

# Ethereal Partition of Deviant Child Parts via Vision Guidance System

L. David William Raj<sup>1</sup>, K. Roja<sup>2</sup>, J. Sasi Theresa<sup>3</sup>, M. Sathyavani<sup>4</sup>, M. Sumithra<sup>5</sup>

Assistant Professor, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India<sup>1</sup>

UG Scholar, Department of ECE, Adhiyamaan College of Engineering, Hosur, Tamilnadu, India<sup>2,3,4,5</sup>

**ABSTRACT:** Gear and shaft plays an important role in the manufacturing of vehicle. Hence, there is a need for correct identification of variant to be organized in a gear box. As manual checking results faulty closure of different gears and shafts, an automated material handling system is used. It's target is to sort the different variants which are in the pallet by picking and placing the variants in its respective place. Thereby terminating the tedious work done by human, attaining accuracy and speed in the work. This can be implemented by using vision guidance system and UR10 Cobot.

**KEYWORDS:** Automated material handling System, Vision guidance System, UR10 Cobot, PLC, HMI.

## I. INTRODUCTION

Automated material handling system is one of the most used technologies in industries. It synchronizes the movement of robotic arm to pick the variant from the pallet. In this case, sorting of different variants and placing them in its respective places are two important works. Gearing is a process of producing power from crank shaft to drive shaft by running under the vehicle to power the wheel. Crank shaft follow the principles of reciprocating system to rotate the wheel, they are often takes clock wise direction while the rods move too and fro. Driver shaft is used for transmitting torque and rotation. Gear box plays an important role in the manufacturing of any vehicle. Mixing of variant in gear box results in vehicle explosion. Hence, there is a need for correct identification of variant to be organized in a gear box.

## II. LITERATURE SURVEY

The gearbox is also denoted as the transmission system and it is a part of the power train in an automobile. It is assigned to modify the speed and torque of vehicle according to the variety of road and load conditions. Transmission box modifies the engine speed into torque when climbing hills and when the vehicle required. Sometimes it is referred to as the torque converter. Manual handling of gear needs more manpower and energy than an automatic, which becomes most apparent in heavy traffic. Many carmakers find the additional risks in gear selection and clutch control daunting and take their driving test in an automatic vehicle.

Year	Paper	Information
2015	Robust and Smooth Nonlinear Control of an Industrial Robot for Automated Pick and Place	Robot can operate in a larger operating range,i.e., outside its linear limits [1].
2013	Low cost flexible robot manipulator for pick and place tasks	Flexible robot and low cost construction. It can pick light weight products [2].
2012	A depth sensor to control pick and place robots for fruit packaging	Object detection and location using commercial 3D depth sensor. Low cost [3].

### III. PROPOSEDSYSTEM

The proposed system seeks the development of a smart and highly sensitive detection system. In order to avoid the drawbacks of manual gearselection, Some industrialists are refusing the manual works, introducing an automatic as standard.Dual-clutch and automatic gearboxes can help cars utilize less fuel and exhaust less CO2 than those with a manual transmission. The advantages of proposed system are followed as

- Time and power consumption is low.
- Offers high efficiency and accuracy.
- Reliability of work will be higher.
- Faulty selection of gears and shaft variants will be negligible.

