Applying Data Skills to a Life-Long Passion

AN *IMPOSSIBLE* SPORTS PREDICTION PERSONAL PROJECT

TALHA A. SIDDIQUI

Background

Personal

- Born and raised in Pakistan
- Watching and playing cricket my entire life

Education

- UBC’s Master of Data Science
- BS Information Systems

Professional

- Data Scientist, aDolus Inc.
- Data and Analytics Consultant, KPMG US

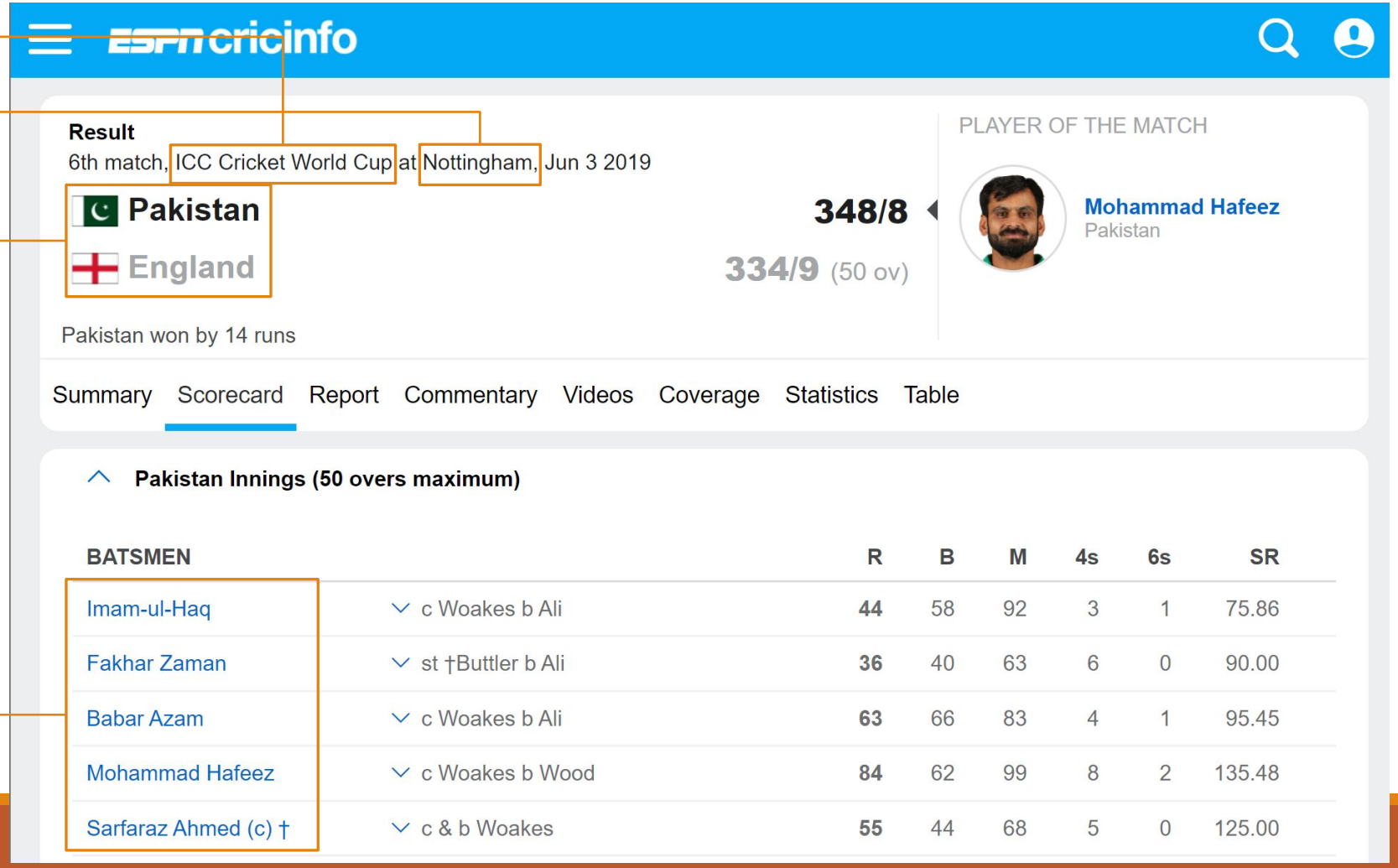
Why Cricket Prediction?

