DATA SCIENCE IN THE UFC

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UCLA- PYTHON I FINAL PROJECT

AGENDA

- ■ Introduction

- ■ Key Findings

- ■ Appendix

FINAL PROJECT GOAL: USE PYTHON TO GAIN INSIGHTS ON THE UFC

- **Why?**
  - Passionate about both MMA and learning data science with Python
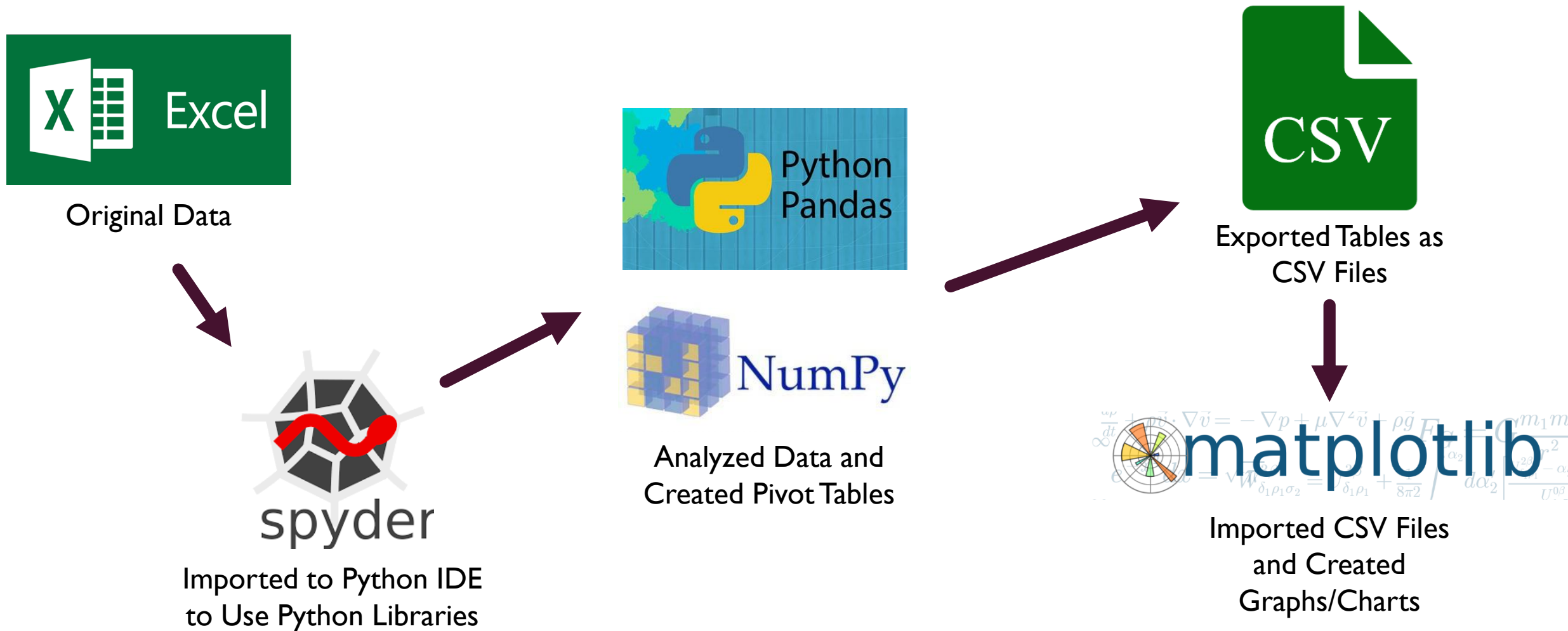
- **Topics of Interest**
  - Most effective tactics used by the UFC athletes
  - How top athletes compare to one another
  - Historical trends from the past 20 years

- **How?**
  1. Obtained data in Excel on 3,000+ UFC fights from Sherdog.com
     - All events from UFC 1 (Nov 1993) through UFC 195 (Feb 2016)
  2. Used Python libraries (CSV/MatPlotLib/Pandas) to manipulate data and visualize findings

