

Predicting the Trajectory of an NBA Player's Career

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Problem

- Average National Basketball Association (NBA) player spends < 5 years in the league
- NBA owners would like to predict player longevity to build their teams
- Created machine learning model that estimates # of years left in player's career given career statistics

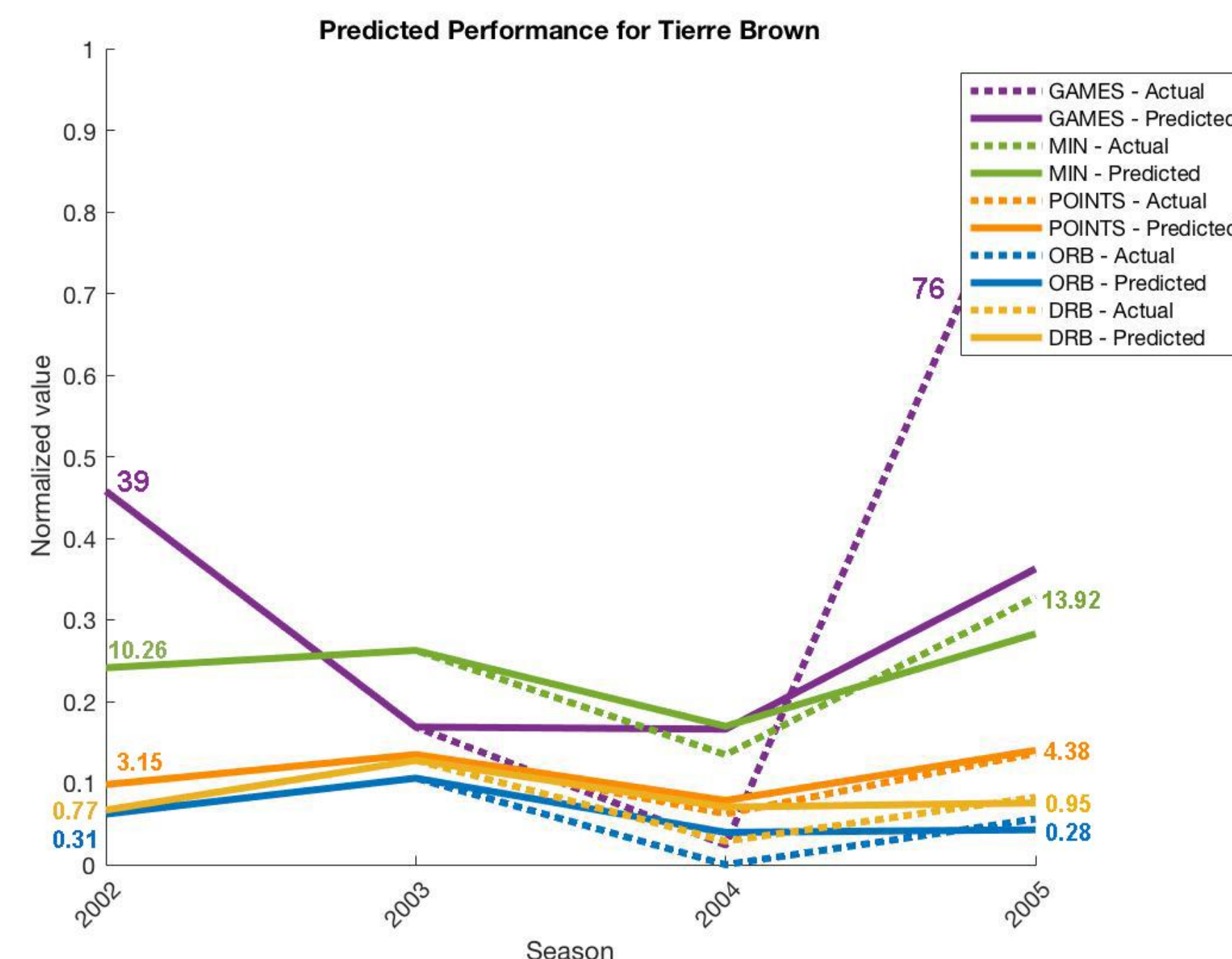
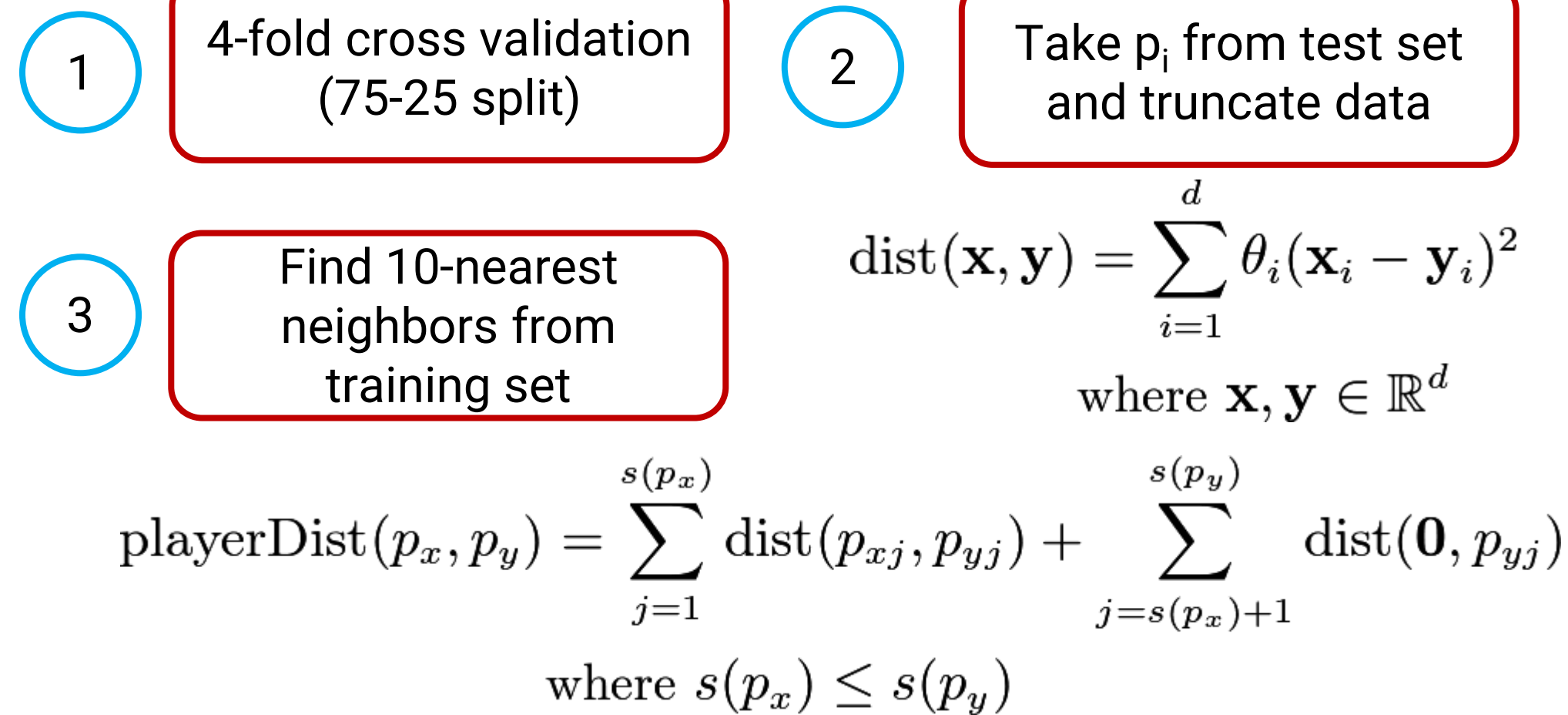
Dataset

