

# Team Members

Insert Photo of the team member in the left column.

	<p><b>Adil Shaikh –CH16B063</b></p> <p>Studying in Department of Chemical Engineering (2<sup>nd</sup> Year B.Tech).</p> <p>Worked in Software Module:- Arduino coding (in embedded C), data transfer from various sensors to Arduino.</p> <p>Also worked in Electrical Module:- Designing the circuit using Eagle, studying various ICs and making appropriate connections.</p> <p>Did modifications in CAD design. Interested in electrical circuitry and sensors.</p> <p>Email: ch16b063@smail.iitm.ac.in</p>
	<p><b>Anuj Sindgi-ED16B030</b></p> <p>Studying in Department of Engineering Design (2<sup>nd</sup> Year D.D).</p> <p>Worked in Mechanical Module:- CAD design using Autodesk Inventor.</p> <p>Manufacturing of the two wheeled bot's body.</p> <p>Ideation of the project.</p> <p>Interested in CAD designing.</p> <p>Email: ed16b030@smail.iitm.ac.in</p>
	<p><b>Atharva Rajadnya-CH16B053</b></p> <p>Studying in Department of Chemical Engineering (2<sup>nd</sup> Year B.Tech).</p> <p>Management:- Finance, keeping records, getting the parts.</p> <p>Documentation and Poster Design.</p> <p>Ideation of the project.</p> <p>Interested in management and finance.</p>

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	<p><b>Rahul Chakwate-AE16B005</b></p> <p>Studying in Department of Aerospace Engineering (2<sup>nd</sup> Year B.Tech).</p> <p>Worked in Software Module:- embedded C programming for Arduino, PID Algorithm code, communication with sensors and drivers.</p> <p>Also worked in Mechanical Module for CAD design using Autodesk and PTC Creo.</p> <p>Interested in Designing (CAD) and Coding.</p> <p>Email: <a href="mailto:ae16b005@smail.iitm.ac.in">ae16b005@smail.iitm.ac.in</a></p>
	<p><b>Siddharth Nayak –EE16B073</b></p> <p>Studying in Department of Electrical Engineering (2<sup>nd</sup> Year B.Tech).</p> <p>Worked in Software Module:- Arduino Programming (Embedded C), PID tuning.</p> <p>Electrical Module:- Studying various pin connections for gyro sensor, motor driver, information exchange with sensors.</p> <p>Major role in the Ideation of the project.</p> <p>Email: <a href="mailto:ee16b073@smail.iitm.ac.in">ee16b073@smail.iitm.ac.in</a></p>

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**1. Abstract:** Tron bike is a one wheeled bot which has self-balancing capability. It is one of the coolest ways of transportation. The basic idea is to get the signals from the gyro and accelerometer sensors, process them in Arduino and send them to the motor which controls the wheel. This results in balancing the bot. Buying such type of bikes is quite expensive outside. So, making the same or a better bike in low cost is the main goal of this project.



**2. Introduction:** The idea of changing personal transportation means prompted us to take up this project. We would like to reduce the size of a scooter and make it ecofriendly. That is why we are using electric batteries.

