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Five College DataFest 2019:

Quantifying and Predicting Exhaustion

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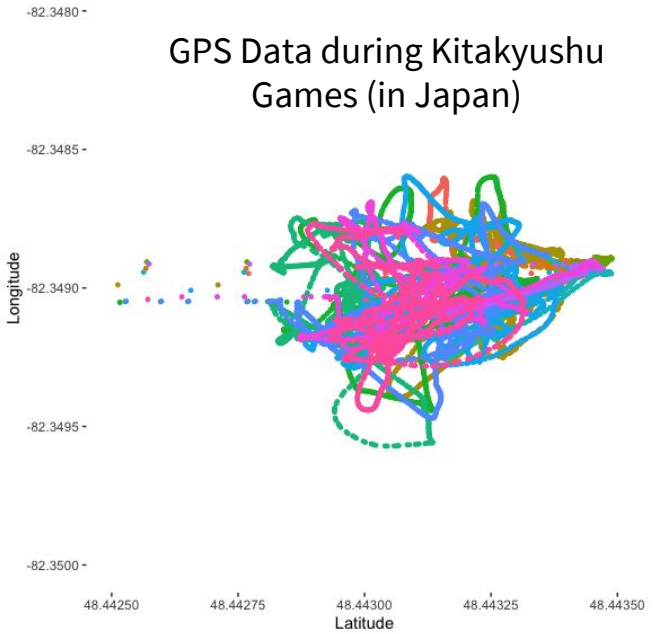
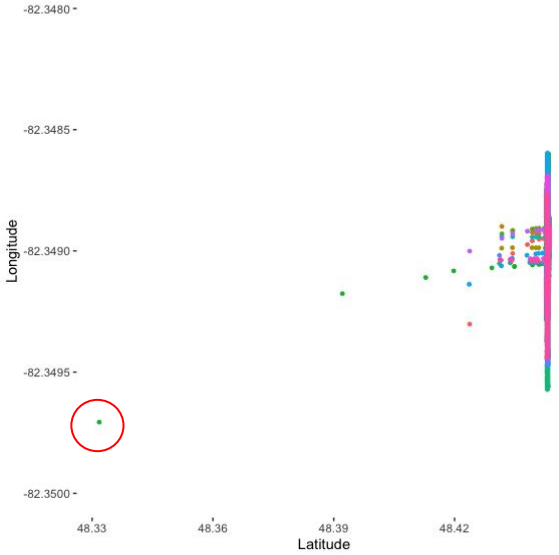
TEAM LOAF

Visualizations

- Interesting complications with GPS data

GPS Data during Kitakyushu Games (in Japan)

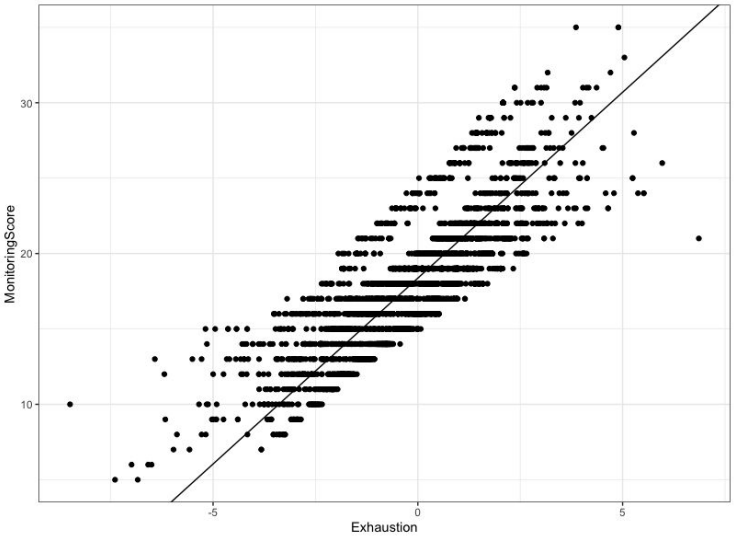




- Other players go from Canada to Philadelphia and back within two minutes (~1800 miles).

Summarizing Overall Fatigue

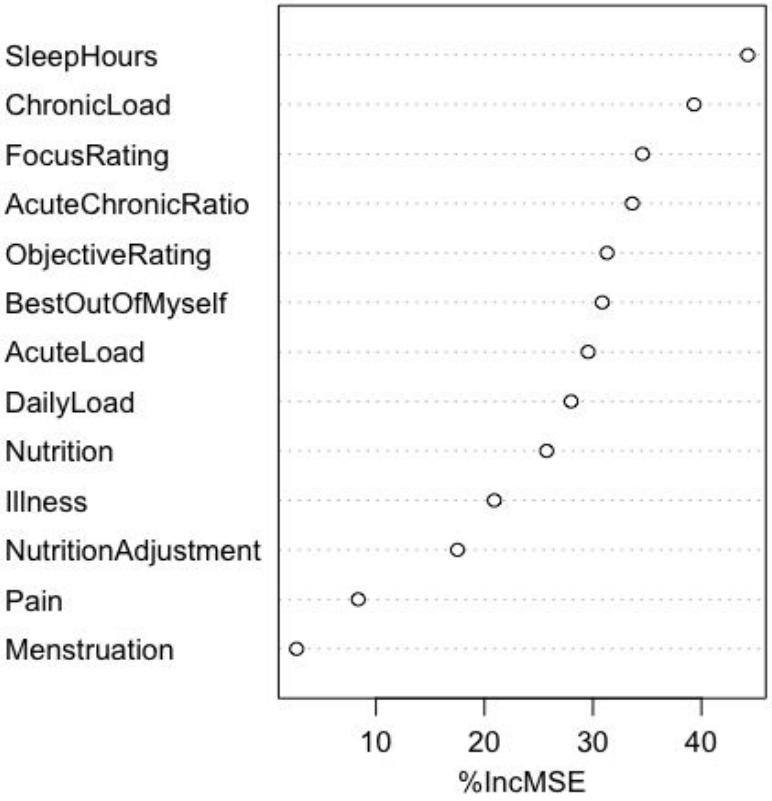
- Principal component analysis (PCA) to determine best summary of:
  - *Fatigue*, *Soreness*, *Desire*, *Irritability*, and *SleepQuality*
  - Standardized within *PlayerID*
- Weighted average → ***ExhaustionMS***
  - Explained 45% of the variability
  - Theoretically better than *MonitoringScore*



Training Analysis

- Standardized *RPE* and training loads by *PlayerID*
- Find important predictors for *ExhaustionMS*
- Prediction of *ExhaustionMS* is more accurate than *Fatigue*
  - *ExhaustionMS* seems more likely

Random Forest Variable Importance Plot for Predicting Exhaustion



Game Analysis

- Predicting exhaustion in games based on accelerometer readings
- Scraped and added weather conditions by game
- Ran **17** different models
  - Gradient Boosting Regressor
    - Training MSE: **0.48**
    - Test MSE: **2.72**
- Multiple Linear Regression (stepwise) includes only *WindSpeed* and *TeamPoints*
  - Higher *WindSpeed/TeamPoints* ⟺ less *ExhaustionMS*