PROCESS FLOW CHART

Original Data

Imported to Python IDE
to Use Python Libraries

Analyzed Data and
Created Pivot Tables

Exported Tables as
CSV Files

Imported CSV Files
and Created
Graphs/Charts

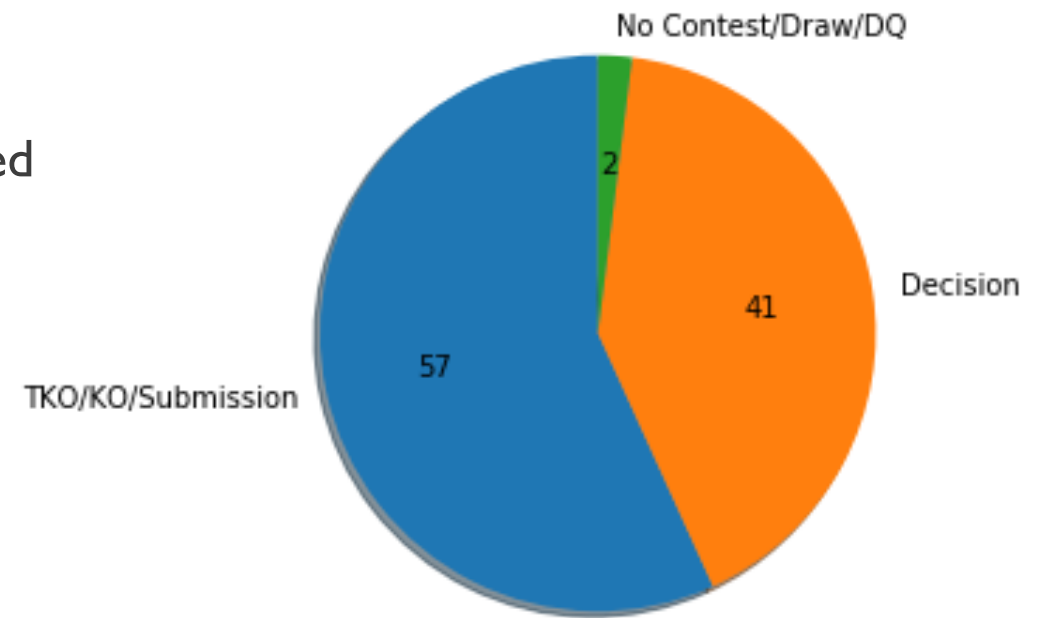# AGENDA

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HOW DO MOST UFC FIGHTS END?

- **Most fights ends via knockout or submission (57%)**

  - Note- in the early years of the UFC, the rules required all fights to end this way

- **However, a significant amount go to decision (41%)**

Fight Outcome by % of Total Fights

Ex. 1- Includes all UFC fights 1993 – Feb 2016

FIGHT-ENDING TECHNIQUES

If a fight doesn't go to decision:

- **Punches are by far the most common way for a fight to end (44%)**

- **Out of hundreds of techniques, 4 submissions have proven the most effective (32% of all TKOs, KOs and Submissions combined)**

