

Speed Ratings

John Farrell Brown University 10/17/2023

https://github.com/johnsfarrell/speed-ratings

Goal - Predict speed ratings for all runners in any given race in NYS.

Regression problem



Why - Subjectivity, Scarcity & Recruitment

Note ... These are the hig I have time to speed rate only a limited number of races

Speed Ratings in the Tunykunners Database come from minuted-science meets nationally (and most meets from within in 1) ... note that the State in the Tables below sometimes (not always) refers to the meet location.

Note ... I have time to speed rate only a limited number of races ... So some very good performances are therefore not included in the list below 🕮 ...

Boys Highest Speed Ratings 2023 (through Sept 28, 2023)

| | Name | Gr | School | Meet | St | Date |
|----|----------------------|-----|------------------------------|---------------------|----|--------------|
| 1 | Drew Griffith | 12 | Butler | Marty Uher Vulcans | PA | 9/2/2023 |
| 2 | Evan Noonan | 11 | Dana Hills (SS) | Woodbridge Classic | CA | 9/16/2023 |
| 3 | Clay Shively | 12 | Wichita Trinity Academy | Roy Griak Invite | KS | 9/22/2023 |
| 4 | Daniel Simmons | 12 | American Fork | Watsatch Rendezvous | UT | 8/26/2023 |
| 5 | Sam Scott | 12 | Minneapolis Southwest | Roy Griak Invite | MN | 9/22/2023 |
| 6 | JoJo Jourdon | 12 | Olympus | Bob Firman Invite | UT | 9/23/2023 |
| 7 | Robert Mechura | 11 | Roseville Area | Roy Griak Invite | MN | 9/22/2023 |
| 8 | Nathan Neil | 12 | Bozeman | Flathead Invite | MT | 9/1/2023 |
| 9 | Ty Steorts | 11 | Hurricane | Adidas Challenge | WV | 9/16/2023 |
| 1 | O Anthony Fast Horse | 12 | Ventura (SS) | Woodbridge Classic | CA | 9/16/2023 |
| 1 | 1 Emmanuel Perez | 12 | Cathedral (SS) | Woodbridge Classic | CA | 9/16/2023 |
| 1 | 2 Paul Bergeron | 12 | Westford Academy | Ocean State Invite | MA | 9/23/2023 |
| 1 | 3 Byron Grevious | 12 | Phillips Exeter Academy | Manchester Invite | NH | 9/23/2023 |
| 1 | 4 Colin Whitaker | 12 | Lampeter Strasburg | Adidas Challenge | NC | 9/16/2023 |
| 1 | 5 Austin Westfall | 12 | 0rem | Bob Firman Invite | UT | 9/23/2023 |
| 1 | 6 Aloysius Franzen | 12 | Stevens Point | Roy Griak Invite | WI | 9/22/2023 |
| 1 | 7 Thomas McMahon | 12 | Upper Arlington | MSU Spartan Invite | MI | 9/15/2023 |
| 1 | 8 Joshua Ruiz | 12 | Belen Jesuit Preparatory Sch | Southern Showcase | AL | 9/16/2023 |
| 1 | 9 Samuel Ricchiuti | 12 | Dub. Jerome | MSU Spartan Invite | OH | 9/15/2023 |
| 2 | 0 Miles Ramer | 12 | Ravenwood | Southern Showcase | AL | 9/16/2023 |
| 2 | 1 Dylon Nalley | 12 | Marion (H.S.) | Forest Park Fest | IL | 9/9/2023 |
| 2 | 2 Ryan Pajak | 12 | Ringgold | Mingo Scrimmage | PA | 8/30/2023 |
| 10 | | 4.0 | | C 11 C1 | | 0 /4 C /2022 |

The Class Of 2026's Top 50 Boys Recruits: First Update

Recruiting Rundown Ashley Tysiac



With their first full year of high school track and field competition now complete, it's time now

