PORTFOLIO MILESTONE

By: Matthew Laken

Spring 2022

Who Am I?

- Undergraduate
  - Graduate of The University of Maryland, College Park School of Information Studies, Bachelor of Science in Information Science, May 2020.
- Masters
  - Enrolled in Syracuse University Master of Applied Data Science Program, Fall 2020.
  - Completion of Master of Applied Data Science Program, Spring 2022.
- Objective
  - Expand the application for information and data science by digging deeper.

My Course Highlights:

IST 659: Database Administration

IST 687: Introduction to Data Science

IST 707: Data Analytics

IST:652 Scripting for Data Analysis

IST 659: Database Administration

Goal: Fundamentals of databases; compiling datasets, building tables, writing queries and storing models.

Professor: Chad Harper

Date: Fall 2020

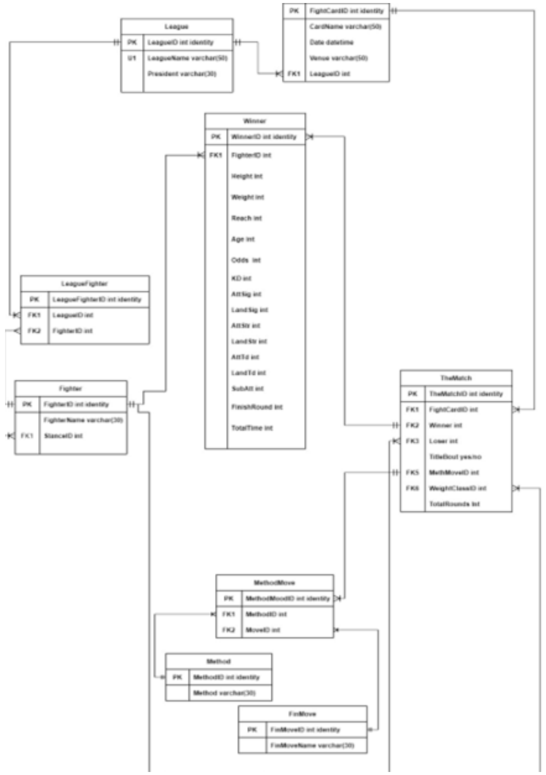
Software: Microsoft SQL, Access, Excel, R (R Studio)

UFC Relational Database

Purpose: Develop a logical relational database to store information on UFC fighters and the results of their matches to gain insight into the sport.

Data Source: http://ufcstats.com/

Deliverable: Comprehensive report including the logical model of the database, questions, views/functions, and evaluation.



	League
PK	LeagueID int identity
U1	LeagueName varchar(50)
	President varchar(30)

PK	FightCardID int identity
	CardName varchar(50)
	Date datetime
	Venue varchar(50)
FK1	LeagueID int

	Winner
PK	WinnerID int identity
FK1	FighterID int
	Height int
	Weight int
	Reach int
	Age int
	Odds int
	KD int
	AttSig int
	LandSig int
	AttStr int
	LandStr int
	AttTd int
	LandTd int
	SubAtt int
	FinishRound int
	TotalTime int

	LeagueFighter
PK	LeagueFighterID int identity
FK1	LeagueID int
FK2	FighterID int

	Fighter
PK	FighterID int identity
	FighterName varchar(30)
FK1	StanceID int

	TheMatch
PK	TheMatchID int identity
FK1	FightCardID int
FK2	Winner int
FK3	Loser int
	TitleBout yes/no
FK5	MethMoveID int
FK6	WeightClassID int
	TotalRounds int

	MethodMove
PK	MethodMoodID int identity
FK1	MethodID int
FK2	MoveID int

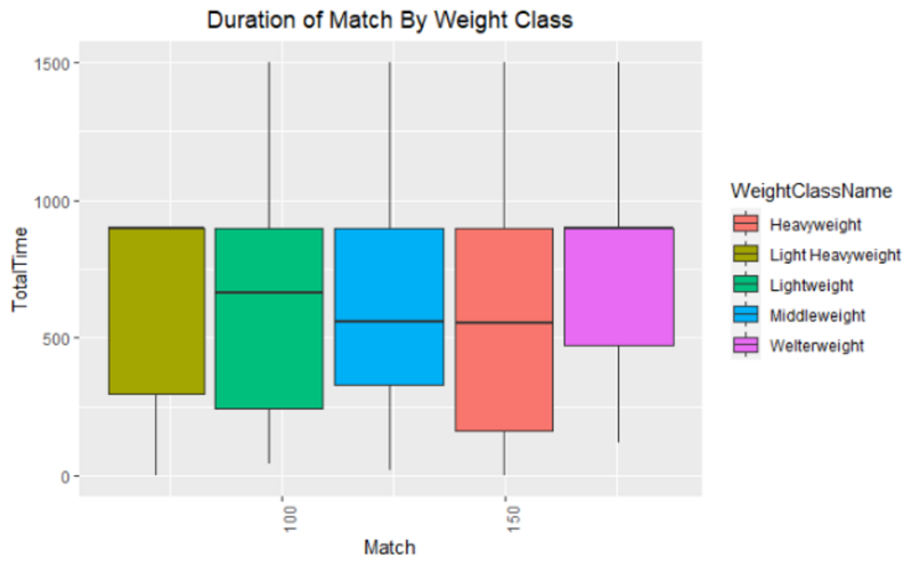
	Method
PK	MethodID int identity
	Method varchar(30)