- Passion
- Fun
- Personal
- Different
- Data Available
- Fits the Machine Learning Paradigm

ICC CRICKET WORLD CUP
ENGLAND & WALES
2019

Breaking Down the Problem

- Tournament
- Venue
- Teams
- Players



Keep Breaking

- Players
  - Attributes
  - Bat
  - Bowl

Mohammad Hafeez

Pakistan

Full name Mohammad Hafeez

Born October 17, 1980, Sargodha, Punjab

Current age 39 years 13 days

Major teams Pakistan, Faisalabad, Faisalabad Wolves, Guyana Amazon Warriors, Kolkata Knight Riders, Lahore Lions, Lahore Qalandars, Melbourne Stars, Montreal Tigers, Peshawar Zalmi, Sargodha, St Kitts and Nevis Patriots, Sui Northern Gas Pipelines Limited

Playing role Allrounder

Batting style Right-hand bat

Bowling style Right-arm offbreak

Batting and fielding averages

	Mat	Inns	NO	Runs	HS	Ave	BF	SR	100	50	4s	6s	Ct	St
Tests	55	105	8	3652	224	37.64	6520	56.01	10	12	455	28	45	0
ODIs	218	216	15	6614	140*	32.90	8633	76.61	11	38	664	110	85	0
T20Is	89	86	8	1908	86	24.46	1643	116.12	0	10	196	51	25	0
First-class	210	365	15	12169	224	34.76			26	56			183	0
List A	340	337	20	11402	140*	35.96			17	75			144	0
T20s	274	260	23	5753	102*	24.27	4760	120.86	2	31	605	169	90	0

Bowling averages

	Mat	Inns	Balls	Runs	Wkts	BBI	BBM	Ave	Econ	SR	4w	5w	10
Tests	55	77	4067	1808	53	4/16	4/48	34.11	2.66	76.7	2	0	0
ODIs	218	177	7733	5400	139	4/41	4/41	38.84	4.18	55.6	1	0	0
T20Is	89	67	1117	1226	54	4/10	4/10	22.70	6.58	20.6	1	0	0
First-class	210		14992	6764	253	8/57		26.73	2.70	59.2		7	2
List A	340		13269	9304	256	4/23	4/23	36.34	4.20	51.8	4	0	0
T20s	274	203	3773	3994	174	4/10	4/10	22.95	6.35	21.6	4	0	0

Data Science Workflow

Data Scrapping

- 6,000+ web pages: 4,000 one-day international matches played over 50 years by over 2,000 cricketers