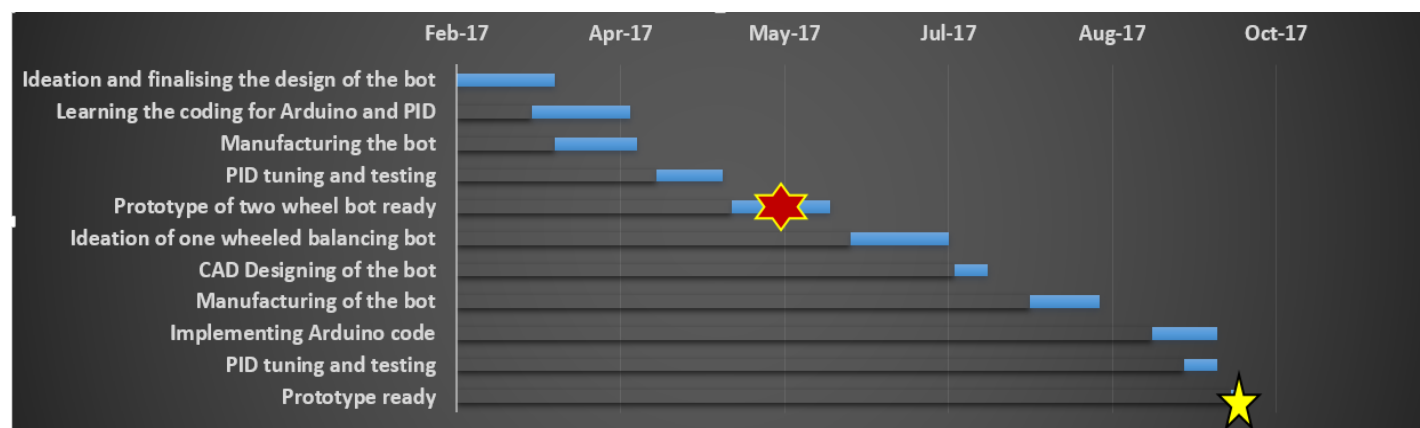
**3. Research:** A company called Ryno Motors sells one wheeled bikes/ segways. Those bikes are quite expensive and not affordable for everyone. We will be aiming to decrease the cost.

## 4. Task Overview:

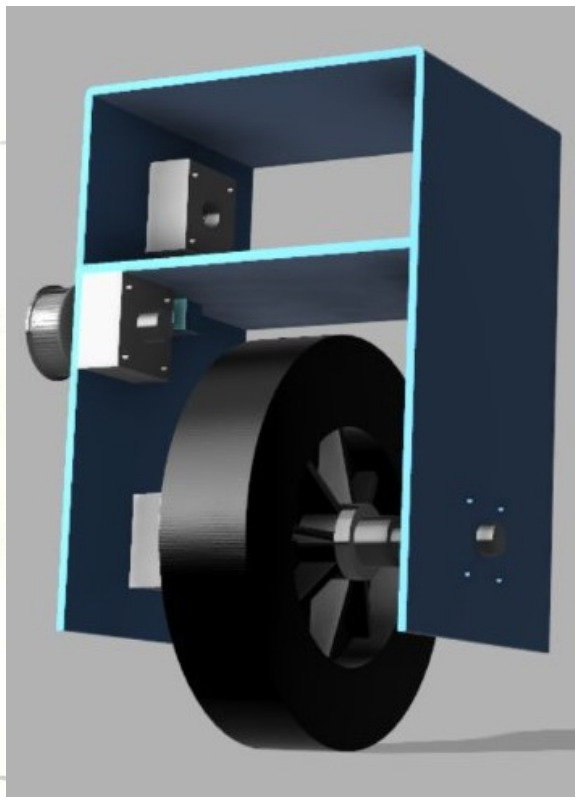
- 1) Electrical Module: Includes receiving data from sensors and sending appropriate signals to the motors via motor driver IC. Controlling the robot by a loop feedback system.
- 2) Mechanical Module: Includes designing the bot using Autodesk Inventor. Manufacturing the various parts of the bot. Finding center of gravity using CAD analysis for finding parameters to control the bot.
- 3) Software Module: Includes the code for integrating MPU 6050 sensor and motor driver IC(L293D) with Arduino UNO R3.

## 5. Project Timeline:

Gantt chart



## 6. Design History and overview:



(Give an

overview of your current design. Include all the prototypes or models made before arriving to the present one, issues with the previous design. Also include the images of previous and current designs. )

**7. Marketing Opportunities:** This project is not available in Indian market as of now. Also it is quite expensive in international market. We think our cost effectiveness would be one of the major factors in attracting Indian consumers. Also people will find such bikes attractive and cool to use.