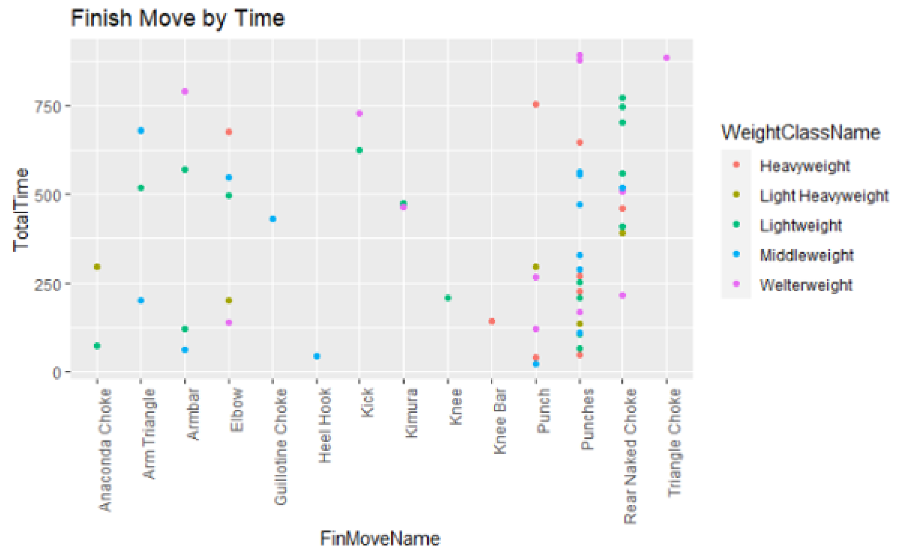
	FinMove
PK	FinMoveID int identity
	FinMoveName varchar(30)

Analysis

- Aggregated data by Weight Class:
  - Analyzed aspects of the match to observe the differences between the different divisions.

- Concluded the following:
  - Heavyweight matches end earlier than others, and they throw fewer strikes compared to other divisions.
  - Majority of fights that are stopped early result in the winner by punches.


Duration of Match By Weight Class


Finish Move by Time

Learning Outcomes

- Collect, clean data, and develop a database.
- Understand database development lifecycle.
- Construct, analyze, and solve business problems by using SQL language to create and run queries.
- Enforce integrity of data/database through database design and implementation.

IST 687: Introduction to Data Science

Goal: Exploring the key components of data science by expanding on knowledge of spreadsheets to utilize R to answer business problems.

Professor: Jeffery Saltz / Tin Hoang

Date: Fall 2020

Software: R (R Studio), Microsoft Excel

Project: Analysis of Cost and Salary Potential of Attending College

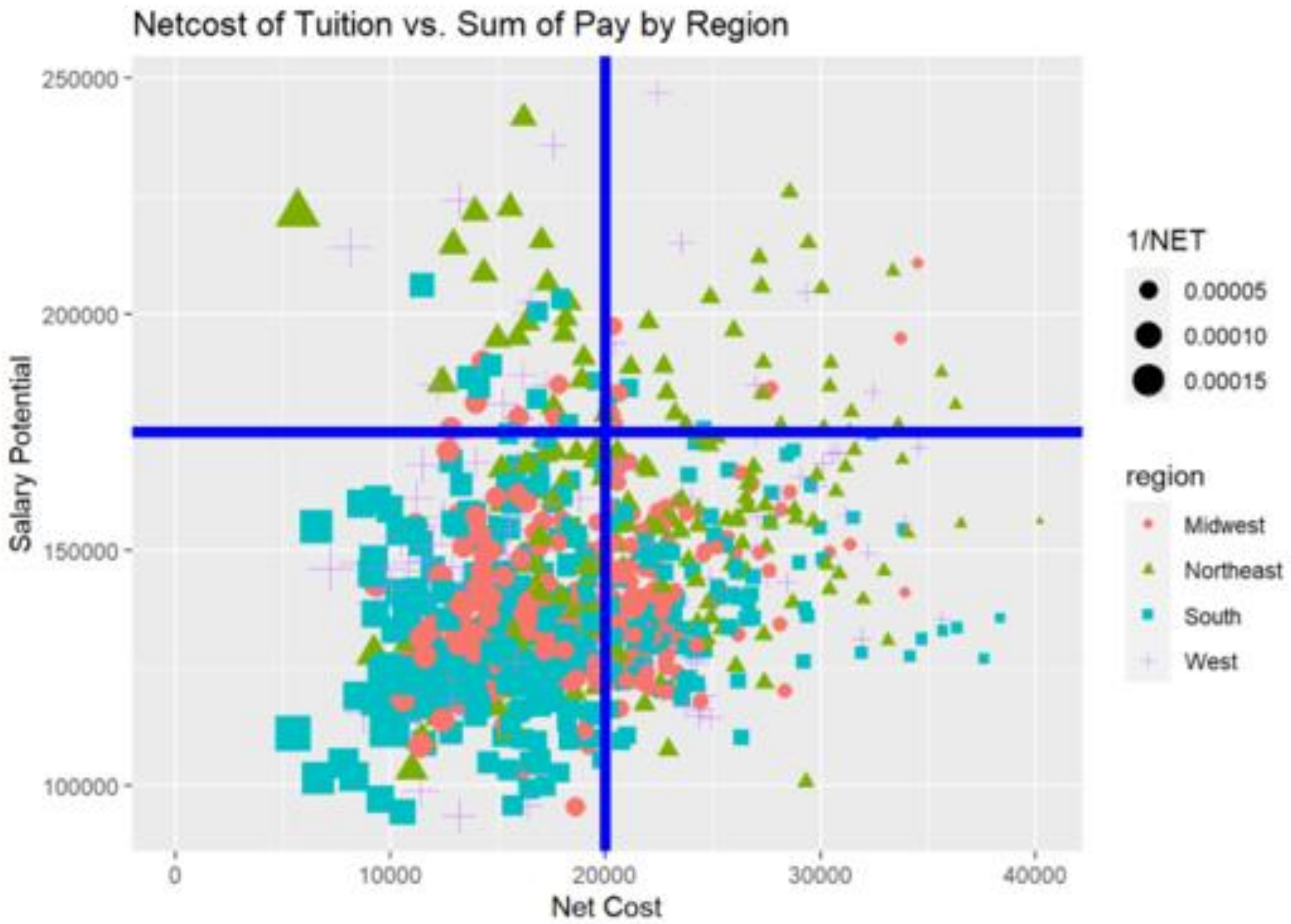
Purpose: Analyze the cost of going to college and one's salary potential upon graduating to determine the most cost-beneficial schools to attend.

