Intelligent Cricket Ball

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Abstract

- This project aims at developing a prototype cricket ball with embedded instrumentation.
- The intelligent cricket ball will be able to provide characterization of bowling deliveries.
- The ball will be designed as per the ICC standards.
- The ball is aimed to be used for research purposes, training purposes and practice sessions.

PROBLEM STATEMENT

- The spin profile of ball is vital for swing and spin.
- Tracking the ball flight using video technology is expensive and complex.
- Placing markers on the ball disturbs the aerodynamics of the ball.

PROBLEM STATEMENT

- Measurement of **angle of release** has not been done remotely yet.
- Real-time data acquisition of bowling has not been done yet.
- Data logging should initiate when the ball is released, not when the power is on.
- It is not possible to equip cricket academies on a large scale with modern technology.

Objectives

We aim to achieve these main targets via successful completion of this project:

1. **Spin rate** of the delivery.
2. **Location of spin axis** of the delivery.
3. **Angle of release** of the ball.

Objectives

- These three parameters would allow us to study the dynamics of deliveries.
- The importance of each factor would be appreciated by the amount of spin/swing.
- Finally, the quality of bowling can be improved by analyzing the results.

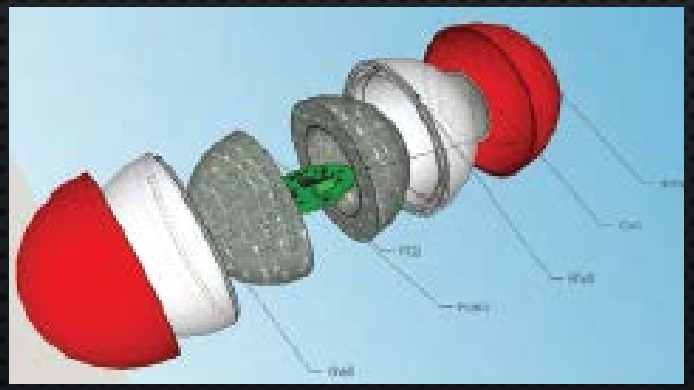
SCOPE

- We aim to commercialize this ball.
- Cricket academies would be our initial target.
- Growing cricket leagues like PSL, BPL and IPL present a great opportunity for such products.
- Lack of cricket facilities in the associate nations of ICC can be targeted.
- Can be further improved to get the 3D trajectory of ball without expensive and complex hawk-eye.

LITERATURE REVIEW

The following research papers were read:

- Determination of spin rate and axes with an instrumented cricket ball.
- Development of a smart cricket ball for advanced performance analysis of bowling.
- Bringing IoT to Sports Analytics.

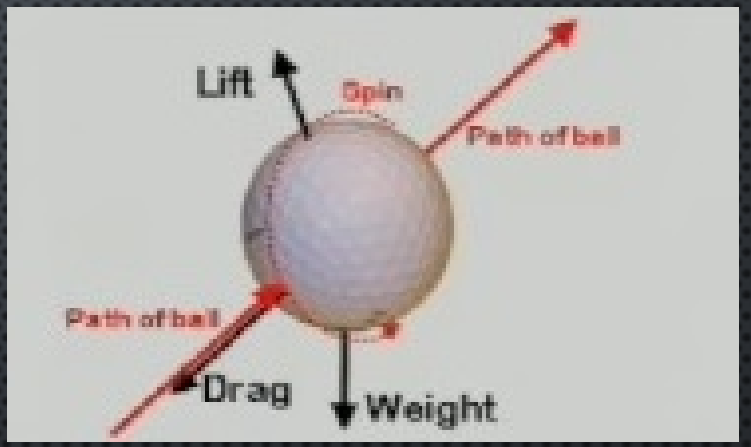


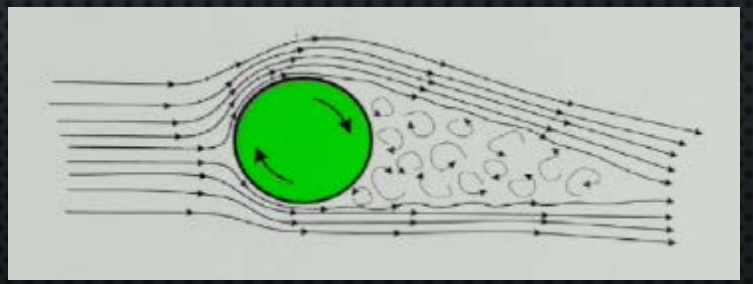
LITERATURE REVIEW

- Different videos were seen on youtube related to the insights of a cricket ball and its manufacture.
- Similar products were searched and studied e.g. '**miCoach Smart Soccer Ball**' manufactured by adidas.