**8. Gallery:** (Upload videos on YouTube and give video links)

**9. What did we learn?**

First of all we learnt how to program an Arduino. Then we got to know about the MPU-6050 sensor which gives the linear acceleration and gyroscopic acceleration values. Then we also got to know about the Proportional Integral and Derivative Algorithm (PID) for error calculations and correcting them.

We also learnt to make 3D models on CAD softwares.

Then we learnt to simulate model on Matlab Simulink

We learnt control theory for understanding the concepts related to the control of the bot.

10. **Applications:** We can use for transport .Also it is eco\_friendly as we have used electric batteries to power it. It can replace waiters in restaurants to serve food. **(Also include unconventional applications. Think think !!!!!)**

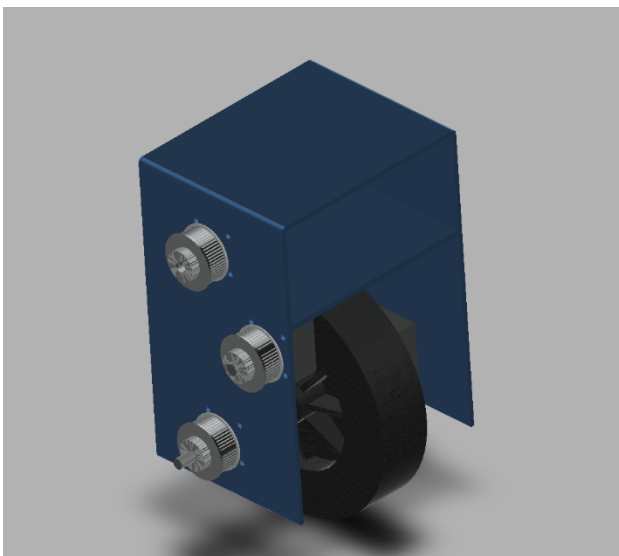
11. **Acknowledgements :** Adarsh Somayaji and Saurav Baloor for mentoring us. Arul the CFI workshop coordinator for helping us manufacture the parts required for the body of the project.