Data Source:
https://www.kaggle.com/jessemostipak/college-tuition-diversity-and-pay?select=salary_potential.csv

Deliverable: Comprehensive report including methods of analysis and evaluation.

Analysis

Ability to determine which schools have the lowest cost and the greatest potential for salary.

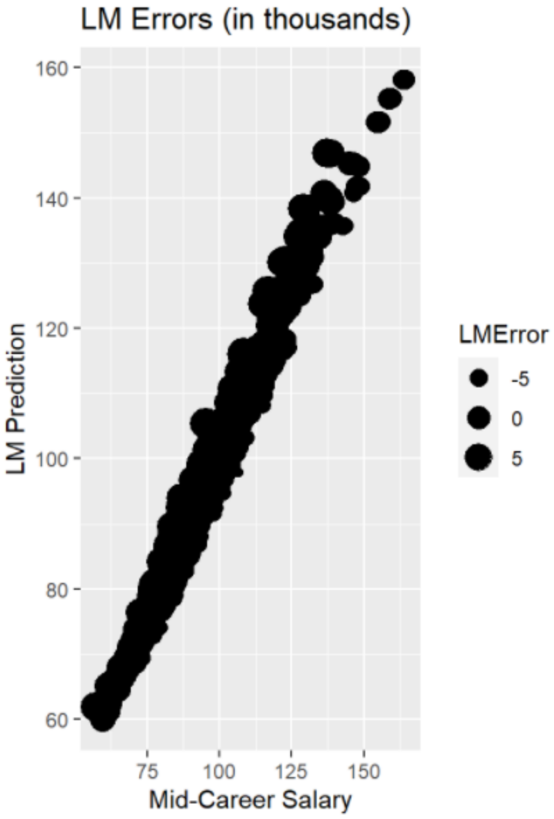


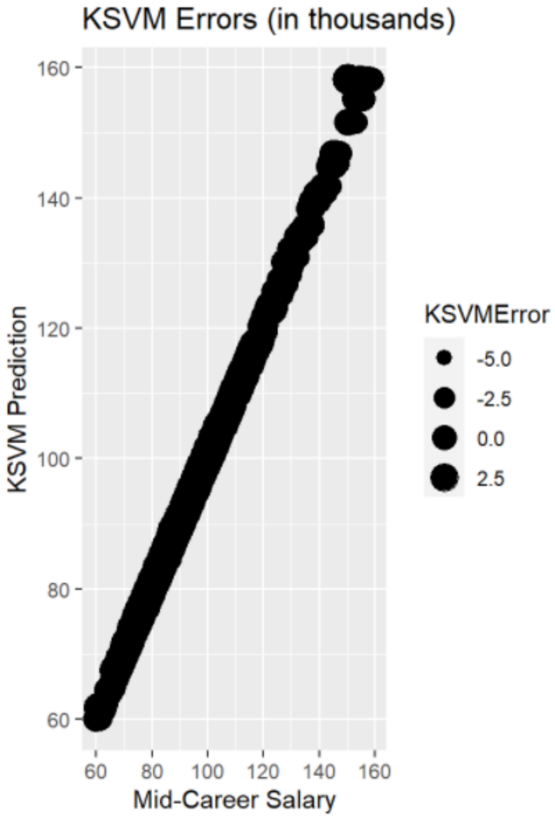
```
## 1 Rhode Island School of Design      Northeast RI
## 2 Spelman College                     South     GA
## 3 Savannah College of Art and Design South     GA
```

