

# EVENT REPORT

MC PROJECT FAIR 2018

(DATE: 2<sup>nd</sup> APRIL 2018)

Coordinated By:

Dr. Ajay M Patel



**G H PATEL COLLEGE OF  
ENGINEERING & TECHNOLOGY**

Department of Mechatronics, G H Patel College of Engineering and Technology, Vallabh Vidyanagar has organized the "IT Project Fair 2018" on 2<sup>nd</sup> April 2018.

Total 19 projects were demonstrated by final year mechatronics students. They have displayed the flex banners and rough prototypes of their project to make it easily understandable for junior students who had visited the fair. An open invitation was sent to all the staff members and students of the institute. Third year students and faculties have visited the fair. This fair has provided a great platform for final year students to share their learning, ideas and experiences with the visitors.

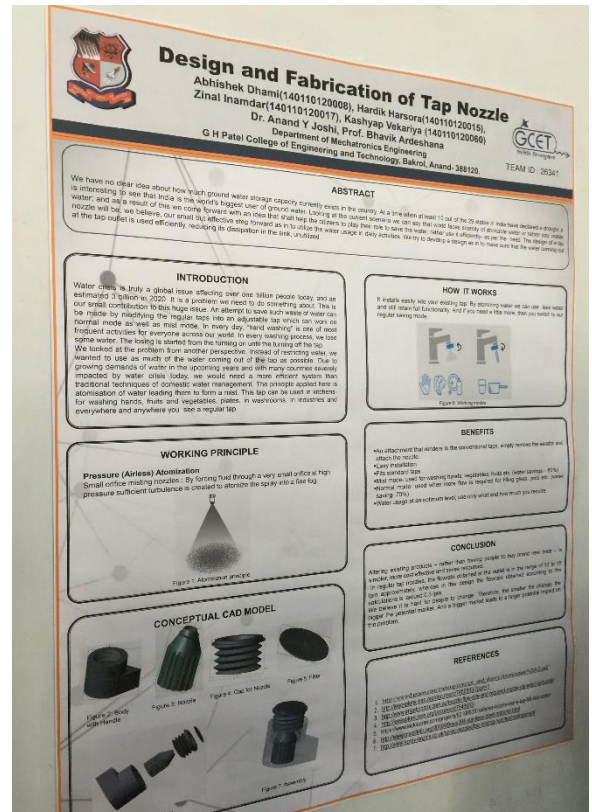
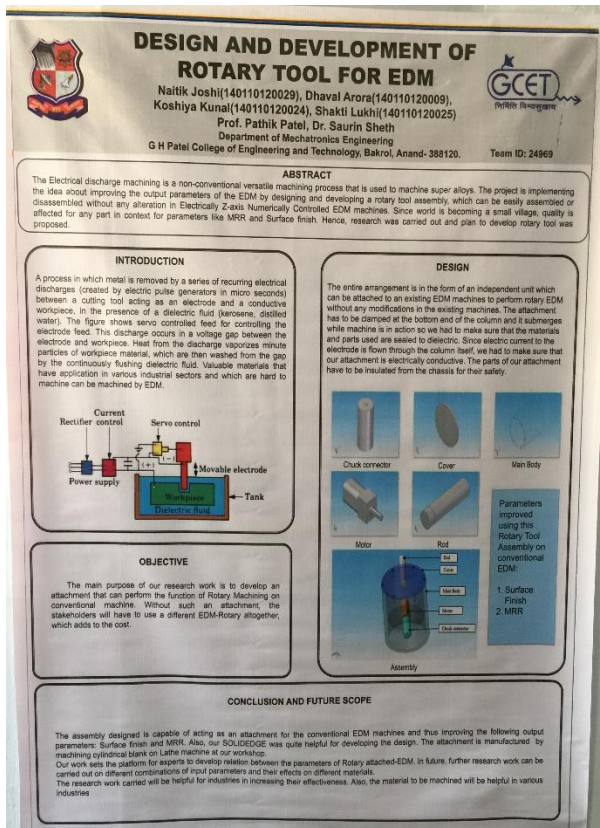
We have invited an expert Dr. Yashavant D. Patel, Associate Professor, from A D Patel Institute of Technology, New V. V. Nagar to judge the projects.

