A Feature Selection Approach to Identify Key Performance Indicator in Simulated Racing

Fazilat Hojaji, Adam Toth, John Joyce ,Mark Campbell

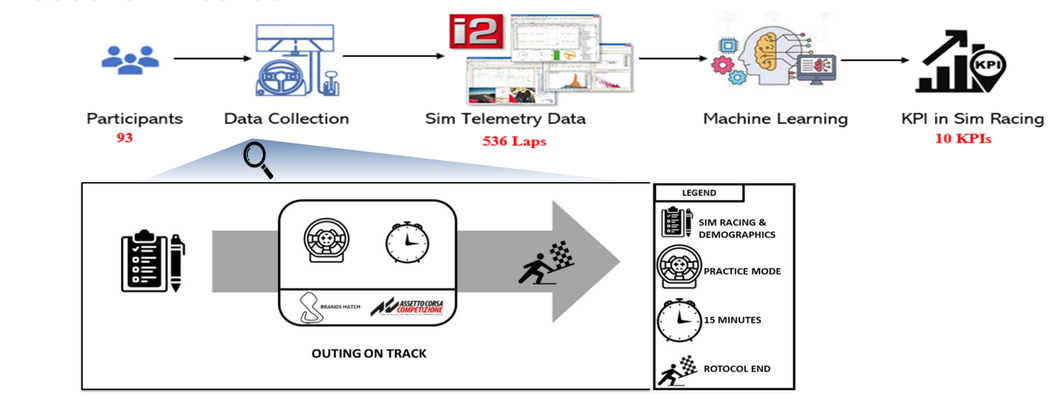
1 BACKGROUND:

- The emerging and rapid progress of esports currently lacks approaches for ensuring high-quality analytics to augment performance in professional and amateur esports teams.
- The application of Artificial Intelligence (AI) and Machine Learning (ML) approaches in the esports domain, particularly in simulated racing can identify Key Performance Indicators (KPIs) that indicate performance .
- Feature selection is a critical step in data analysis and machine learning, referring to the reduction of input variables and develop the best performing predictive models.

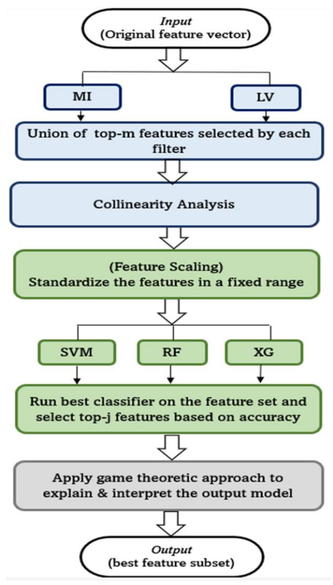
Aim: Applying Machine Learning to explore and identify the KPIs of Simulated Racing

2 METHODS:

Research Method



Machine Learning Approach



Filtering

MI
Mutual Information

LV
Low Variance

Wrapping (ML incorporating)

SVM (3)
Support Vector Machine

RF (4)
Random Forest

XG (5)
eXtreme Gradient Boosting

Interpreting

Figure 1. Proposed Feature Selection Approach to find KPIs in simulated racing

3 RESULTS:

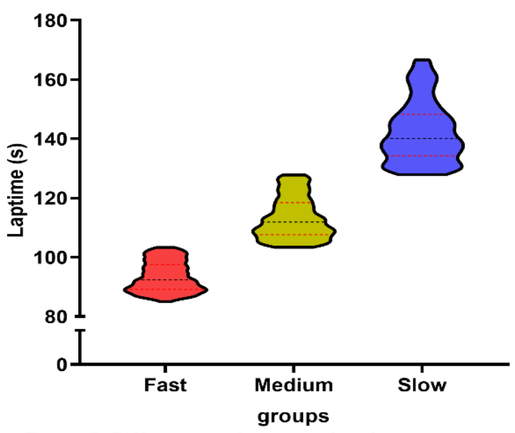


Figure 2. Different performance level groups across drivers

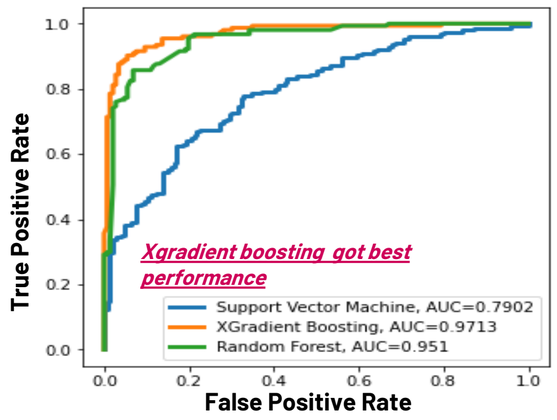


Figure 3. comparison of the performance of ML algorithms

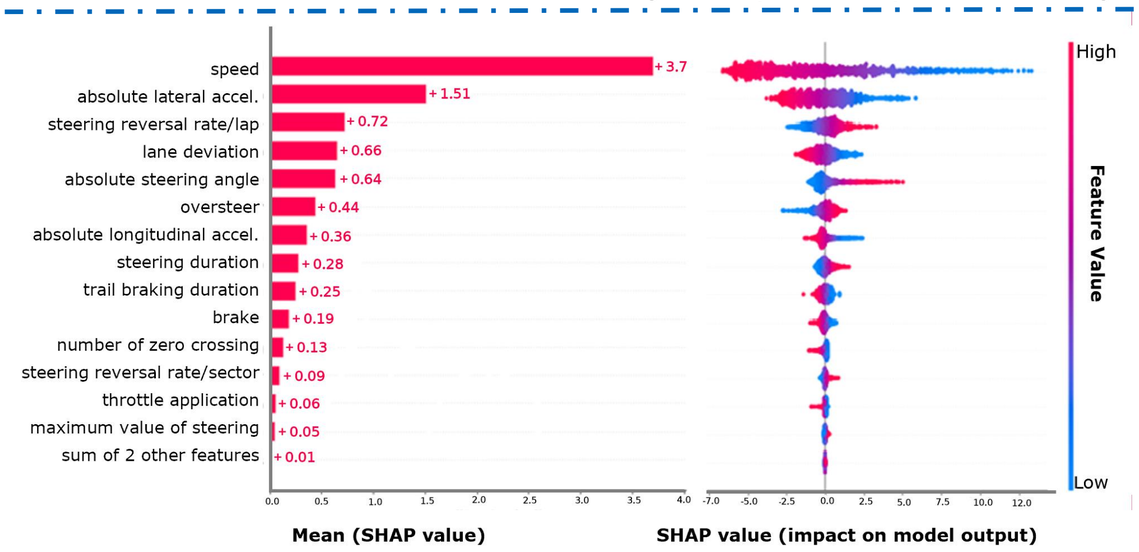


Figure 4. KPI in sim racing resulted from feature selection approach. The violin plots display the distribution of importance for each metric. The greater the value (red), the greater the probability of shorter lap time.

"Speed" is the most contributing metrics, followed by "lateral acceleration", "steering reversal rate", and "lane deviation".

4 SIGNIFICANCE:

- The study highlights the promising use of AI and ML to classify performance level in simulated racing, and determine most important metrics, enhancing sim racing knowledge and know how.
- By collecting 536 feature-rich telemetry data from 93 participants, we were able to group the obtained laps based on the performance and identify the critical factors that influenced driving performance during a lap.
- The finding of this research might be used to improve the effectiveness and efficiency of sim racing performance including software tools to train the drivers.

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