THE COMMENTARY BOX

GROUP No.: 2

PROJECT SUPERVISOR

Prof. Niloy Ganguly

PROJECT MENTORS

Sankarshan Mridha
Satadal Sengupta

TEAM MEMBERS

Ashish Sharma	|	13CS30043
Jatin Arora	|	13CS10057
Pritam Khan	|	13CS10036
Sidhartha Satapathy	|	13CS10056
Sumit Agarwal	|	13CS10061

MOTIVATION

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1 **India vs New Zealand, 1st Test, 2016**

Umesh Yadav, right-arm fast medium, comes into the attack

Some respite for my fingers. They have been more active than any NGO has ever been. One slip

Update: Rahul has a hamstring issue and is hence off the field

24	Runs Scored: 2 0 0 0 0 0 2	Score after 24 overs NZ 61-4	Santner Ronchi	2(8) 13(22)	Ashwin 12-1-51-3

2 **India vs West Indies, 1st T20, 2016**

This is it from this game. What an enthralling one we had. My fingers still bleed from the action we saw (read I typed). But I am not complaining even a little bit. Hopefully we see

MOTIVATION

3 **India vs South Africa, 3ˢᵗ Test, 2015**

Welcome back... I'm being selfish and looking at my plight when I type this. Great to see South Africa bowling. They won't start with two spinners. Morkel will begin. Gives my fingers breathing space and my heartbeats become normal. Everything seems fine with the world at the very moment. Never seen a Test match before where every ball had so much action happening. I haven't covered a game like that. Today's morning session was manic to say the least. Anyway enough of that. Let's move on. Morkel has the ball. Two slips in place. Vijay on strike

4 **India vs New Zealand, 1ˢᵗ Test, 2016**

15.1 Jadeja to Latham, no run, flat and quick, Latham defends off the back foot

Now round the wicket comes Jaddu to Latham

Lots of field changes inside the same over from Kohli. Difficult to keep track when the spinners are rushing through their overs, but will try my level best to keep you updated on everything

| 15	Runs Scored: 1 0 1 0 0 0 0	Score after 15 overs NZ 50-1	Williamson Latham	7(15) 18(44)	Ashwin 3-0-9-0

14.6 Ashwin to Williamson, no run, now eludes short leg with the same shot, but mid-wicket is there

WHAT IS THE **COMMENTARY BOX** ABOUT?

- ❖ Helping hands to cricket forums like CricBuzz, ESPNCricinfo, etc.
- ❖ **The Commentary Box**
  - Mimicking commentators
  - A system which uses ML and AI techniques to provide automatic real-time commentary.
- ❖ **Proposed Approach**

Detect the **Type of Shots played** using **Sensors**
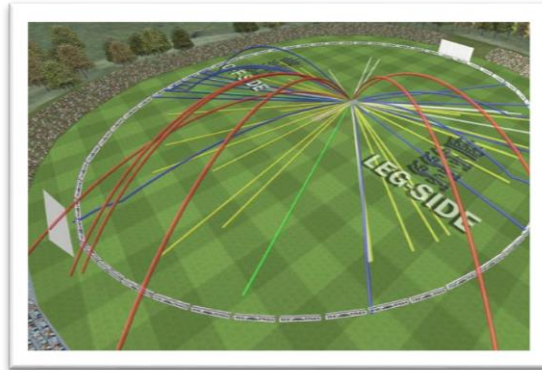
Trace the trajectory of ball to identify boundaries

Track the movements of the batsman to know the **number of runs he took**

USE CASES

1 Personal Assistance to Online Commentators

2 Reduction in man power required for commentary
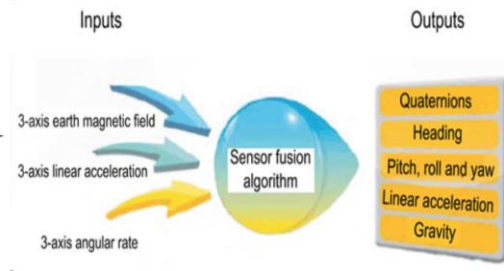
3 Instant display of live scores and commentary

DEMO

METHODOLOGY

Sensor Fusion

Inputs

3-axis earth magnetic field

3-axis linear acceleration

3-axis angular rate

Sensor fusion algorithm

Outputs

Quaternions

Heading

Pitch, roll and yaw

Linear acceleration

Gravity

Form Feature Vector

[[0.15960693, 0.3821411, -0.1377716], [0.14772034,…]