By the judgement of expert Dr. Yashavant D. Patel, following 7 projects were chosen in the category of Best 6 projects and they were rewarded with the certificates for same;

Sr. No.	Project ID	Enrolment number	Name of Students	Project Title
1	UDP	140110120012	Abhishek Gajjar	Performance Enhancement of 3-D Printer
		140110120013	Rajan Gohil	
		140110120023	Ravi Khunt	
		140110120028	Mayur Mungara	
2	IDP	140110120058	Mrugaksh Trivedi	Design and Development of Automatic weighting and counting for billing machining
		140110120051	Parin Shah	
		140110120052	Saloni Shah	
3	IDP	140110120044	Sagar Bhardia	Design and Development of a Semi- Automatic Inspection Machine for Comparing the Races of Deep Groove Ball Bearing
		140110120048	Aashiv Shah	
		140110120010	Dhawal Mehta	
		140110120053	Shrey Shah	

4	IDP	140110120033	Patel Dipen P.	Design-Modification & Development of Diaphragm Valve
		140110120007	Dave Nikhil K.	
		140110120061	Patel Vinit	
5	UDP	140110120009	Dhaval Arora	Enhancing the Machining Capability of EDM by Design and Development of Rotary Tool
		140110120024	Krunal Koshiya	
		140110120025	Shakti Lukhi	
		140110120029	Naitik Joshi	
6	IDP	140110120006	Chudasma Harry	Converting an Ordinary Pump to a Smart Pump for Critical Application
		140110120011	Dudhaiya Mohit	
		140110120027	Keval Moradiya	
		140110120030	Kartik Panchal	
7	UDP	140110120038	Kishan A. Patel	Smart Shooter - An Automated Surveillance system
		150113120006	Tirth D. Patel	
		120110120050	Devansh Patel	

### Photographs of the event



## Designing and Development of a Semi-Automatic Inspection Machine for Comparing the Races of Deep Groove Ball Bearing

**ABSTRACT**  
Single row deep groove ball bearing is the most widely used roller bearing type. They are characterized by having deep grooves in which the inner and outer rings have circular area of slightly larger radius than that of the balls in the end of axial rotation to retain one ball to lock on outer of the product with least inspection time. Presently, ball bearing industries are using conventional gauges for checking the dimensional tolerances which consumes a lot of time and the chances of human errors are there as the process is carried out manually. To make the same process automatic, the semi-automatic machine for comparing the races of deep groove ball bearing is proposed.

**PROBLEM STATEMENT**  
A. Presently ball bearing industries are using conventional gauges to measure thickness. Outer Diameter and inner diameter of the bearing races. This process is manually done.  
B. It consumes a lot of time i.e. setting the gauges to check dimensions is lengthy process.  
C. There is an issue of repeatability in gauges as the dimensions of bearing rings varies.  
D. Human error is also an important factor in the process.

**PROPOSED SOLUTION**  
A. To design a semi-automatic machine for comparing the races of deep groove ball bearing.

**PROCESS FLOW**  
Bearing on conveyor  
↓  
Image Capture using Camera  
↓  
Image Processing using Matlab  
↓  
Acceptance  
↓  
Rejection OR Send to machining

**MAIN COMPONENTS**  
1. Conveyor Belt  
2. Motor  
3. Pneumatic Cylinder  
4. Motor Machine Interface  
5. PLC  
6. Camera  
7. Image Processing Software

**WORKING METHODOLOGY**  
A. When conveyor belt starts and sensor senses the bearing, data starts and a signal sent to PC through Arduino which instructs camera to take picture.  
B. The image is stored in PC and the image processing is carried out with image processing software.  
C. Conveyor stops when it is sensed by sensor.  
D. 2 pneumatic cylinder gets actuated when the image parameters is beyond the standard value.  
E. Otherwise the ring will pass at the end and will be accepted.

**DESIGN**  
A. To design a semi-automatic machine for comparing the races of deep groove ball bearing.  
B. To design a conveyor belt to move the bearing.  
C. To design a camera to capture the image of the bearing.  
D. To design a pneumatic cylinder to stop the bearing.  
E. To design a motor to drive the conveyor belt.  
F. To design a motor machine interface to control the motor.  
G. To design a PLC to control the motor and pneumatic cylinder.  
H. To design a software to process the image and control the machine.