Analysis

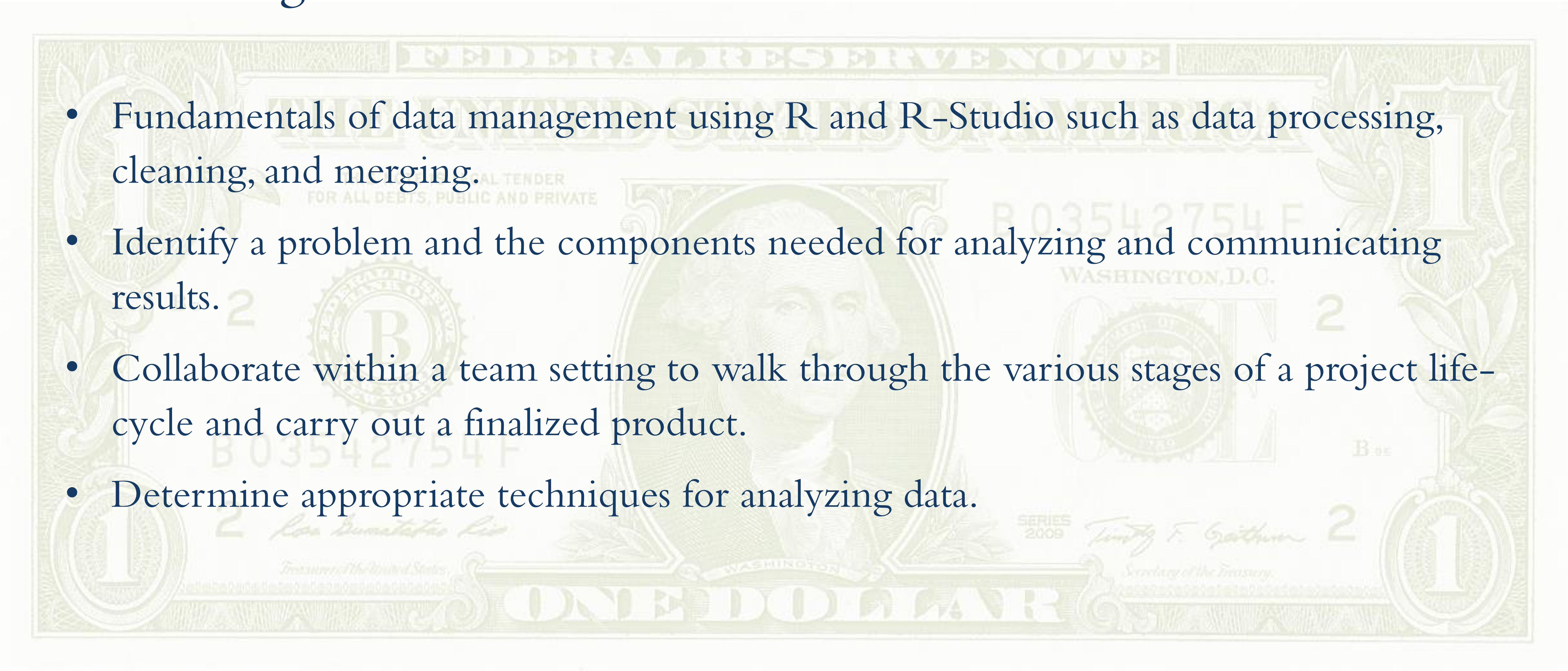
Can we predict the mid-salary career based on where they go to school?

- KSVM model tracks closer to the true data than the linear model.
- Both models have about the same overall error.
- The narrower range of error makes the KSVM more accurate, but the linear model runs much faster.
- Either model seems sufficient to predict mid-career salary.





Learning Outcomes



- Fundamentals of data management using R and R-Studio such as data processing, cleaning, and merging.
- Identify a problem and the components needed for analyzing and communicating results.
- Collaborate within a team setting to walk through the various stages of a project life-cycle and carry out a finalized product.
- Determine appropriate techniques for analyzing data.

