

Quality Inspection of Windshield Motor System

i Introduction

At times it becomes difficult for our eyes to carry out a complex task which often leads to failure of a product. If such an accident becomes periodic, dedicated machines should be installed to maintain the quality of the product.

“ This case study showcases a similar scenario where due to repetitive human errors, the company was facing losses. But, with the help of Winjit's Machine Vision, the problem was rectified, enhancing the quality and quantity of products. ”

👤 Customer

The client is an established entity in automobile parts manufacturing industry. Having an experience of 5 decades, the client has been providing technology expertise in DC motors. They have been manufacturing 8 kinds of wiper motor systems, serving various auto tech giants in India like Tata, Mahindra, Ashoka Leyland, JCB, etc. Now, the client aims to automate the testing process of the windshield motor system to reduce human errors and increase efficiency.

⚙️ Requirement

To get the overall view of the scenario, Winjit's machine Vision team identified the key requirements as:

- ▶ Energy meters to be interfaced with RS-485
- ▶ Calibration of inspection instruments.
- ▶ Digital capturing of voltage, current and RPM
- ▶ Software driven inspection process to digitize inspection parameters.
- ▶ An automation to stamp OK motors.
- ▶ A camera oriented buzzer system in case of mismatched harness.



Challenges

The client has been supplying windshield washer assemblies to some auto giants in India in inundate quantities. Due to some process inconsistencies and lack of monitoring and control Defective / untested components were being dispatched.

The client was facing the following problems which he wanted to be rectified-

- ▶ Issues were reported for dual motor systems where the incorrect harness connections have led to rear windshield washer start spraying when front one was switched on.
- ▶ Sometimes the pump was picked from the wrong bin resulting in a defective assembly being shipped out.



Solution

Machine vision for smart inspection was achieved by the Winjit MV team with the value addition of creating a smart alarm system.

The following components- Raspi Cam, Raspberry Pi-3 with 4×ARM Cortex-A53, 1.2GHz processor, 1 GB RAM and on-board Wi-Fi was the preferred solution for the implementation.

The inspection of the pump units was traditionally performed using colour based wiring harness. Such testing often made the working pumps defective when the polarity of the wires of harness was reversed, mistakenly.

Such a mistake was avoided using the Winjit's MV. A base image was loaded in the system, containing correct orientation and polarity of the wires. While testing in presence of camera, the system used to compare the fresh images captured from the live stream with the base image. Whenever a difference was noticed in orientation or polarity of wires, a buzz alarm was raised. This alerted the labour from performing a wrong test on the pump unit.



Achievements & Benefits

- ▶ With the help of MV, the defective systems were restricted from being shipped.
- ▶ Efficiency in testing increased by more than 90%.
- ▶ By the integration of MV with the existing system, labour accuracy also increased significantly.
- ▶ The buzzer system we created, helped in alerting the labours when they tried to test the unit with wrong harness.
- ▶ The system led to better management of resources, by decreasing the count of producing defective systems.



Conclusion

The solution developed for the client helped in eliminating human errors using an alarm system. Also, tendency of a defective product getting dispatched was reduced significantly.

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