**CONCLUSION & FUTURE SCOPE**  
A. This machine will be having various features which may prove to be the bearing industries in future.

**Team Members:-**  
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Dr. Sanket Bhat  
Prof. Bhavesh Hink

## Design & Development of Automatic Weighing and Counting Machine for Billing

**ABSTRACT**  
The present work is to design and develop an automatic weighing and counting machine for billing. The machine will be used in the retail sector to weigh and count the items and generate the bill. The machine will be designed using the CAD software and will be developed using the PCB software. The machine will be tested and the results will be compared with the manual method.

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**DESIGN**  
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## 3D SCANNER

**ABSTRACT**  
The present work is to design and develop a 3D scanner. The scanner will be used to capture the 3D data of the objects and will be used for the various applications. The scanner will be designed using the CAD software and will be developed using the PCB software. The scanner will be tested and the results will be compared with the manual method.

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A. The present work is to design and develop a 3D scanner. The scanner will be used to capture the 3D data of the objects and will be used for the various applications. The scanner will be designed using the CAD software and will be developed using the PCB software. The scanner will be tested and the results will be compared with the manual method.

**PROPOSED SOLUTION**  
A. To design and develop a 3D scanner.

**DESIGN**  
A. To design and develop a 3D scanner.

**CONCLUSION & FUTURE SCOPE**  
A. This scanner will be having various features which may prove to be the various applications in future.

## DESIGN OF AUTOMATIC PUNCHING MACHINE USING GENOVA MECHANISM

**ABSTRACT**  
The present work is to design and develop an automatic punching machine using the Genova mechanism. The machine will be used to punch the holes in the sheets of metal. The machine will be designed using the CAD software and will be developed using the PCB software. The machine will be tested and the results will be compared with the manual method.

**PROBLEM STATEMENT**  
A. The present work is to design and develop an automatic punching machine using the Genova mechanism. The machine will be used to punch the holes in the sheets of metal. The machine will be designed using the CAD software and will be developed using the PCB software. The machine will be tested and the results will be compared with the manual method.

**PROPOSED SOLUTION**  
A. To design and develop an automatic punching machine using the Genova mechanism.

**DESIGN**  
A. To design and develop an automatic punching machine using the Genova mechanism.

**CONCLUSION & FUTURE SCOPE**  
A. This machine will be having various features which may prove to be the various applications in future.

Mechatronics Department, GCET (TEAM ID : 26342)

# 3D SCANNER

Sanket Thakkar (140110120057)  
Viren Soparwala (140110120055)

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Guided by : Prof. Bhavik Ardesana | Prof. Umang Jani

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### ABSTRACT

3D Scanner is device which converts the object 3 dimensional seen in the 3d and the where it reduces the design, timings and workmanship problems in the designing of complex mechanical designs. So project proposed the low cost 3d scanner it uses the low cost microcontroller. Stepper motor is used that will provide more accurate and precise control. It uses proximity sensor that will measure distance for shape approximation and finally the microcontroller will calculate distance and shape approximation and generate location information then microcontroller signal will be converted to STL file using MATLAB.

### How it works

Take one table, on that table we put our object. This table is controlled by stepper motor. Then we take sensor in some distance from object, this sensor is placed in mechanical strip which is free to move in up & down direction. It is working from an optical plane to one position and sensor then take table move in some angle and sensor doing so by directly sensor take one reference point and sensor. After taking one table we reference point and sensor. Then sensor step up in small distance and doing same thing with reference point and sensor of layer created. So we can scan full object this way and virtual image and size of object is stored on digital file of our files of computer.

### Components

Component	Specification
STEPPER MOTOR	NEMA17
IR SENSOR	SHARP GP1VA151KRF
MOTOR DRIVER	ADR0612V
ARduino UNO	ARDUINO UNO
POWER SUPPLY	12V
VOLTAGE REGULATOR	7805
THICKENED ROD	0.6mm
PUSH BUTTON	

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### FLOW DIAGRAM

### Applications

Rapid prototyping, entertainment industry in the production of movies and video games, inspection and documentation of cultural artifacts for heritage preservation and museum purpose.