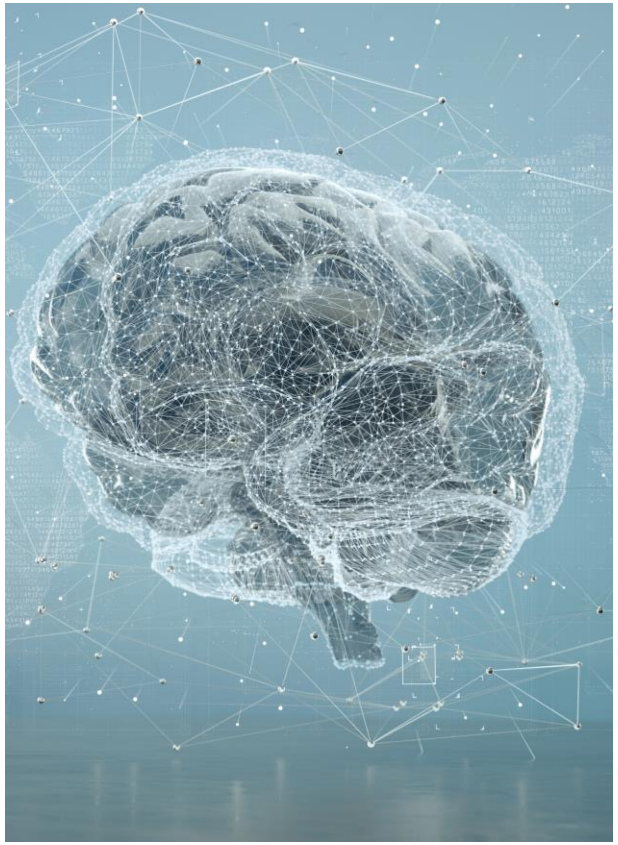
IST 707: Data Analytics

Goal: Utilize the tools and methods of data mining while introducing its real-world application to solving problems in business.

Professor: Stephen Wallace

Date: Spring 2021

Software: R (R Studio), Weka, Orange, Alteryx, Excel



Project: Marvel vs DC Analysis

Purpose: Experiment with various classification methods, by comparison, analyzing data on Superheroes and Villains from Marvel and DC Comics.

Data Source: https://www.kaggle.com/dannielr/marvel-superheroes

Deliverable: Comprehensive report detailing the methods, proposed questions, and results of the experiment.

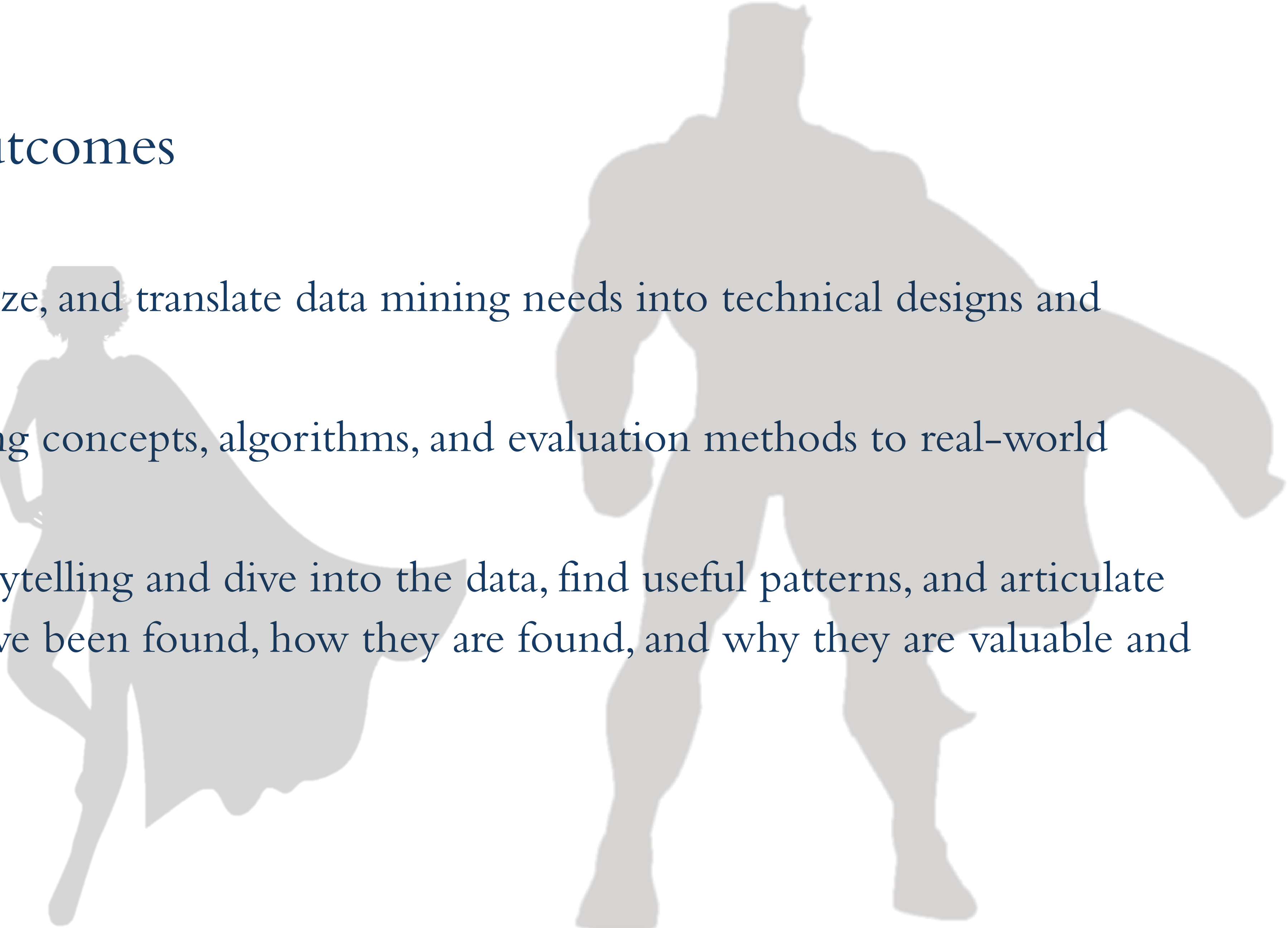
Analysis

Using SVM, kNN, Random Forest, and Naïve Bayes to determine which model is most accurate in classifying the characters.