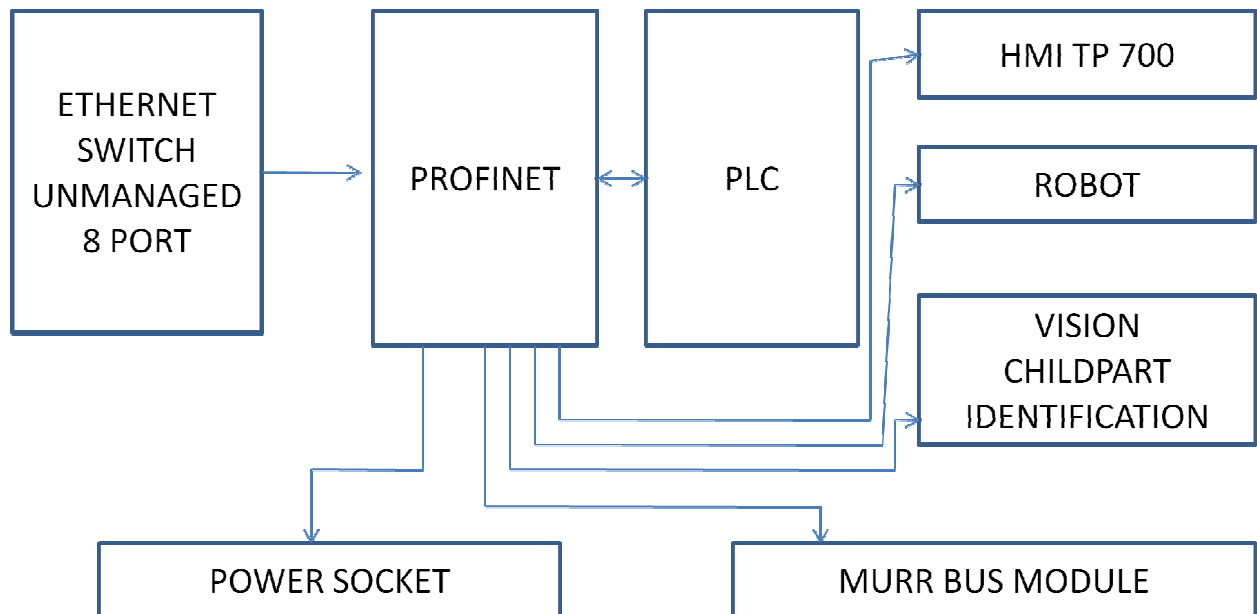
### IV. WORKING PRINCIPLE

Working sequence of the machine consists of four units which are listed below.

1. Sensing Unit
2. Identification Unit
3. Isolation Unit
4. Safety Unit

Child parts of gear box will arrange in the pallet through manually.Using pneumatic cylinder and the solenoid valve the moving and locking process of pallet will be done.By using thru beam sensor the presence of pallet with an arrangement of child parts in its accurate position was detected.Identification is a second stage of process.Vision system is used to scan the variant of child parts.Cognex In-Sight Vision System is using for the identification purpose, which includes Vision light, Vision Camera and Lens. In isolation unit, The captured images of each variant are verified with pre-defined pictures. A bar code is assigned for each variant , So it helps the arm to sort each variant to its own type. The sorted child parts are carried along the conveyor and moves toward its respective place using UR10 COBOT.

### V. SYSTEM BLOCKDIAGRAM



#### PROFINET:

PROFINET stands for Process Field Network which is an industrial technical standard for data communication over Industrial Ethernet. It is used to collect data from industrial systems and delivering data with a particular strength.

#### Murr bus module:

Murr bus module is a kind of bus module that links the main elements of a computer system. It has three different classifications which are data bus, address bus and control bus. Data bus transfers the information, Address bus is to identify the location where data should be sent and control bus is used to define and control its operation.

#### PLC:

Programmable Logic Controller [PLC] is designed to perform digital operations in the electronic system for the industrial purpose. These are the microprocessor-based system that monitors external activity from additional devices. They are suitable for harsh environments due to its high-reliability automation

#### HMI:

HMI is abbreviated as Human Machine Interface and it can be designed as an interface between the user and the machine. The three classes of HMI are given below.

- Pushbutton replacer
- Data handler
- Overseer

**Cobot:**

Collaborative Robot is used here. It is called as Cobot which can directly interact with human in workspace and also it provides safety to the human while processing. The applications of Cobot are machine tending, pick and place, palletizing and quality inspection. Features of Cobot are listed below.

- Capable of carrying payload upto 10kg
- Capable of working together with human in an office environment
- Support and relieve the human operator in conjoint work flow
- Reprogrammable
- 6-axis with 360<sup>0</sup> rotation