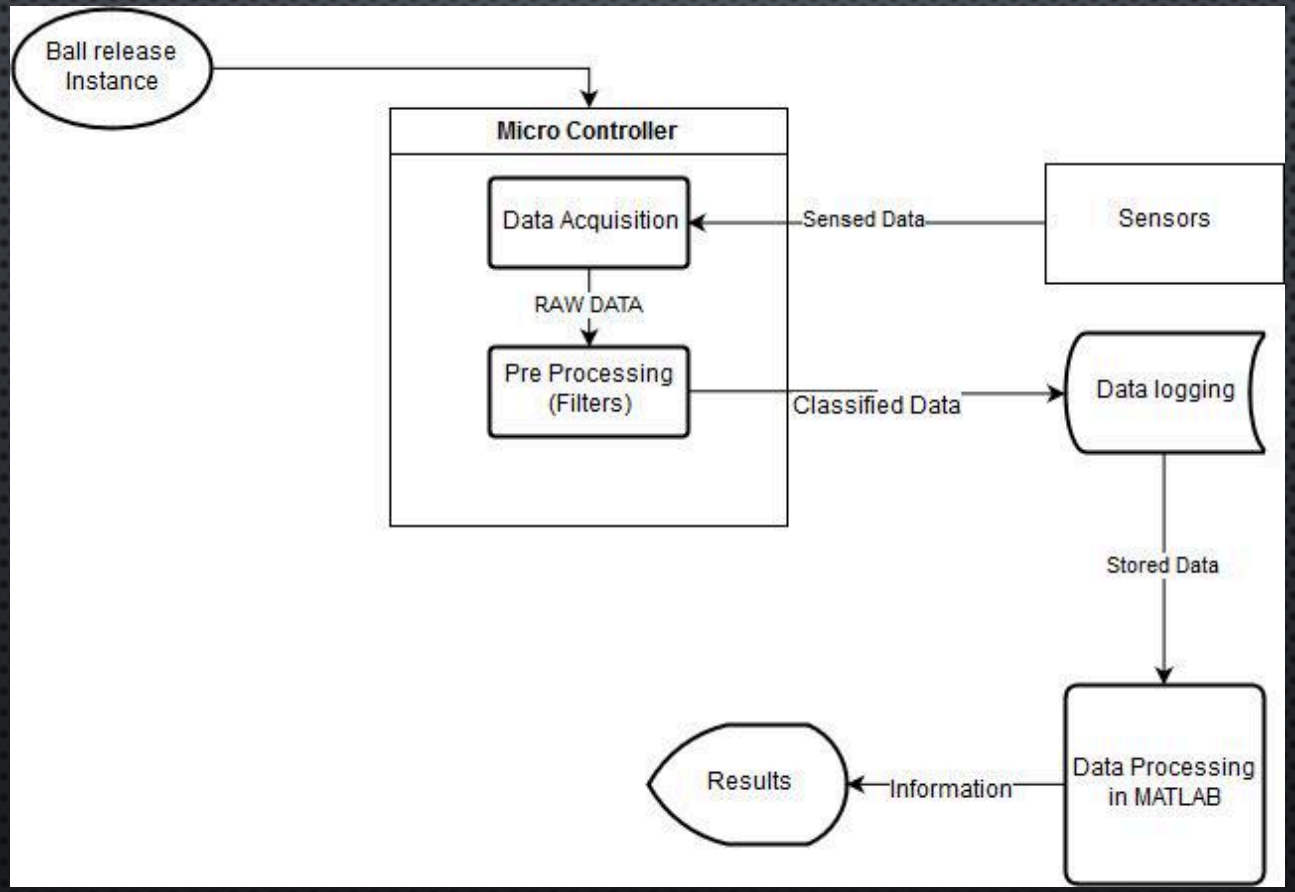
Design Methodology

- Physics Models Of Motion Of Ball
- Multimodal Sensing
- Algorithm Development





DESIGN METHODOLOGY