- 3-fold cross validation to determine how they can predict publisher and alignment for the power dataset, the rating statistics dataset, and the combined dataset.
- SVM algorithm yielded the greatest percent of classification accuracy.

Experiment	SVM CA
Experiment 5: Predict Publisher with Master Dataset	69.1%
Experiment 6: Predict Alignment with Master Dataset	68.2%

Learning Outcomes



- Document, analyze, and translate data mining needs into technical designs and solutions.
- Apply data mining concepts, algorithms, and evaluation methods to real-world problems.
- Employ data storytelling and dive into the data, find useful patterns, and articulate what patterns have been found, how they are found, and why they are valuable and trustworthy.

IST 652: Scripting for Data Analysis

Goal: Comprehend the tools and skills of scripting to utilize data science while solving real-world problems by analysis or visualization.

Professor: Dr. Debbie Landowski

Date: Summer 2021

Software: Python, Excel

Project: MLB Strikeout Investigation

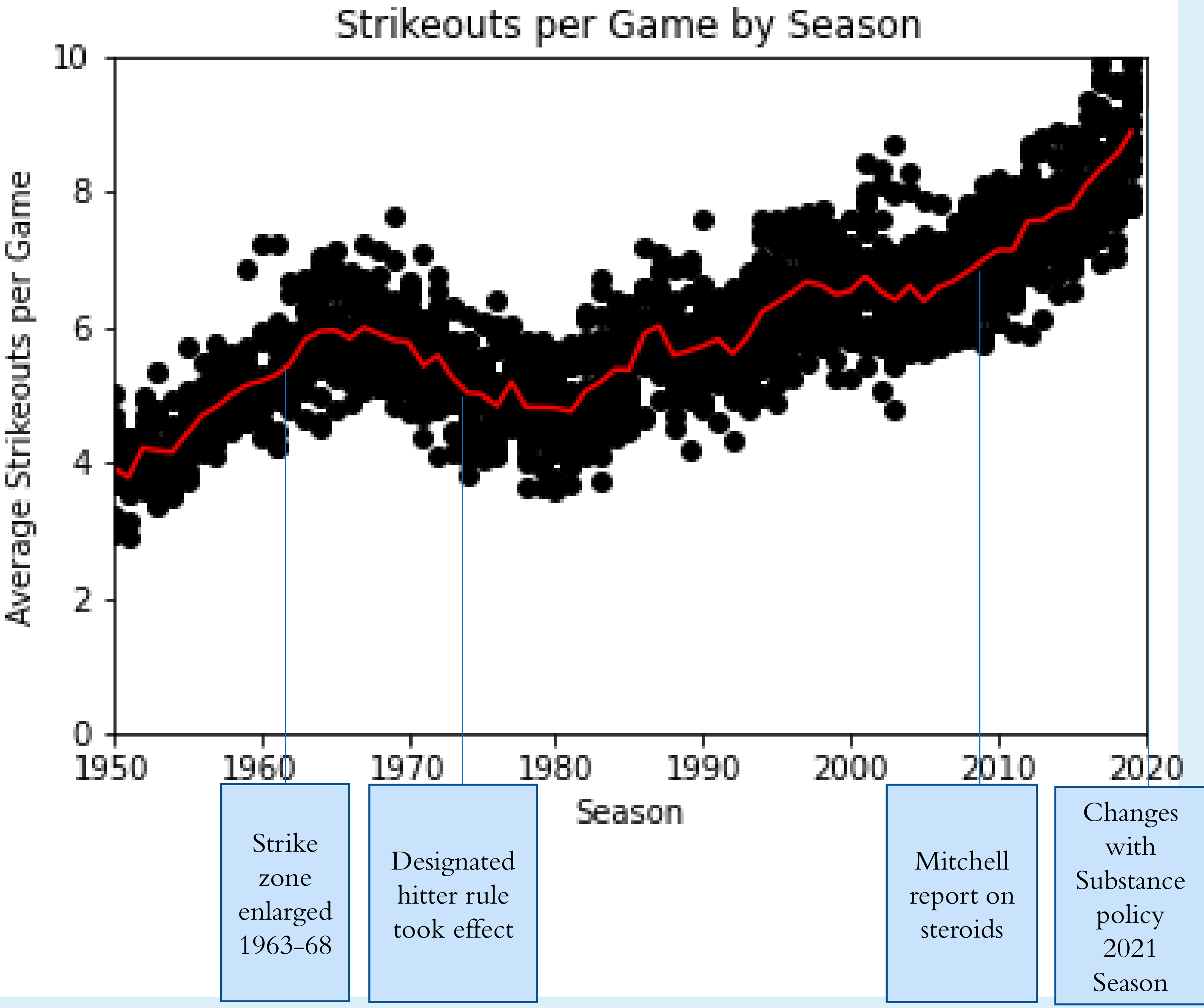
Purpose: Collaborate with peers to write Python scripts to investigate data and communicate findings utilizing the techniques for processing data. This is demonstrated using baseball metrics from the pybaseball package analyzing strikeouts throughout history.