  - Rear naked choke 13%

  - Guillotine choke 8%

  - Armbar 6%

  - Triangle choke 5%

**% of TKOs, KOs, & Submissions
by Technique**
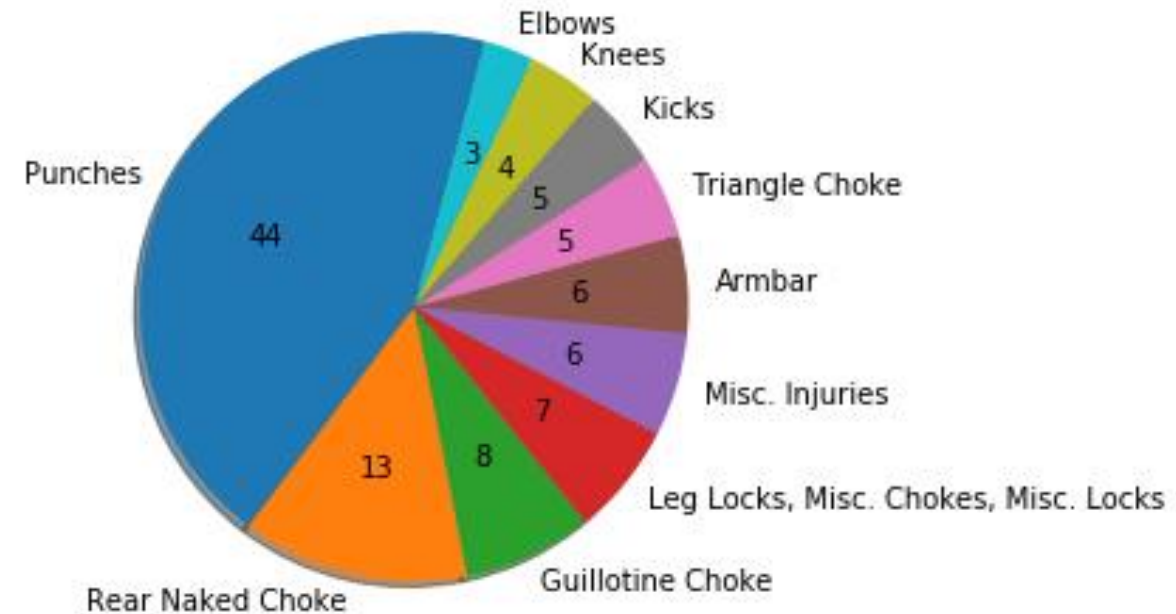
Ex. 2- Breakdown from all fights ending in submission, KO, and TKO from 1993 – Feb 2016

HOW DO TOP FIGHTERS WIN?

- **It is much more desirable for a fighter to win via a KO/submission than risk going to decision**

- **Fan favorites are often the ones who win by knockout**

  - Notable examples include Anderson Silva (75%), Chuck Liddell (63%), and Tito Ortiz (53%)

- **Fighters with a higher than average % of wins by submission include:**

 - Frank Mir (53%), Demian Maia (44%), Jon Jones (33%), and Gleison Tibau (29%)

Win Breakdowns for Fighters with the Most UFC Wins
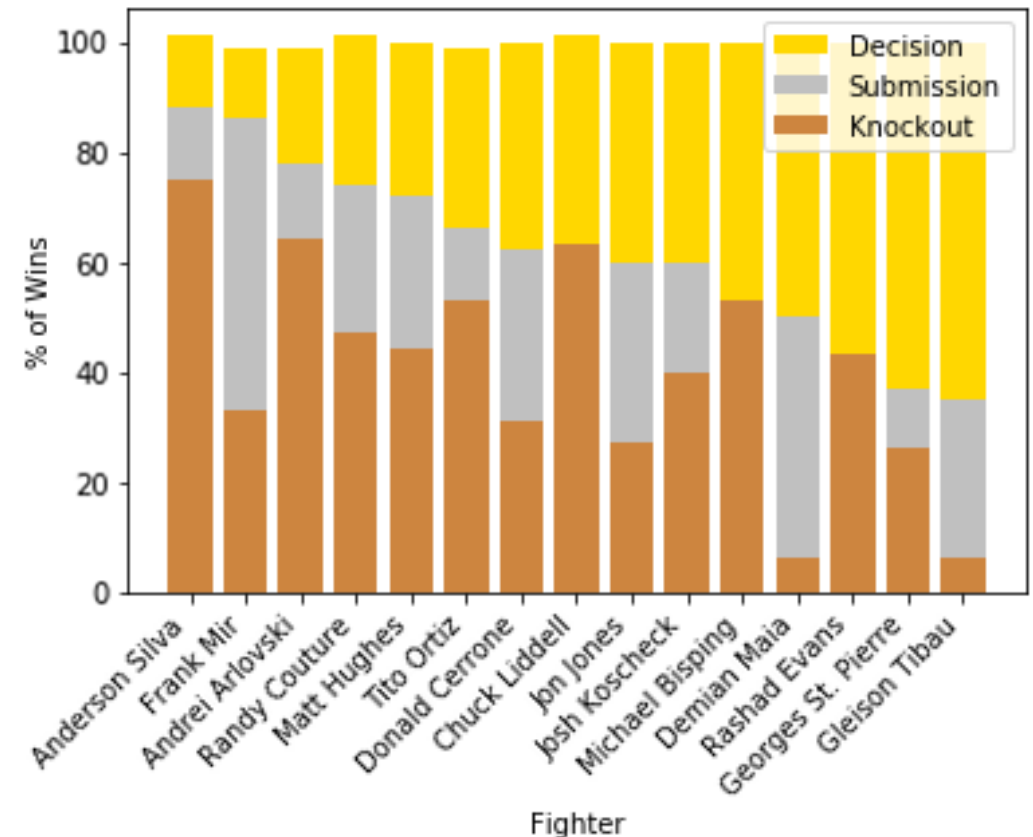
Ex. 3- Select UFC fights 1993 – Feb 2016