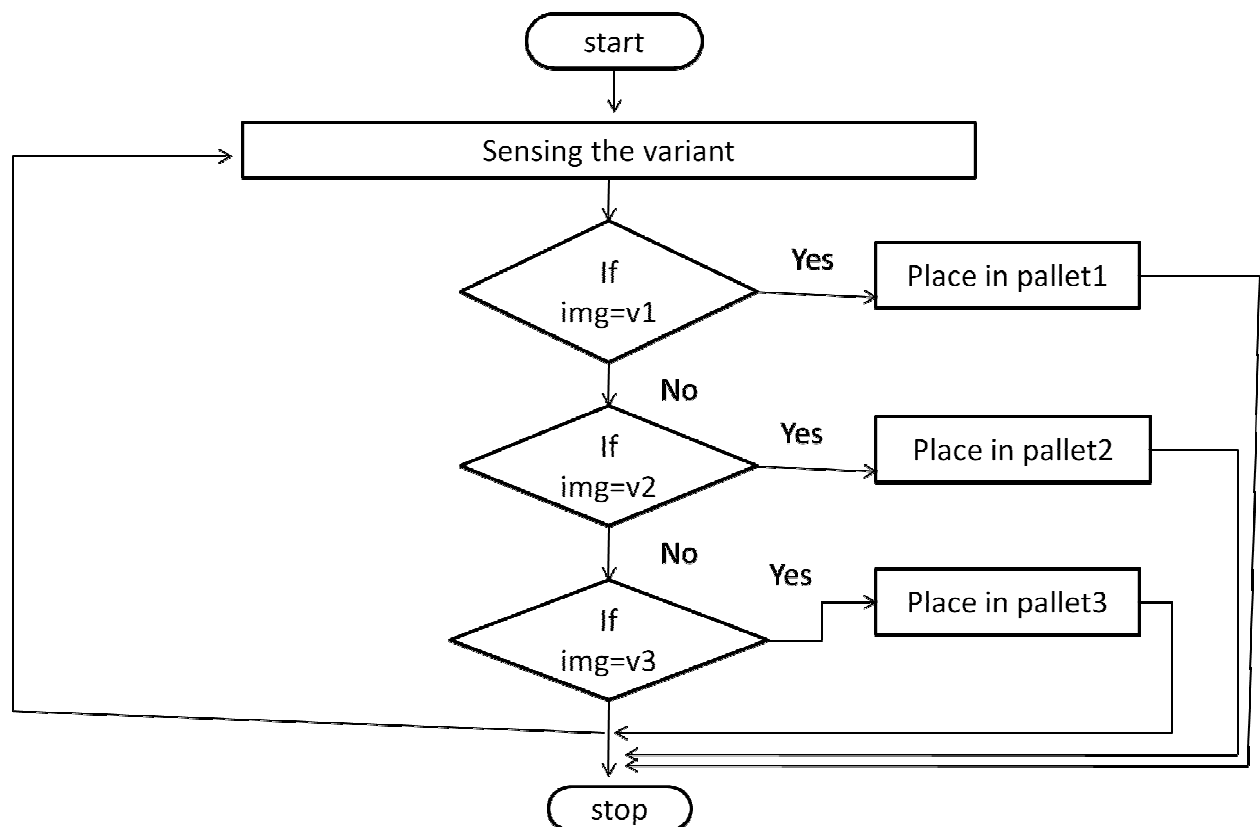
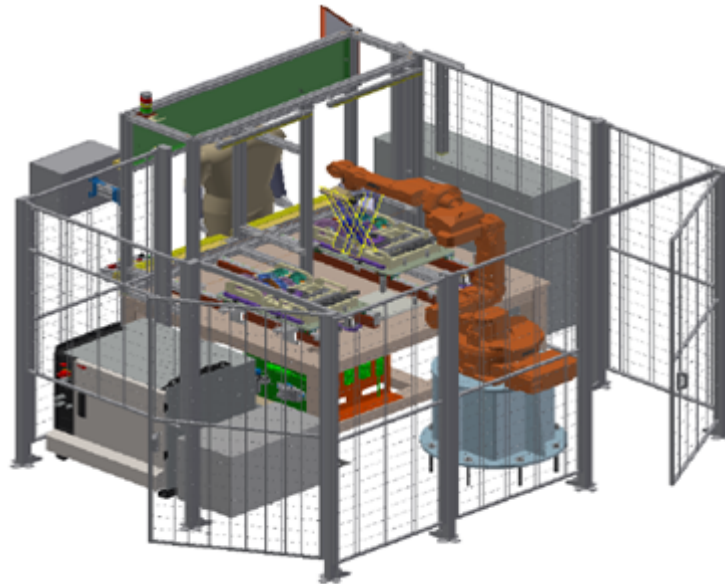