Sensor Data

Feature Vector

Check Sound

If matches ball hitting bat

Shot Offered

Classifier

No Shot Offered

Shot Classification

DEVICE USED

❖ **Metawear CPRO**
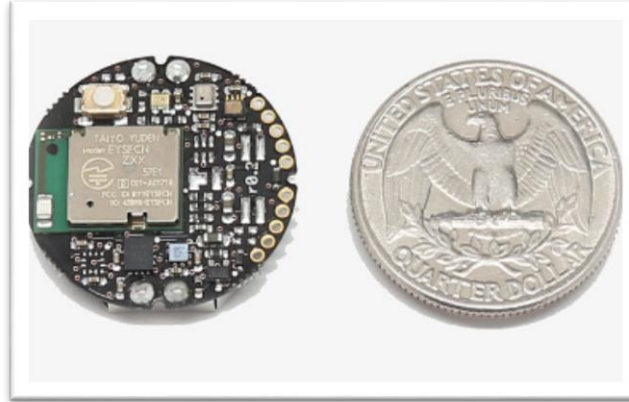
- **Accelerometer + Gyroscope**
- Magnetometer
- Pressure (Barometer) + Temperature
- Ambient Light

SENSOR **FUSION**

❖ Determining angular position in 3D space

❖ **Problems with Accelerometer**
- Every small force working on the object disturbs the measurement
- Will see movement in every direction due to large no. of forces

❖ **Problems with Gyroscope**
- the angular position has the tendency to drift because of the integration over time
- Does not return to zero when the system goes back to its original position

❖ **Complementary Filter**

- "Best of both worlds"