KNOCKOUT/SUBMISSION TRENDS

- **Originally, there were no time limits in the UFC- fights had to end by either knockout or submission**

  - The rules were changed in 1995 to make the sport more TV-friendly

- **The % of fights ending in knockout / submission has declined significantly**

  - However, the bulk of this occurred in the 1990s and the avg. % has settled at about 50%

% of Fights Ending in TKO, KO, or Submission
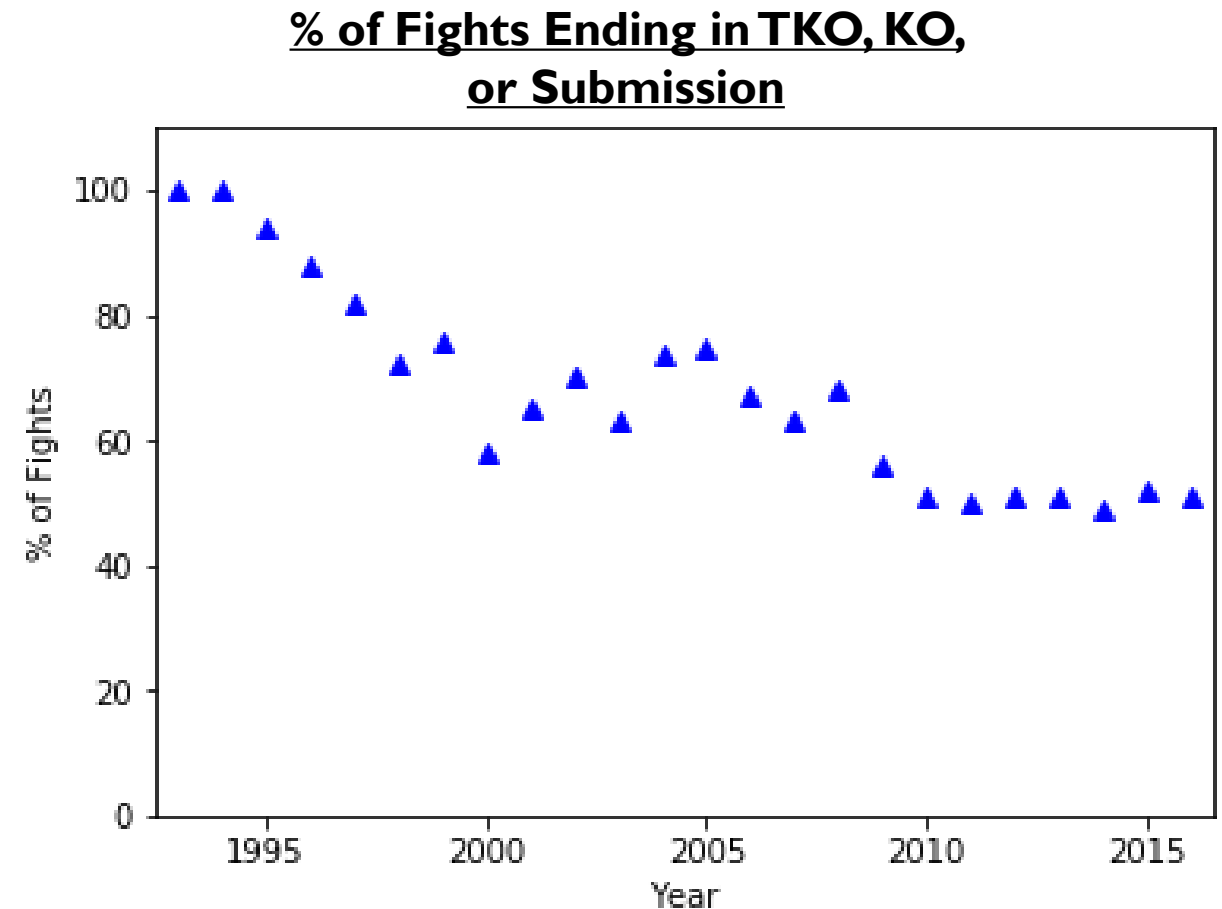
Ex. 4- All UFC fights ending in TKO/KO/Sub 1993 – Feb 2016