- Career statistics of ~2000 NBA players from nbaminer.com over the last 20 years
- Example stats: points per game, rebounds per game, minutes per game
- Parse player data into feature vectors for each season the player participated in
- Normalize all features to the same scale

Notation

- $d = 20$ features
- $m = 1809$ players
- $\theta \in \mathbb{R}^d$: relative weight of each feature
- p_i : player i
- $p_{ij} \in \mathbb{R}^d$: feature vector of j^{th} season by p_i
- $s(p_i)$: number of seasons played by p_i

Model



Results

GAMES	MIN	POINTS	ORB	DRB
REB	AST	STL	BLK	TO
PF	FGM	FGA	FG%	3PTM
3PTA	3PT%	FTM	FTA	FT%

Uniform Weighting

1	1	1	1	1
1	1	1	1	1
1	1	1	1	1
1	1	1	1	1

Learned Weighting

1	1.3851	1.3657	1.0935	1.4365
1.4066	0.7679	0.6929	0.4321	-1.0876
-1.9867	0.466	0.985	0.1336	0.5182
1.2226	1.8686	1.956	2.0713	1

Model	Avg Error
Truncated	1.2809
Uniform	2.9241
Learned	1.875

Analysis & Future Work

- Low truncated error due to majority of players playing only a couple of seasons
- Higher model error due to worse performance on players that play a couple seasons
- Unintuitive learned weightings possibly due to learning before performing feature elimination
- Try locally weighted regression with gradient descent instead of k-NN to tune weights
- Gather data on players from before 1995

References

Gunday, G. and Karasu, A. (2014). NBA Miner Player Basic Stats. Retrieved November 10, 2016 from <http://www.nbaminer.com/player-basic-stats/>.