Data collection

<u>Boys</u>:

```
IXCboys2019.zip1 ... 2019 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2018.zip] ... 2018 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2017.zip] ... 2017 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2016.zip] ... 2016 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2015.zip] ... 2015 Season - BOTH Section 3 & Non-Section 3 boys
[XCbovs2014.zip] ... 2014 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2013.zip] ... 2013 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2012.zip] ... 2012 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2011.zip] ... 2011 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2010.zip] ... 2010 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2009.zip] ... 2009 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2008.zip] ... 2008 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2007.zip] ... 2007 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2006.zip] ... 2006 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2005.zip] ... 2005 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2004.zip] ... 2004 Season - BOTH Section 3 & Non-Section 3 boys
[XCboys2003.zip] ... 2003 Season - Section 3 boys only
[XCboys NonSec3 2003.zip] ... 2003 Season - Non-Section 3 boys only
[XCboys2002.zip] ... 2002 Season - Section 3 boys only
[XCboys NonSec3 2002.zip] ... 2002 Season - Non-Section 3 boys only
[XCboys2001.zip] ... 2001 Season - Section 3 boys (a few non-Section 3)
[XCboys2000.zip] ... 2000 Season - Section 3 boys (a few non-Section 3)
```

Girls:

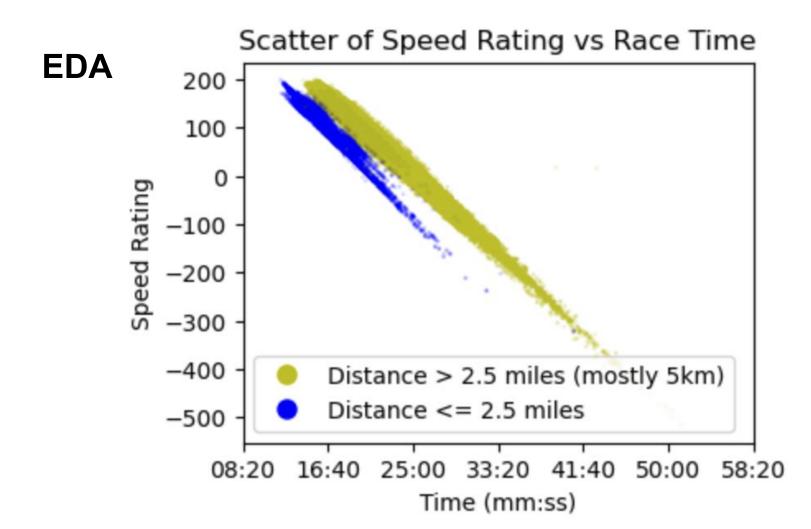
```
[XCgirls2019.zip] ... 2019 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2018.zip] ... 2018 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2017.zip] ... 2017 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2016.zip] ... 2016 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2015.zip] ... 2015 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2014.zip] ... 2014 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2013.zip] ... 2013 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2012.zip] ... 2012 Season - BOTH Section 3 & Non-Section 3 girls
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[XCgirls2008.zip] ... 2008 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2007.zip] ... 2007 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2006.zip] ... 2006 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2005.zip] ... 2005 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2004.zip] ... 2004 Season - BOTH Section 3 & Non-Section 3 girls
[XCgirls2003.zip] ... 2003 Season - Section 3 girls only
[XCgirls NonSec3 2003.zip] ... 2003 Season - Non-Section 3 girls only
[XCgirls2002.zip] ... 2002 Season - Section 3 girls only
[XCgirls NonSec3 2002.zip] ... 2002 Season - Non-Section 3 girls only
[XCgirls2001.zip] ... 2001 Season - Section 3 girls (some non-Section 3)
[XCgirls2000.zip] ... 2000 Season - Section 3 girls (some non-Section 3)
```

Data collection (2)