AVERAGE NUMBER OF ROUNDS

- **Rounds were added to the UFC in 1999**

  - Most fights have a limit of 3 5-minute rounds

  - Championship fights have a limit of 5 5-minute rounds

- **The average fight now lasts about 2.5 rounds**

Average Number of Rounds by Year
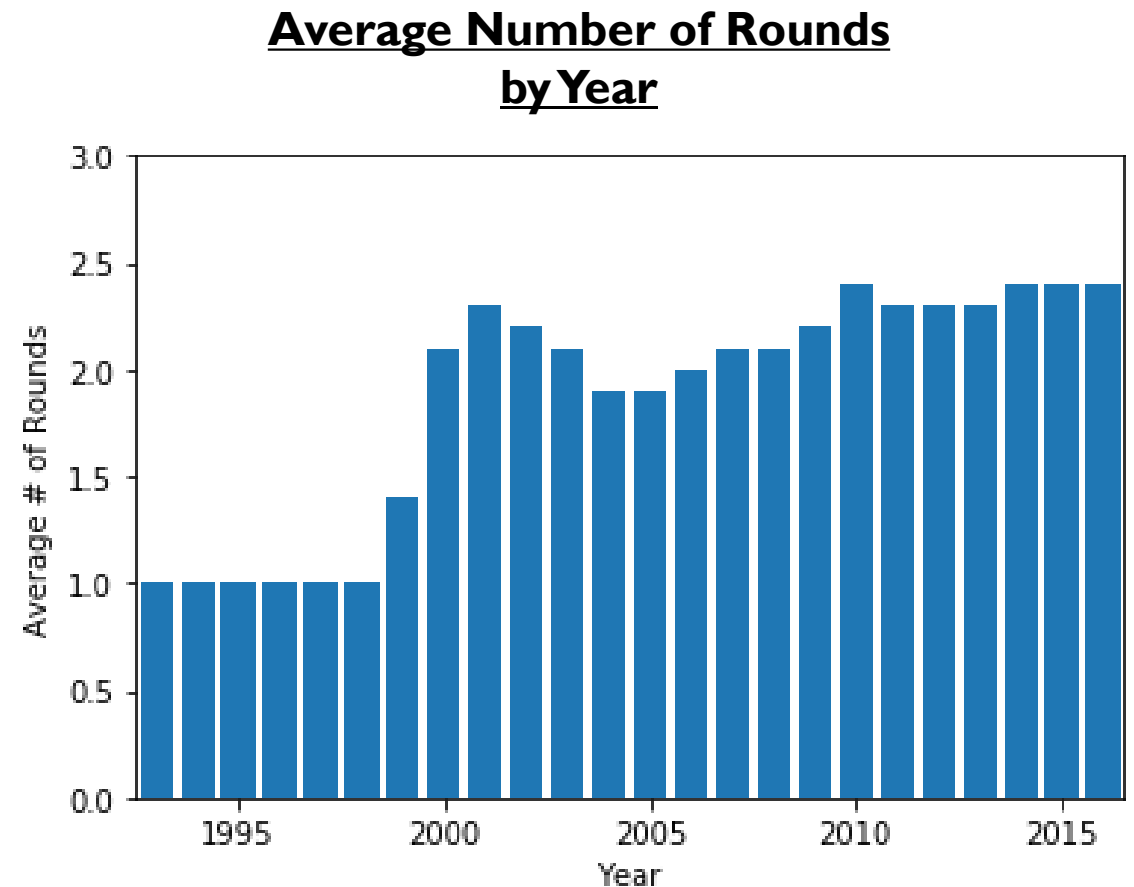
Ex. 5- Includes all UFC fights 1993 – Feb 2016

MOST COMMON SUBMISSIONS OVER TIME

- **3 submission techniques make up the majority of submission wins (70% avg.)**

  - Rear naked choke (35% avg.)