Python Programming

- Reproducible scripts and Jupyter Notebooks

Data Visualization

- Python matplotlib and R ggplot2

Machine Learning

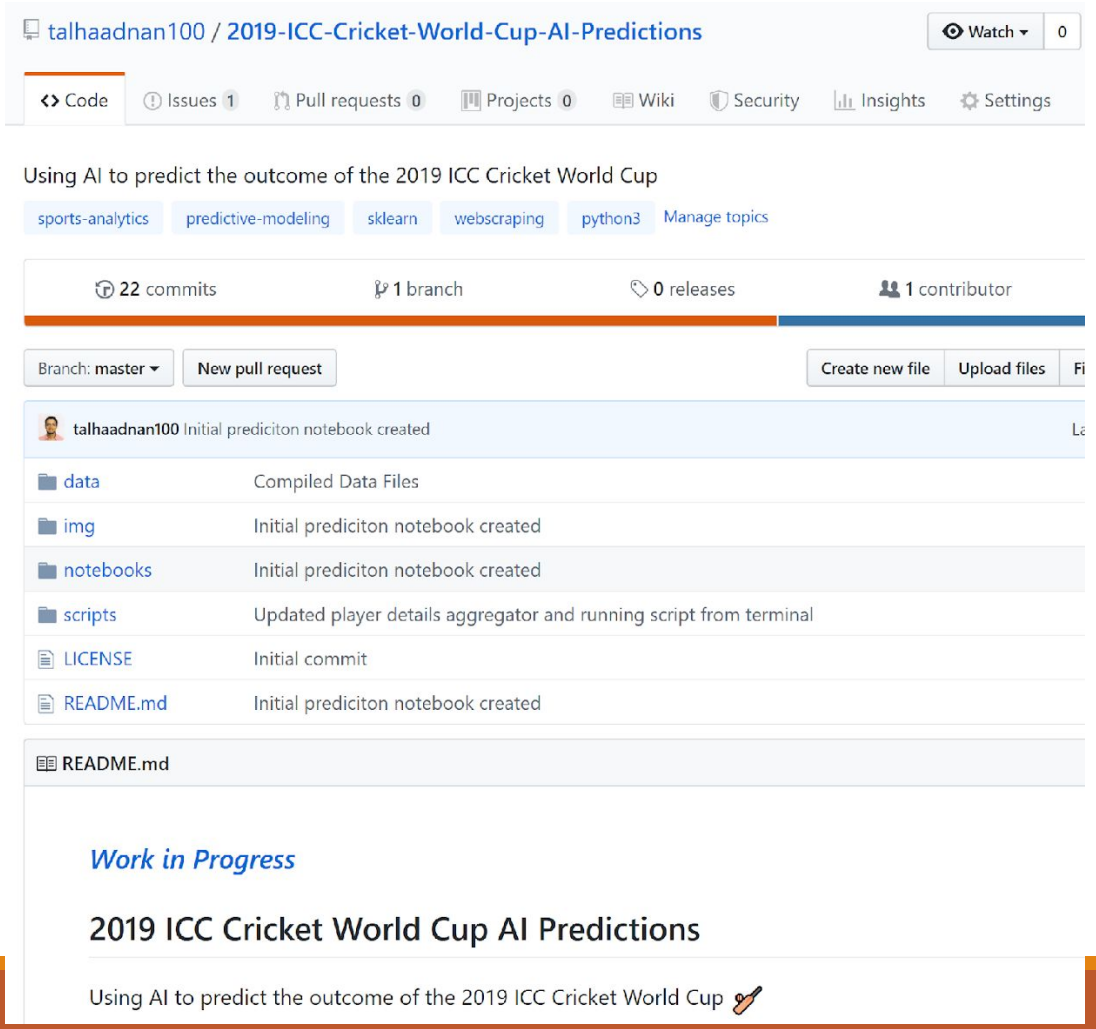
- Scikit-learn models

Project Management

- Issues / Projects

Documentation

- Wiki



Predictions

```
data = pd.read_csv("../data/matches_scorecard_player_details.csv")
print("Shape:",data.shape)
#print(list(data.columns))
```

```
Shape: (4010, 277)
```

```
# Random Forest
param_grid = {'n_estimators' : [10, 50, 100],
              'criterion' : ['gini', 'entropy'],
              'max_depth' : [10, 50, 100],
              'min_samples_split': [2, 5, 20]}

rfc_gridsearch = GridSearchCV(estimator=RandomForestClassifier(), param_grid=param_grid)
print("Number of configurations:", np.prod(list(map(len, param_grid.values()))))

rfc_gridsearch.fit(X_train, y_train)
print('Best Parameters', rfc_gridsearch.best_params_)
print("Training Accuracy:",rfc_gridsearch.score(X_train, y_train))
print("Test Accuracy    :",rfc_gridsearch.score(X_test, y_test))
```

```
Number of configurations: 54
Best Parameters {'criterion': 'gini', 'max_depth': 10, 'min_samples_split': 20, 'n_estimators': 100}
Training Accuracy: 0.9281676089125375
Test Accuracy    : 0.6630109670987039
```

Predictions

```
# Feed forward Neural Network (MLP Classifier)
param_grid = {'hidden_layer_sizes' : [(50,), (10,), (10,10)],
              'learning_rate_init' : [1e-4, 1e-3, 1e-2],
              'alpha' : [1e-5, 1e-4, 1e-3],
              'activation' : ['relu', 'tanh']}

mlp_gridsearch = GridSearchCV(estimator=MLPClassifier(), param_grid=param_grid)
print("Number of configurations:", np.prod(list(map(len, param_grid.values()))))

mlp_gridsearch.fit(X_train, y_train)
print('Best Parameters', mlp_gridsearch.best_params_)
print("Training Accuracy:",mlp_gridsearch.score(X_train, y_train))
print("Test Accuracy    :",mlp_gridsearch.score(X_test, y_test))
```

```
Number of configurations: 54
Best Parameters {'activation': 'tanh', 'alpha': 1e-05, 'hidden_layer_sizes': (50,), 'learning_rate_init':
0.0001}
Training Accuracy: 0.7273029597605587
Test Accuracy    : 0.6520438683948155
```