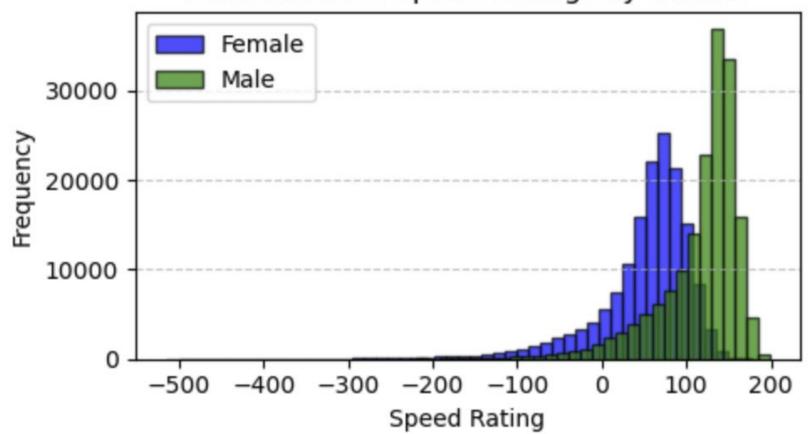


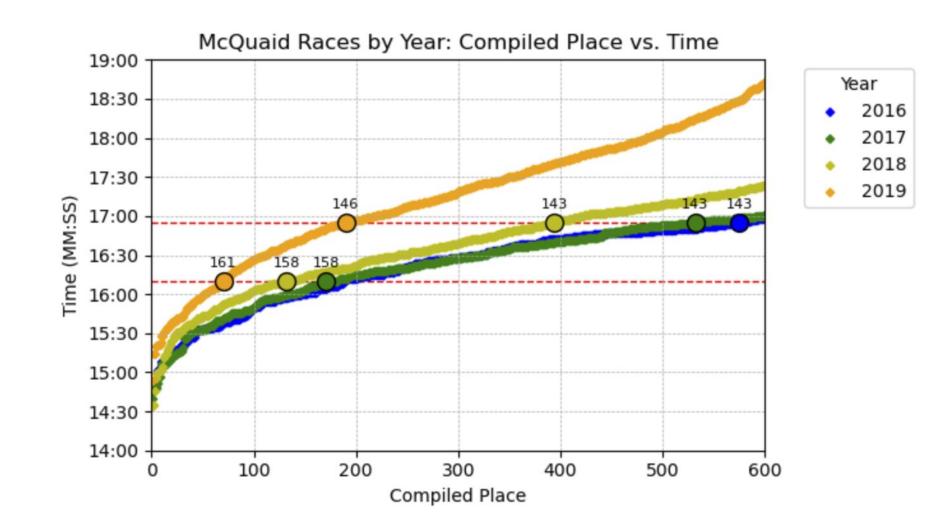
Data collection (3)





Distribution of Speed Ratings by Gender





Splitting

2016 & 2017 data \rightarrow Training (129569 rows)

2018 data → Evaluation (44869 rows)

2019 data → Testing (29247 rows)

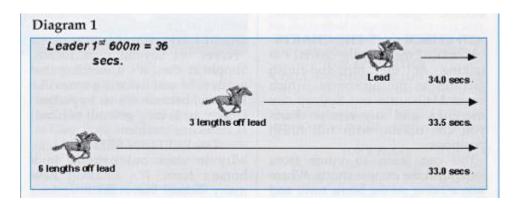
Splitting (2) — What about leakage? (Time Series)

Sequential Data Modeling

Training on runner's past data to predict runner's future data.

Feature Engineering (Performance)

- Speed (mi/sec)
- Average Time & Difference
- Average Time (Class) & Difference
- Time Difference from first place finisher
- Time Difference from first place finisher (Class)



Feature Engineering (Weather)

- Temperature * Humidity
- Wind Speed * Wind Chill
- Temperature * Wind Speed
- Humidity * Wind Speed
- Heat Index * Humidity
- Dew Point * Temperature
- Dew Point * Humidity
- Dew Point * Wind Speed



Feature Engineering (Date & ID)

- Date → Year, Month, Day (ordinal features)
- Name & School → Name-School (categorical ID)



Missing Values

100% of points have missing values



Class 0.077135 (object) [ordinal]

Wind Chill 0.788175 (float64)

Wind Gust 0.623408 (float64)

Heat Index 0.965669 (float64)



PUBLIC SCHOOLS ATHLETIC LEAGUE



Encoding

Categorical → **OneHotEncoder**

Section, Gender, Race, School, Race Section, Name-School

Ordinal → OrdinalEncoder

Class [A, NA, B, ...], Grade, Year, Month, Day

Numeric → StandardScaler

Time data, Finishing Place, Weather data

Before: **26** columns, 203685 rows, After: **10,077** columns, 203685 rows

26 features **46** features

Thank you