STARC '23 Abstract

Dynamically creating and shifting the guideline for wide deliveries

Sport:	Cricket
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Project Details

Background

We have seen multiple uses of technology in cricket to remove ambiguity in certain decisions. For example, ball tracking technology for LBW, Ultraedge technology etc. The wide ball ambiguity is another one which we aim to solve through this project.

The wide ball is one of the most prominent rules and event which happens in the game of cricket. It is based on the simple fact that the bowler cannot bowl a delivery in a place which is out of reach for the batsman. A **Guideline** is drawn on the pitch which indicates the widest ball the bowler can bowl without incurring a penalty. The umpire can usually decide whether a delivery is a wide ball according to where the ball passes through with respect to the guideline. However, if the batsman moves across the crease in order to create different angles to play his shot, then **the guideline must also dynamically move across by the same amount of distance the batsman moves**. This happens a lot in modern day cricket with many batsmen playing 360-degree shots. The umpire must then judge where the new guideline would be based on an approximate assumption of how much the batsman shifted from his original position. This leads to ambiguity in the wide-ball decisions as the umpire cannot make an accurate assumption on where the new guideline is present. Therefore, through this project, we aim to use technology to **dynamically create and shift the guideline** for wide deliveries **based on the batsman's position** at the time of ball release. By making this an automated process, the ambiguity in the wide-ball decisions can be removed completely.

Goals, Objectives and Scope

- This project will mostly require work with video and image data. Our main goal is to **create a virtual guideline** for every ball played by the batsman.
- Our first objective is to identify/detect and separate the pitch, the batsman, the stumps and the guideline - **Weeks 1 and 2**
- Our next objective is to track the position of the batsman at the time of ball release by the bowler. By doing so, we can find out if the batsman has shifted from his initial position and if he has shifted, then by how much distance - **Week 3**
- Based on the distance shifted by the batsman, the next objective is to shift the original guideline by the same distance so as to make a new guideline - **Week 4**
- Since our aim is to make this an automated process, the next objective is to be able to track the ball bowled by the bowler and based on its final position. If the ball crosses beyond the newly created guideline, then it is a wide ball. Any other event is not a wide ball **- Weeks 5,6 and 7**
- Through achieving this set of objectives, we hope to completely automate the process of wide-ball decisions with more accuracy and efficiency than the current working model.

Deliverables

- [ ] The whole project will mostly use image and video data.
- [ ] The dataset we will require should comprise of **video clips of past deliveries in real matches**.
- [ ] Our aim is to dynamically create the virtual guideline for every ball irrespective of the event which happens.
- [ ] We may also require multiple camera angles for the same ball in order to get a better picture of when the ball is released and synchronize it with the batsman's position at the crease.
- [ ] Although any of the past deliveries work for the dataset, we will compulsorily need a few of them which were ambiguous wide ball decisions.
- [ ] We would require **OpenCV in python** to read this video and image data.

- [ ] All the functions that we do later on like - detection of objects, virtually drawing the guideline etc. will need the use of **OpenCV modules and Mediapipe**.
- [ ] We might also need additional technology depending on how our project goes ahead from here on.

Potential Obstacles

Identify the risks that might hinder or limit your project. This could be the requirement of some physical technology. Access to some college resources or the requirement of mentoring. Mention how might tackle them or what resources the core team may provide may help you with these challenges.

We might come across a few risks along the way -

- Getting specific video clips which are of use to us is difficult as wide balls are something that are not included in cricket highlights. We will need to watch full replays to find a few balls which match our expectations for the dataset, and this could be a time-consuming process.
- Our technology must be able to work on any batsman irrespective of the color of their jersey.
- Our project involves dynamic interaction with the video data; thus, it would be of great help if we could be guided by a faculty or a senior who is proficient with computer vision.

Project Approval

Suggestions

Approved by	**Approved by:**
POSITION	**POSITION**
DD/MM/YYYY	**DD/MM/YYYY**