

# Discover Players' Fatigue Levels with Motion Patterns

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# Unsupervised Clustering

- Grasp any existing natural clustering in the motion pattern represented by GPS data
- Original vector generated by flattening the matrix representing each player's GPS data in each game



↓ Averaging Out: reduce observation rate to 1 Hz



↓ PCA: keep 20 most significant principal components

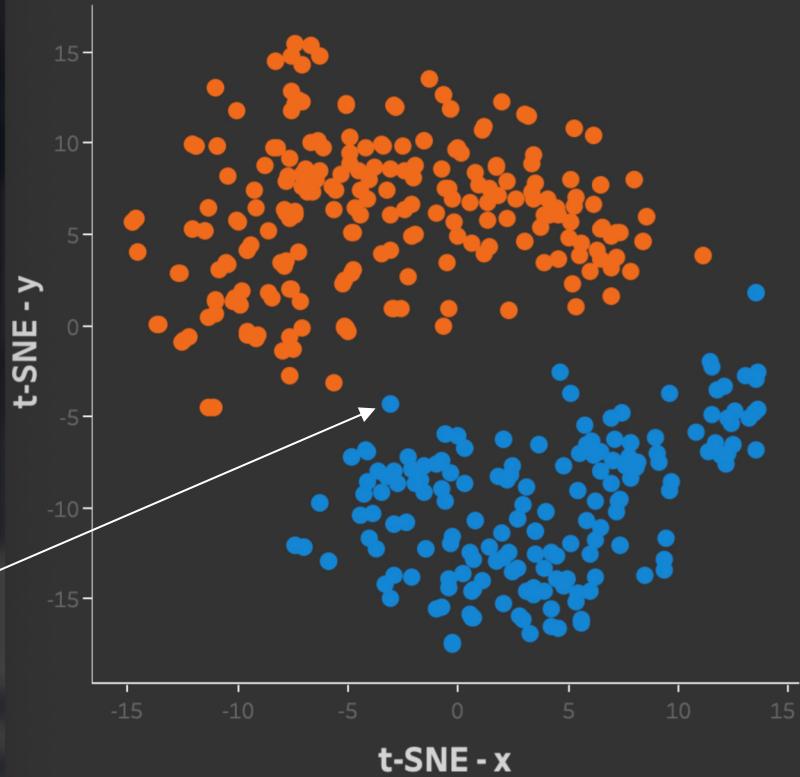


↓ t-SNE: visualizing clustering in 2D

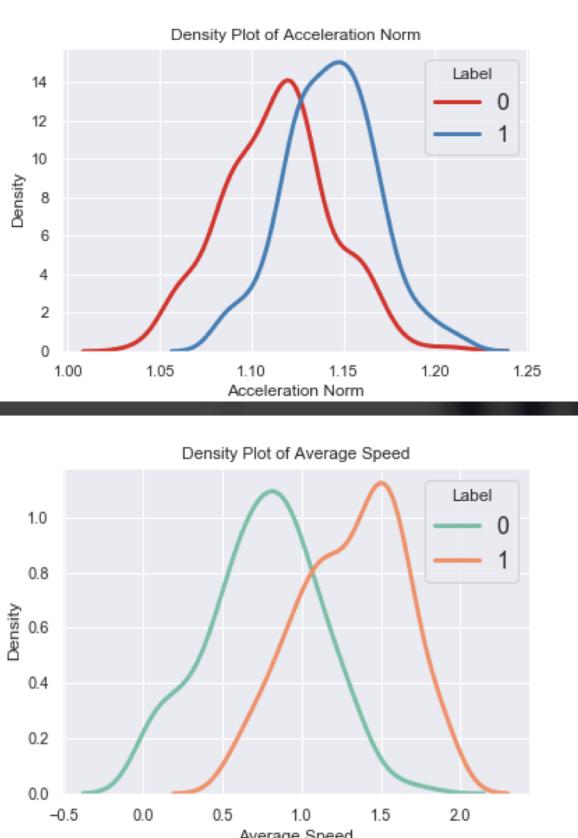


EACH GAME,  
EACH PLAYER

Natural Clustering of GPS Dataset



# Investigation of Clustering Result



- Labels from unsupervised learning reflect the difference of acceleration magnitude and average speed of each player in each game
- Generalizing this interpretation of this labeling, we hypothesize that players with label 1 are more tired after game. Significant difference is found via t-test
- The labels could be used as an objective measure of the players' game-related fatigue