Data Source: https://pypi.org/project/pybaseball/

Deliverable: Comprehensive report detailing an initial plan for the group project. Complete with the demonstration of written Python scripts to access, prepare and use data to produce data summaries, lists, and other structures.

History

- Over 70+ years of historical data in the MLB season.
- More than 700,000 pitches are thrown in each season.
- Strikeouts have risen significantly since 1980 and continue to increase.



Strike zone enlarged 1963-68

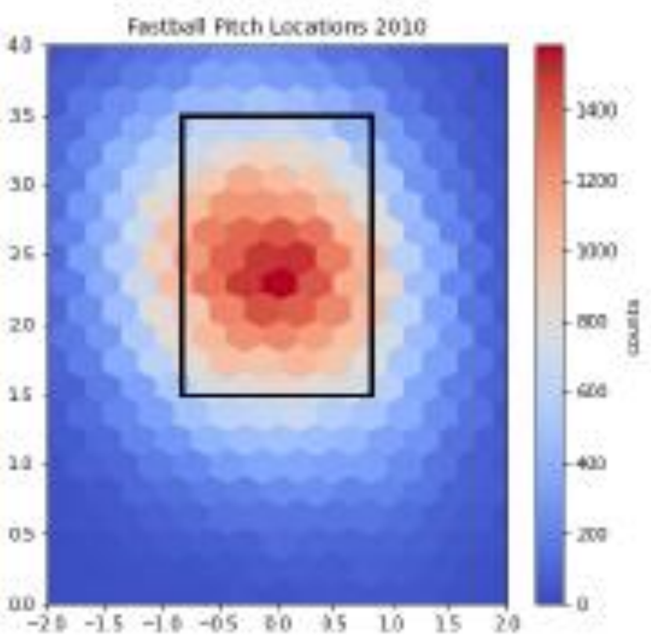
Designated hitter rule took effect

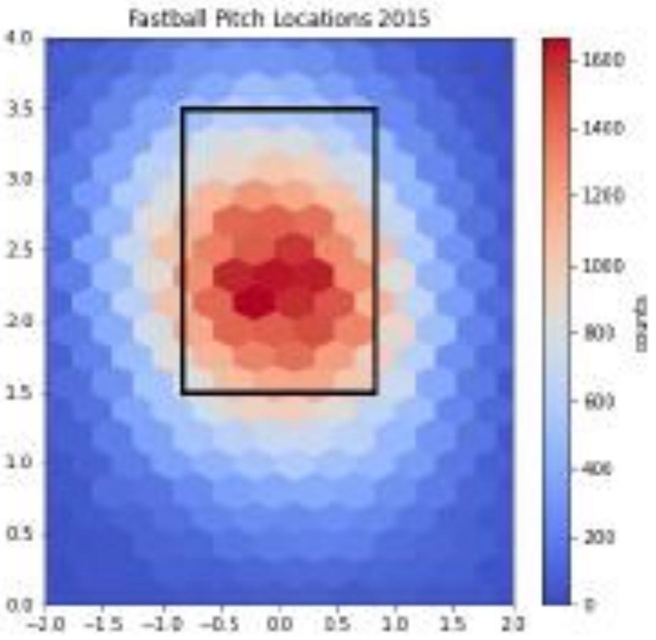
Mitchell report on steroids

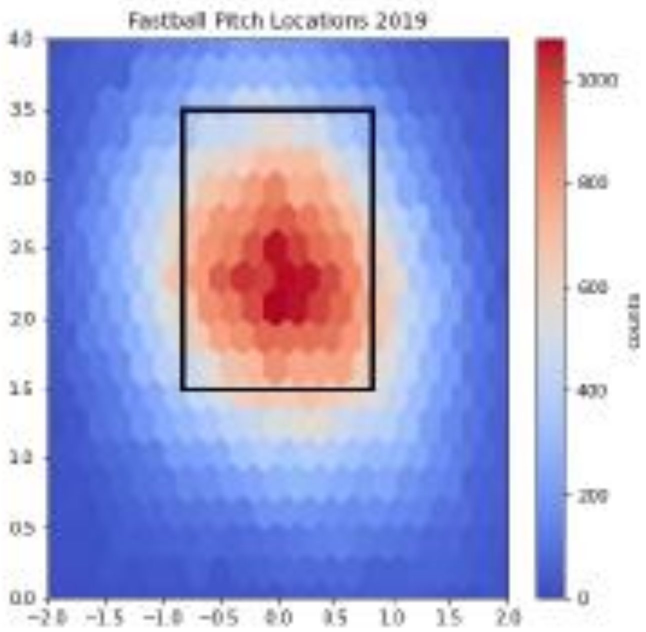
Changes with Substance policy 2021 Season

Analysis

The rise in strikeouts and homeruns can be attested to the way pitchers have gradually raised where they throw fastballs in the strike zone over the past 10 years.