Predictions

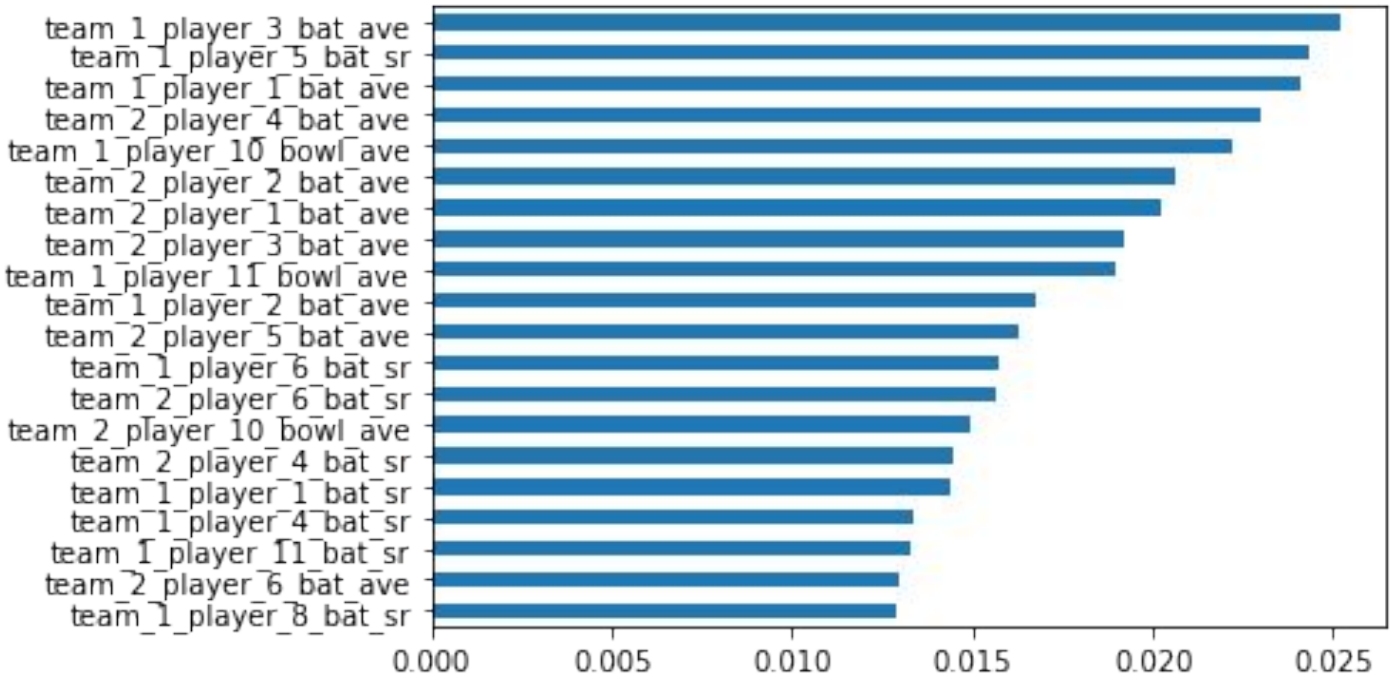
```
# SVC
param_grid = {'C' : [0.001, 0.01, 0.1, 1, 10],
              'kernel' : ['rbf', 'poly', 'sigmoid', 'linear'],
              'gamma' : [0.001, 0.01, 0.1, 1]}

svc_gridsearch = GridSearchCV(estimator=SVC(), param_grid=param_grid)
print("Number of configurations:", np.prod(list(map(len, param_grid.values()))))

svc_gridsearch.fit(X_train, y_train)
print('Best Parameters', svc_gridsearch.best_params_)
print("Training Accuracy:",svc_gridsearch.score(X_train, y_train))
print("Test Accuracy    :",svc_gridsearch.score(X_test, y_test))
```

```
Number of configurations: 80
Best Parameters {'C': 1, 'gamma': 0.001, 'kernel': 'sigmoid'}
Training Accuracy: 0.6923844363152644
Test Accuracy    : 0.6630109670987039
```

Feature Importance



Lessons Learnt

- Did I succeed?
- Skills to showcase
- Quality over quantity
- Passion
- More about the data, less about the model
- Make it public
- Start small

How to Get Started?

- R for Data Science's #TidyTuesday
  - David Robinson's Tidy Tuesday Screencast
- FiveThirtyEight
- Kaggle Datasets
- UCI Machine Learning Repository
- Namara.io by ThinkData Works
- Open Data Portals by City of Vancouver, BC Government, StatisticsCanada

Questions?

bit.ly/cricket-data-project