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### Interfacing

### Reference

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### Feature Enhancement

Some of the value added Features likely to enhance performance of 3D Scanner & make it more user friendly.

- Increase Range
- Bluetooth function can be integrated
- Speed and size can be increased.

# Design & Development of Automatic Weighing and Counting Machine for Billing

Made by: Parin Shah, Saloni Shah, Murgaksha Trivedi

Team ID: 26420

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### Abstract

The primary objective is to design and manufacture a machine to perform the task of automatically weigh and count together with would give us an idea about the size of the commodity that is to be used. This idea is that going to be used for billing purpose under some criteria as set by the organization or the government for the prices respective to the quality of the commodity supplied.

The machine would do this quickly without much of the errors and would automatically consider the samples of 20kg which would be weighed and counted simultaneously and then the further allotment of prices would be done as per the system data acquired as set for them.

### CAD Model

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### Problem Identification

In India, 80% of the economy is based under the Agricultural sector and there is much of manipulation and interference in making bills relative to the commodities that the farmers produce.

So we are trying to develop a machine that generates proper revenue to the farmers as per the quality (size) and weight as the primary parameters for giving them the equivalent price.

Now a days, this whole system is manual and is done under no supervision, so there's much of manipulation in every possible manner. This machine that we're going to develop is going to help in resolving this problem.

Also, there is large variation in loss among the same-type products coming from the different geographical locations due to which one can suspect for the process will be more manually, but the machine can handle 10-50kgs with greater ease and precision.

### Table 2: Items according to size

Count per kg	Rate	Total Amount
5-9	150	150*
10-14	130	130*
15-19	110	110*
20-24	90	90*
25-29	80	80*

\* 10% Tax amount

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### Methodology

Firstly, the farmers will bring their lot for selling in bulk which is going to get weighed under the continuous weighing component with the help of load cells and that data of weight is going to be fed as the first parameter for billing; that is the lot weight.

Here the weight of bags is also calculated. So for more precision that should be subtracted from total weight which will be done by PLC algorithm.

Then the sample as per the lot size is drawn at random from the whole lot and that sample is couriered in the joint machine; this data would be the second parameter for billing.

Lastly, as per the sample report the rate calculations are done according to norms set by industry. Afterwards an invoice of the bill will be generated.

When the sampling is done at random, so no manipulation from any side is affecting the overall billing record and the precision of the lot size is met, as the whole lot is weighed and considered.

Automatic billing would reduce discrimination and bias based problems which earlier existed and would provide the optimum price to the farmers as per the lot that they have brought.

### Table 3: Component Configuration

Component	Model No.	Manufacturer	Specifications	Type
Load Cell	80710	ADI	Load Cell Transmitter (0-100 Kg) Current Signal (2-4mA - mA)	Shearing beam
Photo Cell	-	Cadence Electronics	Sensing Distance 500 mm ( Max ) 15 mm diameter	PNP-NO
Motor	MH043150	-	2.25 HP RPM:1480	-
Gear Box	EM-17002065	Elicent	50 Gear ratio	Worm
Bearing	UCPL-204	NTN	20mm diameter	Self-aligning

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### PLC Configurations

The PLC we've selected in **PIESSE-TP-ETH** depending on the following parameters:

1. Number of analog I/Os
  - On board digital multipoints - 6 each
  - On board analog multipoints - 2 input, 1 output
2. Supply voltage - 24V DC
3. Program memory - 128kb
4. Resolution - on the basis of bit memory 2<sup>12</sup>
5. Scanning time - reduce upto 1ms
6. Serial communication - 2 ports
7. Ethernet communication - 1 ports

### Conclusion

By developing this machine we have successfully rectified all possible discriminations or bias manipulations actions occurred earlier through the manual counting and billing process. Also automation has increased the speed of the whole process exponentially thereby advancing the whole technology of automatic billing.

Therefore the whole world would now help farmers get the true value of their commodities in speculated time duration and it is a new advancement in digitalizing India.

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**Guided By:** Dr Anand Y Joshi  
Prof Bhavik Ardesana

**Industrial Guide:** Mr Hitesh Desai  
HEM Marketing Service

**References**

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6. [www.arduino.cc](http://www.arduino.cc)
7. [www.arduino.cc](http://www.arduino.cc)