

## ABSTRACT

In modern cricket, making fair decisions can be a challenging task due to various contentious aspects of the game. However, with the advancements in technology, an automated AI-based solution can help both the main and third umpires to make critical determinations for Leg Before Wicket (LBW). This technology not only eliminates the waiting time for players but also minimizes the risk of human error in decision-making. The main objective of the AI-DRS (Decision Review System) is to eliminate the need for the umpire's call, which can play a vital role in giving third umpire decisions. The system utilizes support vector machine (SVM) and histograms of gradients (HOG) for object recognition and ball velocity monitoring, enabling accurate and equitable decisions for LBW. To further enhance the system's capabilities, it incorporates stadium records, weather conditions, and a voice recognition system that uses Alan-AI. The AI-powered voice recognition system assists on-field umpires in accessing cricket laws and making clear decisions, reducing the risk of confusion or errors. The system also includes a pitch report that examines several key wicket characteristics, such as soil type, cracks, grass cover, and wetness, captured through drone footage with high-resolution cameras. This information is used to provide cricket teams with valuable insights that enable informed decisions about whether to bat or field and select the strongest playing eleven for the match. By incorporating a Power BI-based visualization tool, this system provides team management with a data-driven approach to

selecting the best 11 players for a cricket match. The tool takes into account critical factors such as batting and bowling averages, recent form, and pitch conditions like weather and moisture. This information is crucial in ensuring that team management can optimize their strategies and prepare accordingly. This system also integrates a Smart LED Hat for umpires, which adds another level of clarity to the decision-making process. The hat glows red when the decision is out and green when the decision is not out, making it easy for both the batsman and other umpires to see the decision. Additionally, the system allows for integration with the existing LED Board for displaying the results, ensuring that everyone in the stadium is aware of the final decision. The Smart LED Hat eliminates any confusion or miscommunication that may arise during tense and high-pressure situations, making the decision-making process more transparent and fairer for all parties involved. The React.js web app is highly customizable, allowing cricket associations to tailor it to their specific requirements. With features like live ball tracking, pitch reports, and decision reviews, the web app provides an intuitive and convenient platform for umpires and team management to make informed decisions during the match. The pitch report feature is particularly useful for team management, as it provides them with critical information about the pitch, such as soil type, cracks, grass cover, and wetness. This information helps them make informed decisions about batting or fielding and selecting the strongest playing eleven for the match. Overall, the AI-DRS system with its user-friendly React.js web app.