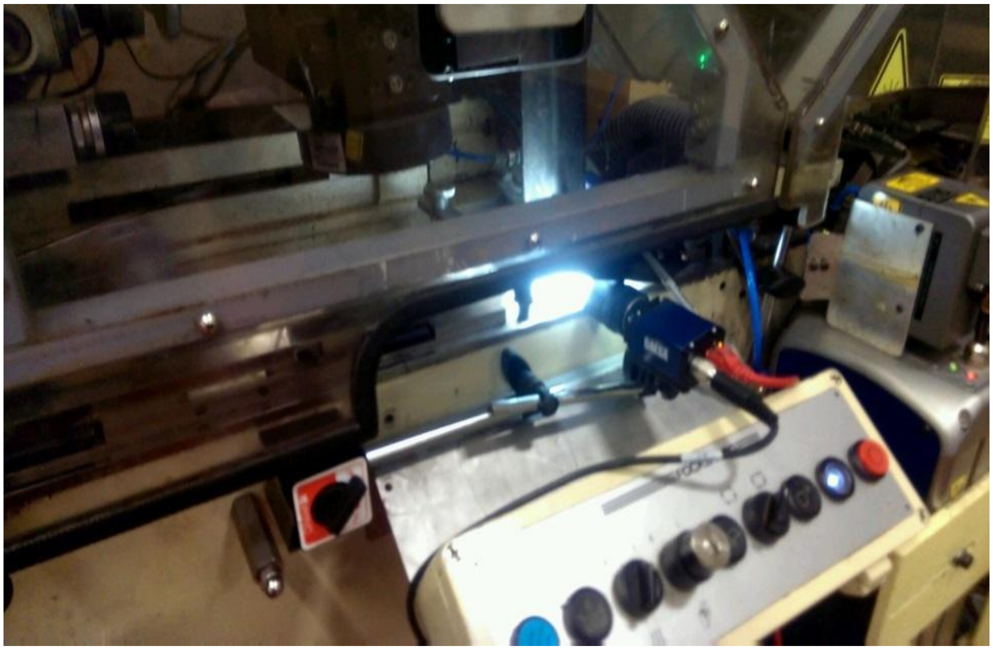
Once the AI model is trained the image acquisition, processing and inferencing occur in real-time (in **EagleEye Edge App**). Though the system is trained, it is still learning, and therefore the character fonts which are not trained may not get identified and UI shows the result as ‘Fail’.

Improve:

The characters missed by the machine vision system would get retrained in the software by performing annotation with a new set of images. The updated trained version of the software would have improved accuracy for recognizing various fonts.

A **loop** of these two processes (Inspect and Improve) would run until the desired accuracy is achieved.

SETUP



WATCH VIDEO - CLICK HERE ▶

IMAGES

REAL-TIME LABEL INSPECTION USING QEP(QUALITAS EAGLE-EYE® PLATFORM)

Real Time OCR

CONCLUSION

With the deployed machine vision system, the following were observed -

1. The accuracy of the read rate was more than 94 percent. As a result, the correct data could be entered into the ERP systems.
2. The inspection cycle time for OCR is reduced to 350 milliseconds, which saves 95 percent of the time (taken in manual inspection).
3. Human operators were completely replaced with the deployed system helping in reducing the cost of labor and training.

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