  - Guillotine choke (19% avg.)

  - Armbar (15% avg.)

- **There have been notable trends in submissions**

  - Armbars became very popular in the late 1990s/early 2000s, peaking at 63% in 2001

  - Rear naked chokes have been the most common submission for most of the past decade

Most Common Fight-Ending Submissions by Year
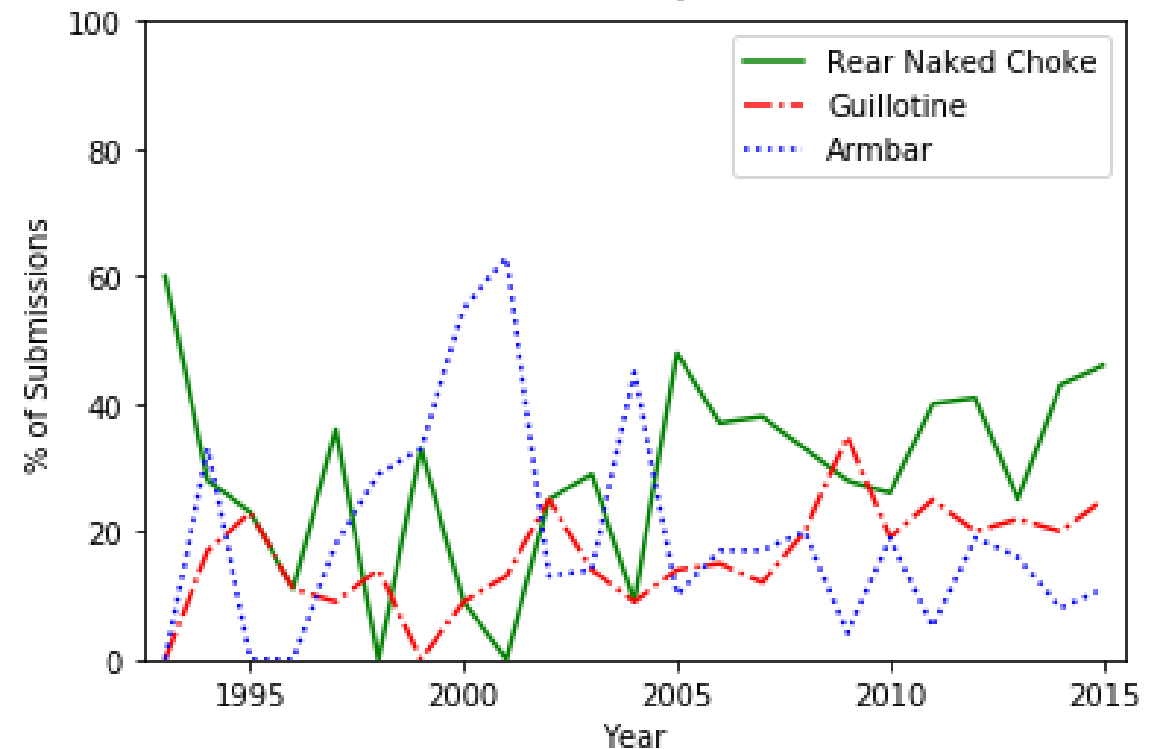
Ex. 6 Selected from UFC Fights ending in submission from 1993- 2015

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FUTURE OPPORTUNITIES

- **There are many opportunities to add additional features. Some ideas to explore are:**

  - **Update Fight Data**

    - Use web scraping to update the data through June 2018

  - **Pull in Individual Athlete Data**

    - Use fighter data to analyze career stats to try to predict future fight outcomes

  - **Automate Process + Add Email Functionality**

    - Create a program to automatically update data monthly, then send an email out with updated charts

TOOLS AND PYTHON LIBRARIES USED

- **Data Source-** Sherdog.com

- **Python IDE-** Spyder (in Anaconda)

- **Libraries-** Pandas, Numpy, Matplotlib, CSV

- **Other Programs-** Excel