$$angle = 0.98 * (angle + gyrData * dt) + 0.02 * (accData)$$

- Short term data from gyroscope (not susceptible to external forces)
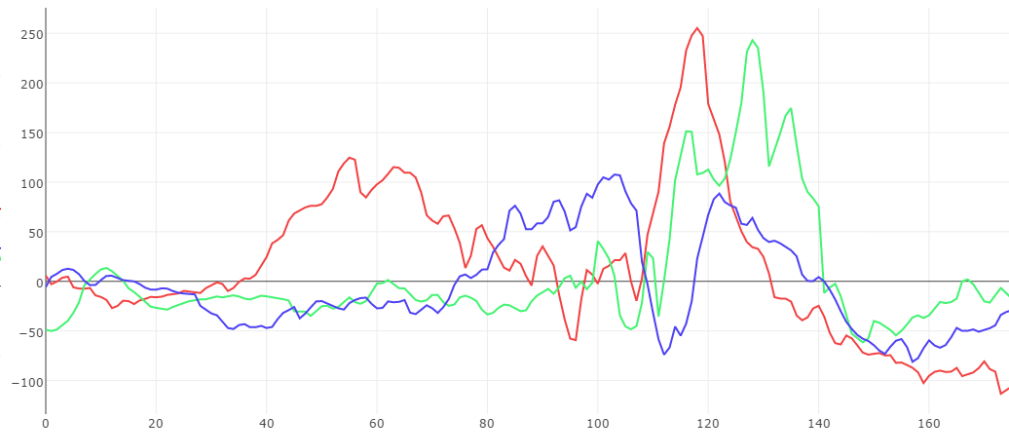- Long Term data from accelerometer (no drift)
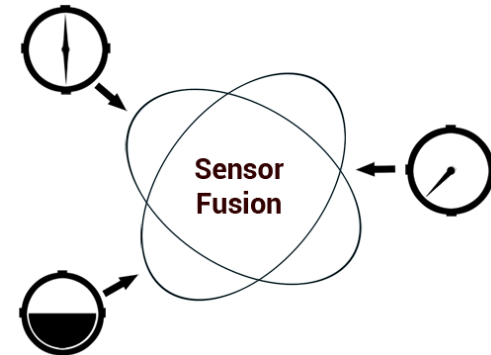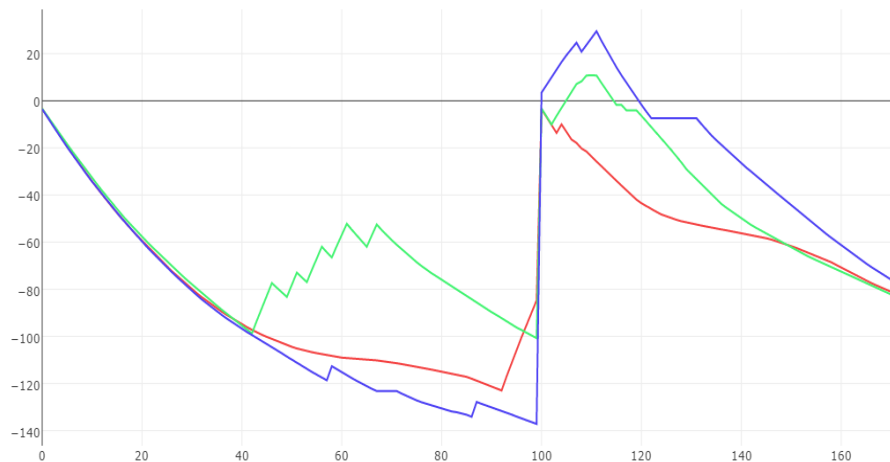
WHICH **SENSORS** TO USE?
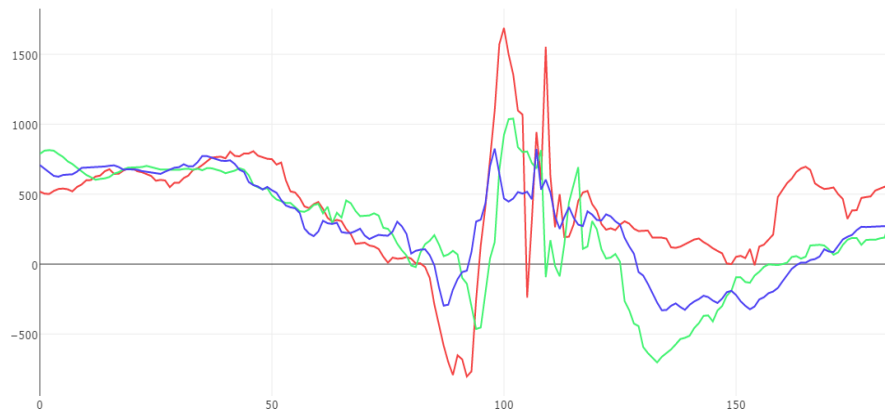
Acecelerometer-X