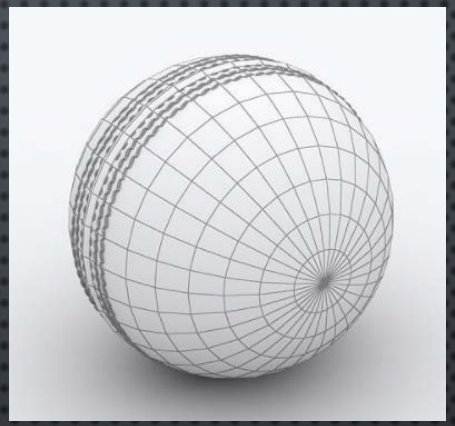
DESIGN METHODOLOGY

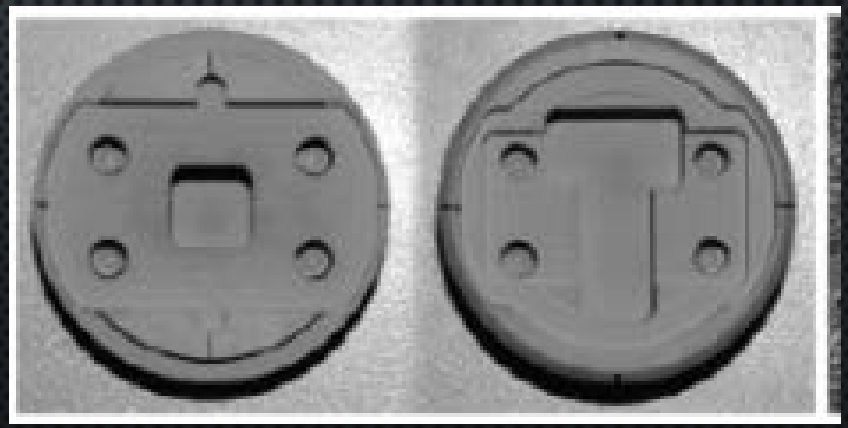
- Structural design
- Protection of circuit
- Charging of a circuit

