MIDAS Basketball Data Madness Challenge 2020 Final Four

About the Challenge

In the spirit of NCAA March Madness, the [Michigan Institute for Data Science](#) (MIDAS) partnered with the [Exercise and Sports Science Initiative](#) (ESSI) to devise a data challenge related to Michigan Basketball. Using datasets comprising NCAA game/season level statistics and player performance data captured during training/gameplay via [Catapult](#) wearable devices, teams of up to four U-M students were asked to devise and solve research questions in line with the following challenge prompts:

1. How do player performance loads relate to game or season outcome (e.g., win/loss)?
2. How do player performance loads relate to game dynamics (e.g., turnover)?

Twenty-three student teams participated in the challenge, having two weeks to submit their research work. Each submission was judged independently by a sports analytics expert and a data scientist for quality of analysis, quality of presentation, and actionability. The top two scoring submissions for each challenge prompt were selected as the "Final Four" winners.

Final Four Winners (Summary)

The **winning teams** are:

Challenge Prompt 1:
- **Team 17:** *Ben Brennan, Lam Tran,* and *Tahmeed Tureen*
- **Team 11:** *Shengyu Feng, Aylin Gunal, Ying Cao,* and *Danielle Park*

Challenge Prompt 2:
- **Team 16:** *Gillen Brown, Tyler Gardner, Cameron Pratt,* and *Juan Remolina Gonzalez*
- **Team 12:** *Jen Sheng Wong, Jin Fu Ooi, Kai Xuan Shau,* and *Wen Hoong Ling*

Final Four Winners (Details)

Challenge Prompt 1

Team 17:
 Ben Brennan, Lam Tran, and *Tahmeed Tureen*

Research Question(s):

Two questions were investigated:

1. Assess the impact that in-game player physical performance (in-game Catapult metrics) has on game outcomes.

2. Assess how the physical performances from practices prior to a game affect in-game physical performance.

Findings:

Based on their results, certain ranges of in-game team loads maximized winning odds, while longer, less-intensive practices result in players contributing a higher average level of effort in subsequent games.

Team 11:

Shengyu Feng, Aylin Gunal, Ying Cao, and *Danielle Park*

Research Question(s):

How to adjust the player load, under different game schedules, in order to achieve the optimal performance/outcome in the game?

Findings:

In the team's analysis, home team advantage was more predictive of game outcome than variations in training player loads. However, for away games, reducing training load two days before while increasing training load the day before an away game resulted in a higher chance of winning.

Challenge Prompt 2

Team 16:

Gillen Brown, Tyler Gardner, Cameron Pratt, and *Juan Remolina Gonzalez*

Research Question(s):

Two questions were investigated:
1. Using data from a week and a day before, how do players' workloads before a game affect game dynamics?
2. By looking at player position and intensity, how do players' workloads during a game affect game dynamics?

Findings:

Based on their results, long-term workloads do not appear to affect game dynamics. Low-intensity movements the day before a game (e.g., practicing free throws) lead to Michigan players getting fouled more frequently. When post players are highly active during the game, they tend to get less defensive rebounds. Additionally, when guards and wing players are highly active during the game, the opponent shoots more three pointers but with a lower percentage,

Team 12:

Jen Sheng Wong, Jin Fu Ooi, Kai Xuan Shau, and *Wen Hoong Ling*

Research Question(s):

Based on players' performance loads, can we determine factors that result in effective training sessions as well as predicting the quality of future training sessions?

Findings:

Based on their results, post, guard, and wing player positions differ in which load features measured during training sessions are predictive of game performance. These features may help differentiate training for each player position.

Thanks

We would like to thank all participating teams for their effort in working on the challenge given the trying circumstances. Special thanks go out to the many people that made the challenge possible:

- Challenge Organizers: Jonathan Gryak (MIDAS) and Sigrid Olthof (ESSI)
- Co-Organizers: Trisha Fountain, Jing Liu (MIDAS); Lisa Rabaut, Ron Zernicke (ESSI)
- Judges: Dean Thomas Finholt (SoI), Professor Stefan Szymanski (Kinesiology), Alex Wong (Michigan Basketball), Qianying Lin, Maria Veiga, and Blair Winograd (MIDAS)