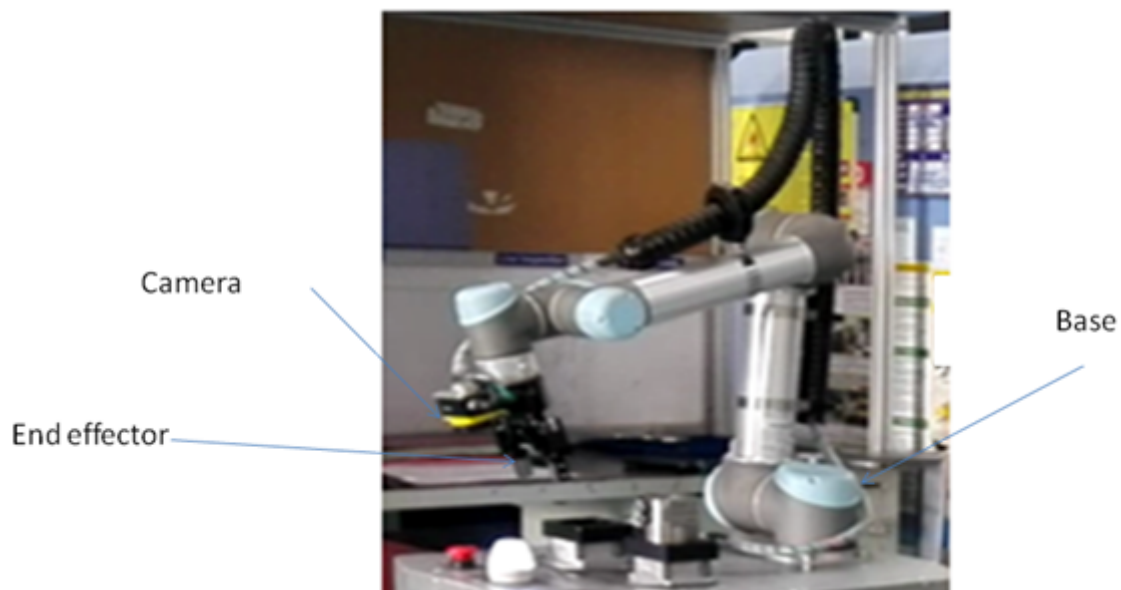
Fig.2: Flowchart for the working sequence of Cobot in isolating mode

Cobothas the vision guidance System in which Thru beam sensor is used to detect the presence of variant. After this detection, It captures the image of current variant. The captured image is checked with the stored image or pre-defined image. Here img→ current image, v1→ First variant, v2→ Second variant, v3→ Third variant. If it is First variant it will place it in pallet1, If not it will check with another image. If it is matched with second variant it will place the variant in pallet2. Likewise the process goes on.

## VI. EXPERIMENTAL RESULTS



*Fig.3: 3D view of the machine*



*Fig.4: UR10 Cobot*

## VII. CONCLUSION AND FUTURE ENHANCEMENT

Thus the accidents are avoided completely and the safety is achieved in the industry by using collaborative robot which is known as Cobot. Due to automation the production will increase and it will become more reliable for operation. Ultimately the quality requirement is satisfied for a great extent. UR10 arm will automate heavier-weight process tasks with payload requirements of up to 10 kg. Payload can be increased more than 10Kg in future.

## REFERENCES

- [1] AbhinavSinha, Rajiv Kumar Mishra, SupratikJaiswal , "Robust and Smooth Nonlinear ssControl of an Industrial Robot for Automated Pick and Place" , International Conference on Computing Communication Control and Automation, 978-1-4799-6892-3/15 \$31.00 © 2015 IEEE, DOI 10.1109/ICCUBEA.2015.11.
- [2] Gustavo Kato, Diego Onchi and Monica Abarca, "Low Cost Flexible Robot Manipulator for Pick and Place Tasks" , 10th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI), 978-1-4799-1197-4/13/\$31.00 ©2013 IEEE .
- [3] PavelDzitac , Abdul MdMazid , "A Depth Sensor to Control Pick-and-Place Robots for Fruit Packaging " , 12th International Conference on Control, Automation, Robotics & Vision , 978-1-4673-1872-3/12/\$31.00 ©2012 IEEE.
- [4] R. Sujitha,A. Devipriya, "Automatic Identification of Accidents and to Improve Notification using Emerging Technologies",2015 International Conference on Soft-Computing and Networks Security (ICSNS),10.1109/ICSNS.2015.7292412.
- [5] AravindaB, Chaithralakshmi C, Deeksha, AshuthaK , "Sensor Based Accident Prevention System",International Journal Of Innovative Research In Electrical, Electronics, Instrumentation And Control Engineering, Vol. 4, Issue 6, June2016.
- [6] [https://en.wikipedia.org/wiki/Programmable\\_logic\\_controller](https://en.wikipedia.org/wiki/Programmable_logic_controller)