DESIGN METHODOLOGY

STRUCTURAL DESIGN

- MATERIALS
- ICC STANDARDS
- 3-D MODEL
- BALANCING
- STRESS ANALYSIS





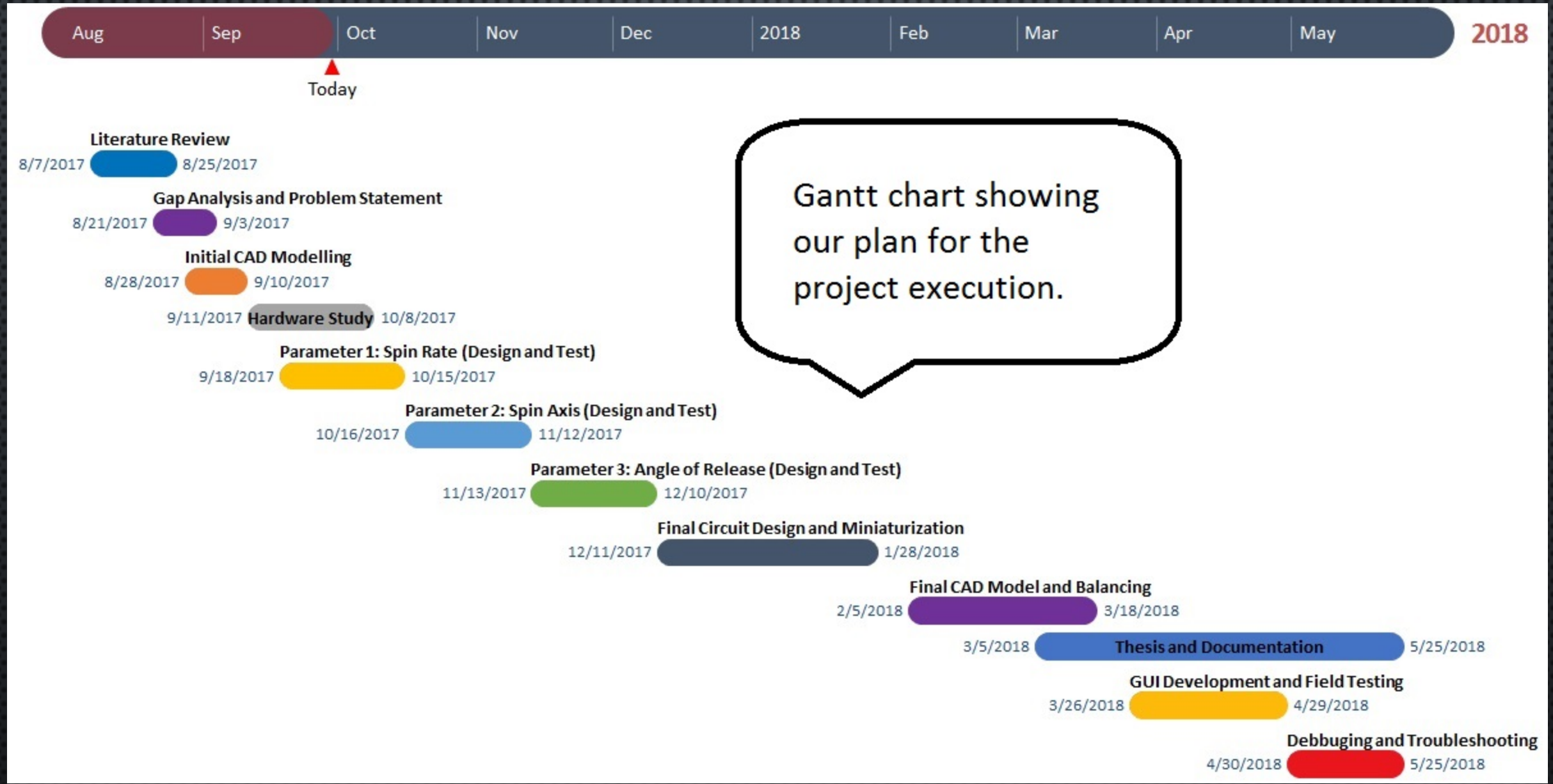
DESIGN METHODOLOGY

PROTECTION AND A CHARGING OF CIRCUIT

- FOR PROTECTION WE CAN USE THE SILICONE ENCAPSULATE AND POTTING COMPOUNDS
- WIRELESS CHARGING

PROGRESS

- Literature review phase has been completed.
- Initial cad modeling of ball has been done.
- Currently working on the measurement of spin rate.
- Working with Gyroscope, Accelerometer and magnetometer.


Aug
Sep
Oct
Nov
Dec
2018
Feb
Mar
Apr
May
2018
Today
Literature Review
8/7/2017
8/25/2017
Gap Analysis and Problem Statement
8/21/2017
9/3/2017
Initial CAD Modelling
8/28/2017
9/10/2017
9/11/2017
Hardware Study
10/8/2017
Parameter 1: Spin Rate (Design and Test)
9/18/2017
10/15/2017
Parameter 2: Spin Axis (Design and Test)
10/16/2017
11/12/2017
Parameter 3: Angle of Release (Design and Test)
11/13/2017
12/10/2017
Final Circuit Design and Miniaturization
12/11/2017
1/28/2018
Final CAD Model and Balancing
2/5/2018
3/18/2018
3/5/2018
Thesis and Documentation
5/25/2018
GUI Development and Field Testing
3/26/2018
4/29/2018
Debbuging and Troubleshooting
4/30/2018
5/25/2018
Gantt chart showing our plan for the project execution.

REFERENCES

https://www.usenix.org/conference/nsdi17/technical-sessions/gowda

https://www.youtube.com/watch?v=4acrj2LlpF8

https://www.youtube.com/watch?v=ebab3e15Nug

THANK YOU!

We are open to your queries and recommendations.