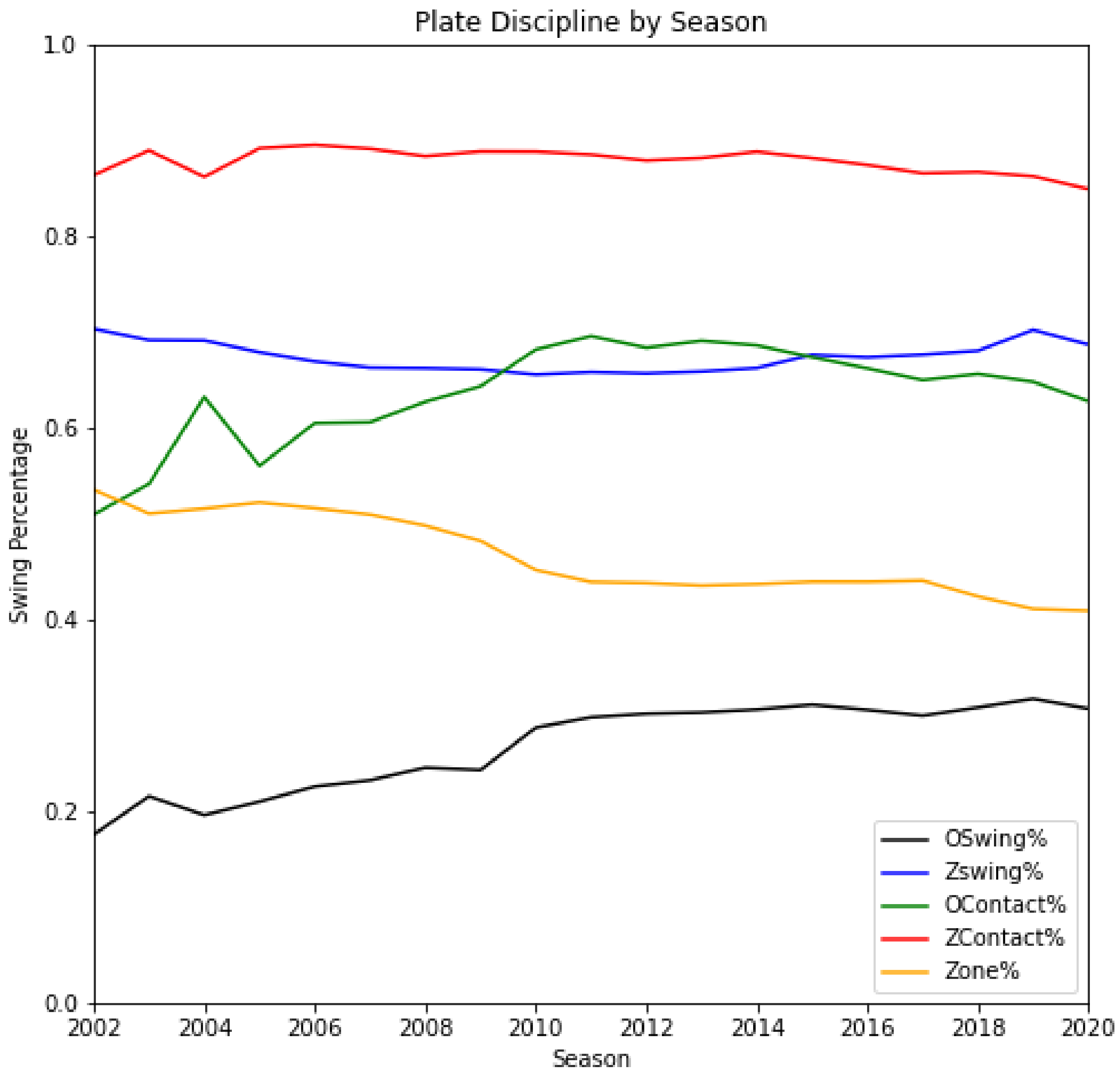






Analysis

- Aggregated data on the players by year to determine how disciplined hitters are.
- More pitches outside the zone = swinging at more pitches out of the zone.
- Rising strikeouts and decreasing batting averages.
- Pitchers are forcing hitters to swing at more pitches outside of the strike zone thus more strikeouts, lower batting average.



Learning Outcomes

- Develop python scripts to access information from files of structured data, access files in semi-structured data, and find patterns in unstructured data.

- Prepare and transform data to produce data summaries, lists, and networks utilizing appropriate software packages that can be integrated into the problem solution.

- Analyze and solve data access problems for the three types of data, to find and frame real-world data questions and show how they can be answered with data.

Thank you!

To review these projects in detail as well as additional information about my studies in this Master's program please check out my GitHub and LinkedIn. I am always open to new connections and conversations!