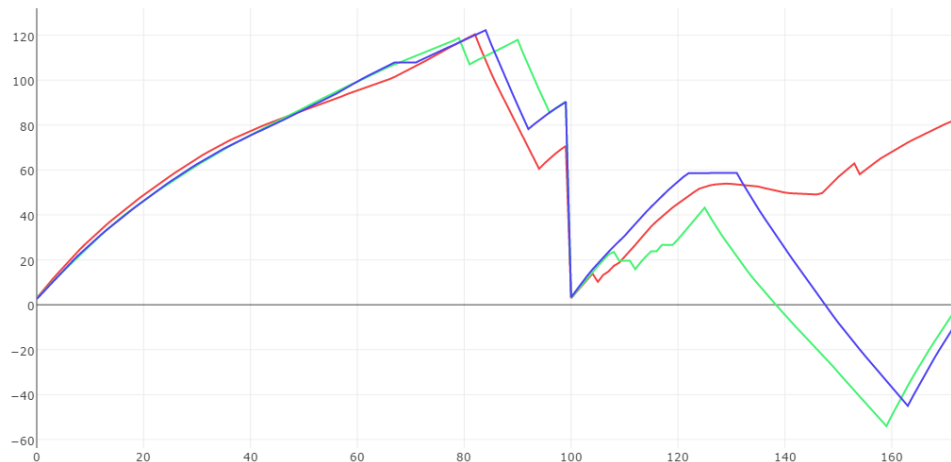Gyroscope-X

— SWEEP
— CUT
— STRAIGHT
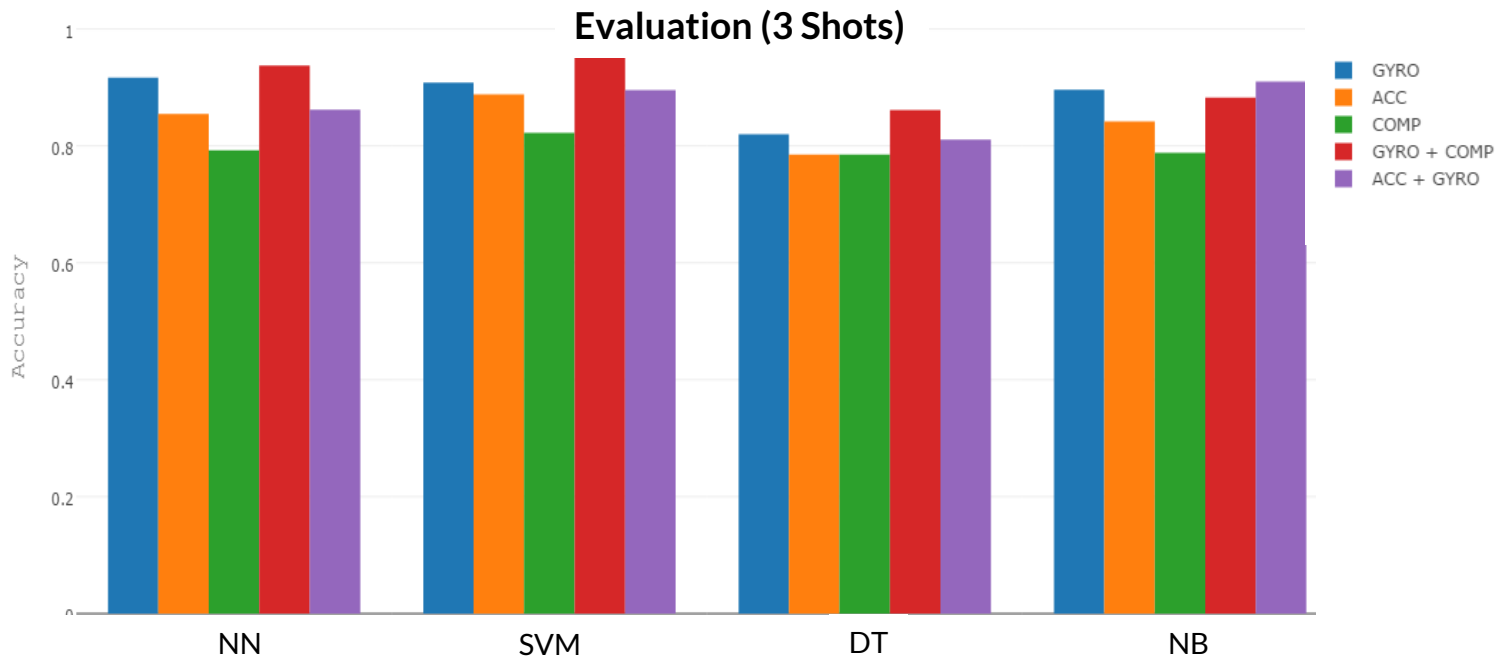
WHICH SENSORS TO USE?

