## **Scope and Features of Shotmaster MVP**

## **Target Users:** Cricketers of all skill levels looking to improve their swing mechanics and gain insights into their performance.

**Development Tools:**

* Hardware: MPU9250 sensor, ESP32 microcontroller
* Software: Flutter for mobile app development, Python for data analysis

**Focus:** Prioritize core functionalities achievable within the 3-month timeframe.

**Key Achievable Features:**

**Data Acquisition and Visualization:**

* Real-time visualization of sensor data (accelerometer, gyroscope) during swings.
* Recorded data playback for analysis and comparison.

**Basic Shot Classification:**

* Train a simple machine learning model (e.g., decision trees) to classify common shots (drives, cuts, pulls) based on sensor data.
* Provide basic feedback on the predicted shot type in the app.

**Swing Quality Analysis:**

* Estimate key swing metrics like peak bat speed, swing path, and impact location based on sensor data analysis.
* Provide feedback on these metrics to help users understand their swing mechanics and identify areas for improvement.

**Additional Features (if time permits):**

* User-specific calibration based on height and weight for personalized feedback.
* Simple data visualization with charts and graphs.
* Export recorded data for further analysis in external tools.

**Alternative Approach: Exploratory Data Analysis and Insights:**

* **Collect sensor data:** Gather user data from the MPU9250 during swings.
* **Analyze data:** Explore correlations between user data (e.g., peak acceleration, swing duration) and user-reported metrics (e.g., self-reported bat speed, impact location).
* **Provide basic insights:** Based on observed correlations, offer **generalized** and **informative** insights to users, such as:
  + "Users with higher peak acceleration often report faster bat speeds."
  + "Swings with longer durations might indicate potential room for tightening technique."
* **Encourage professional guidance:** Clearly communicate to users that the provided insights are for **informational purposes only** and **recommend seeking guidance from qualified coaches** for personalized advice and training.

**Benefits and User Outcomes:**

* **Gain insights into swing mechanics:** Users can receive feedback on their swing speed, path, and impact location, helping them understand how they swing the bat.
* **Identify areas for improvement:** The app can help users identify potential weaknesses in their swing and focus on areas that need improvement.
* **Track progress over time:** Users can compare their performance over time by viewing past data and analyzing their progress in meeting goals.
* **Engaging experience:** The combination of data visualization, feedback, and potential gamification elements (if implemented) can create an engaging experience that motivates users to practice and improve their skills.

**Future Enhancements (beyond MVP):**

* Explore more advanced ML models for improved shot classification and swing analysis.
* Integrate ball tracking technology (if feasible) for a more comprehensive picture of the swing.
* Develop video recording and analysis features to provide visual feedback on swing mechanics.
* Implement advanced swing analysis metrics like bat lag and swing efficiency.
* Offer personalized training programs based on user data and goals.

**Conclusion:**

By focusing on achievable features like data visualization, basic shot classification, and swing feedback within a 3-month timeframe, this Shotmaster MVP can provide valuable insights to users and help them improve their cricket swing mechanics. The proposed scope prioritizes core functionalities while incorporating an additional **exploratory data analysis approach** to provide users with basic correlations and highlight the importance of seeking professional guidance for personalized training. The combination of core functionalities and responsible data analysis lays the foundation for future enhancements and potential expansion of the app's capabilities based on user feedback and the evolution of development resources.

**Scopes in summary:**

1. Record practice session(ball by ball)
2. Session summarizing
3. Comparing two players based on batting parameters
4. Periodic summarization
5. Improvement graph
6. Personalized note and feedback
7. Shot based analysis
8. Connect your coach