Appendix A – Data Sheets & Calculations

Appendix B – Electrical Schematics

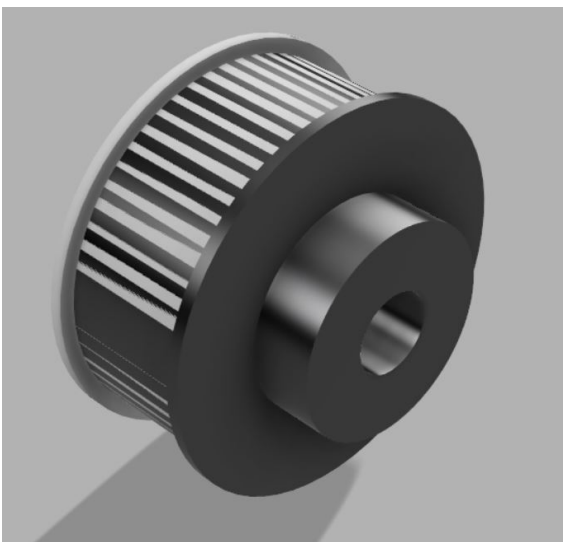
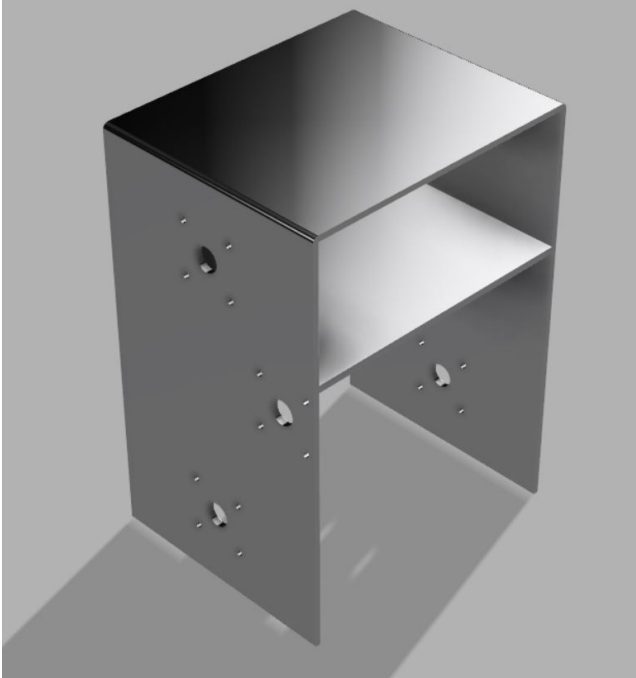
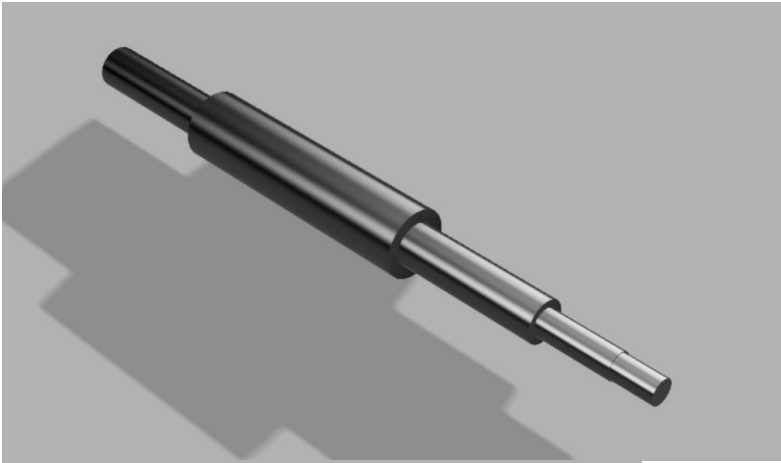
Appendix C - Parts Drawings

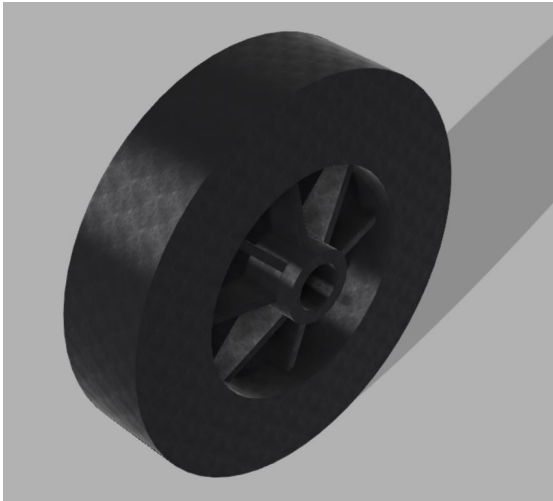
Body Design:



Link: <http://a360.co/2w000am>

Parts Design:





Part Links:

<http://a360.co/2xu3GLP>

<http://a360.co/2xnq26H>

<http://a360.co/2xnhZql>

<http://a360.co/2yidVXH>

## Appendix D – Source Code

GitHub link :- <https://github.com/nsidn98/one-wheeled-balancing-robot-2-wheels->

## Appendix E – Budget and Cost Analysis

Lithium Polymer Battery (12V, 3-Cell) - Rs 1300/-

Johnson DC motor- Rs 400/-

Arduino UNO R3- Rs 450/-

MPU 6050- Rs 200/-

Motor Driver (L293D) - Rs150/-

Timing Belt Pulleys and Belt- Rs500/- per pulley(x4) and Rs200/- for the belt

Ball Bearings- Rs 200/- per piece (x4)

Wheel- Rs 500/-

Misc Costs- Rs 500/-

**Total Budget- Rs 6500/-**

## Appendix F – Professional Networks



GitHub Profile- <https://github.com/nsidn98>

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## Bibliography

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