Comp-Pitch

Comp-Roll

— SWEEP
— CUT
— STRAIGHT

EVALUATION WITH 3 SHOTS

❖ Cut, Straight Drive and Pull

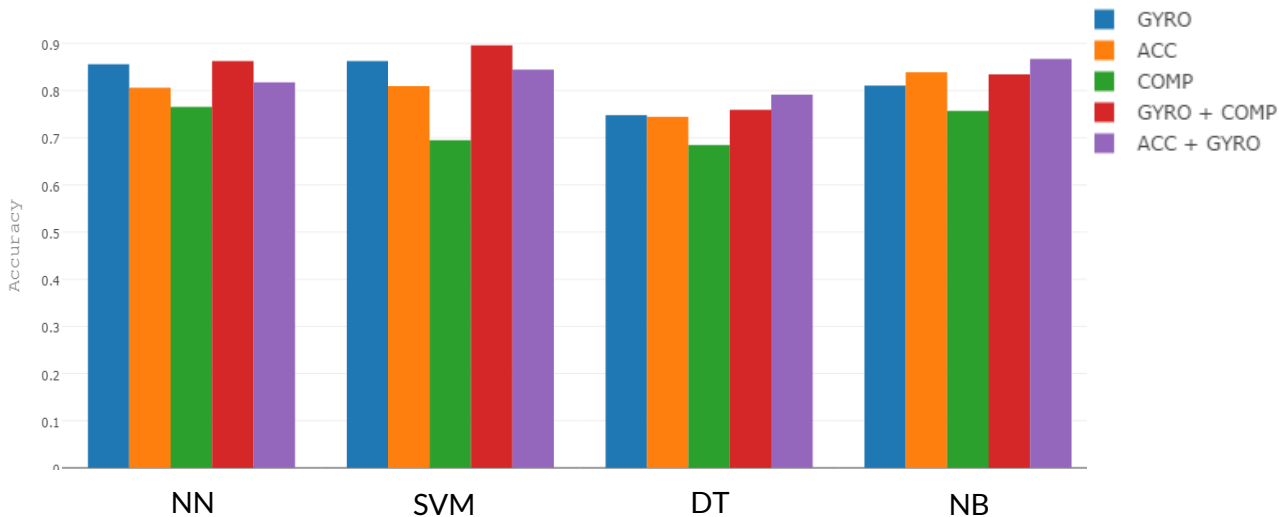❖ K-Fold Cross Validation with K = 10 (180 examples)

Evaluation (3 Shots)

EVALUATION WITH 5 SHOTS

❖ Confusing Shots:
  - Cut & Cover Drive, Pull & On Drive

❖ K-Fold Cross Validation with K = 10 (300 examples)

Evaluation (5 Shots)
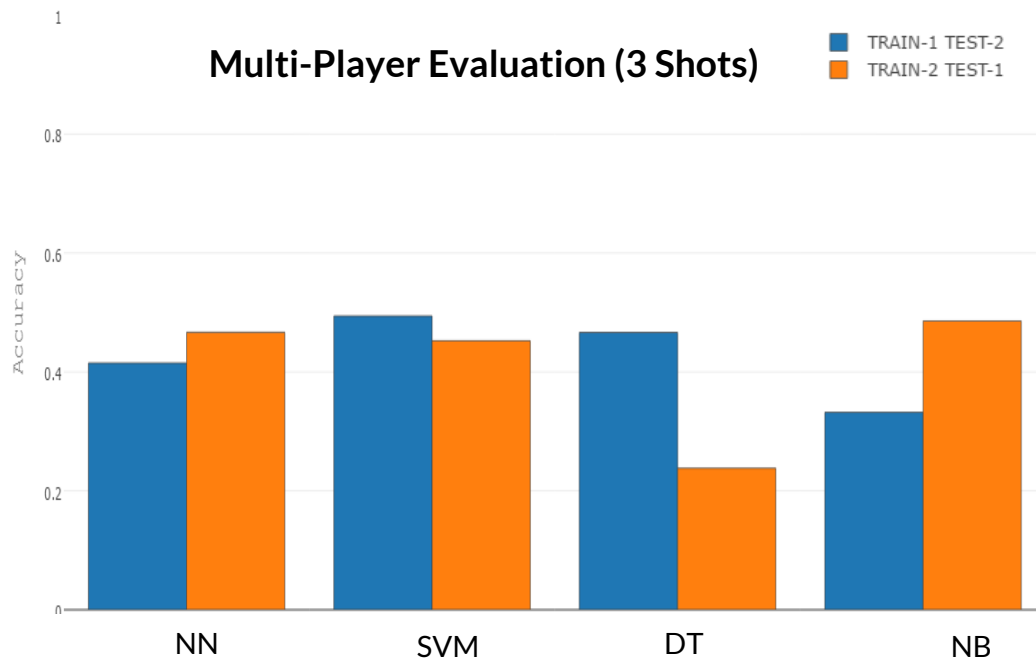
MULTI-PLAYER TESTING

❖ **Train on one, Test on other**

Multi-Player Evaluation (3 Shots)

❖ Generalized model not likely to work
❖ Train for different batsman separately

PLAYER+SHOT IDENTIFICATION

- ❖ Collect training data over multiple batsman
- ❖ Build a model which first figures out the player and then the shot

ROAD AHEAD

1 Right Handed vs. Left Handed Batsmen (will require different models)

2 Inferring the number of runs scored

3 Inferring boundaries and wickets using trajectory of the ball

Thank You!!

"Ms. Jones, there are a number of big questions here to see you. They say they won't leave until they have some answers."