

MUSCLE METRICS

REVOLUTIONIZING BODYBUILDING COMPETITIONS WITH ELO RATINGS

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PROJECT GOAL

Create a metric that can be used to predict the outcome of professional bodybuilding competitions.



BUSINESS CASE

In 2023, there were **43** occurrences of at least 30 competitors in the same class.



Initial group comparisons
in alphabetical order.



Individual Routine



Final group comparisons
in preliminary rank order.

Our ranking can be used as a substitute
for initial group comparisons.

DATA COLLECTION

Amateur and professional contest results were scraped from NPC News Online dating back to 2012.

212 AWARDS			BIKINI AWARDS			FIGURE AWARDS		
FITNESS AWARDS			MEN'S AWARDS			MEN'S CLASSIC PHYSIQUE AWARDS		
MEN'S PHYSIQUE AWARDS			WOMEN'S AWARDS			WOMEN'S PHYSIQUE AWARDS		
WOMEN'S WELLNESS AWARDS								

MEN'S BODYBUILDING	FIGURE	BIKINI
★ MEN'S AWARDS	★ FIGURE AWARDS	★ BIKINI AWARDS
OPEN (19)	OPEN (25)	OPEN (50)
1 DEREK LUNSFORD	1 CYDNEY GILLON	1 JENNIFER DORIE
2 HADI CHOOPAN	2 JESSICA REYES PADILLA	2 MAUREEN BLANQUISCO
3 SAMSON DAUDA	3 LOLA MONTEZ	3 ASHLEY KALTWASSER
4 BRANDON CURRY	4 CHERISH RICHARDSON	4 LAURALIE CHAPADOS
5 CHINEDU ANDREW OBIKEA	5 NATALIA SOLTERO	5 ELISA PECINI
6 HUNTER LABRADA	6 ERICKA MORALES MORGAN	6 AIMEE LEANN DELGADO
7 MICHAL KRIZANEK	7 RHEA GAYLE	7 ARIANA BROTHERS
8 TONIO BURTON	8 JENNIFER ZIENERT	8 ASHLYN LITTLE
9 REGAN GRIMES	9 ADELA ONDREJOVICOVA	9 DARAJA HILL
10 CHARLES GRIFFEN	10 MARIA LUISA BAEZA DIAZ PEREIRA	10 JOURDANNE LEE
11 HASSAN MOSTAFA	11 TEREZA LINHARTOVA	11 PHOEBE HAGAN
12 ANDREA PRESTI	12 OYKU BASAR	12 VANIA AUGUSTE
13 THEO LEGUERRIER	13 MADISON DINGES	13 REIJUANA HARLEY
14 ROMAN FRITZ	14 LENA RAMSTEINER	14 ARIEL BARLEY
15 JUSTIN SHIER	15 KRISTEN MCGREGOR	15 TAMEKIA CARTER

4,086 contests

214,314 competitors

783,708 contest entries

ELO RATINGS

The Elo Rating of a competitor is a numerical value measuring their competitiveness.

01

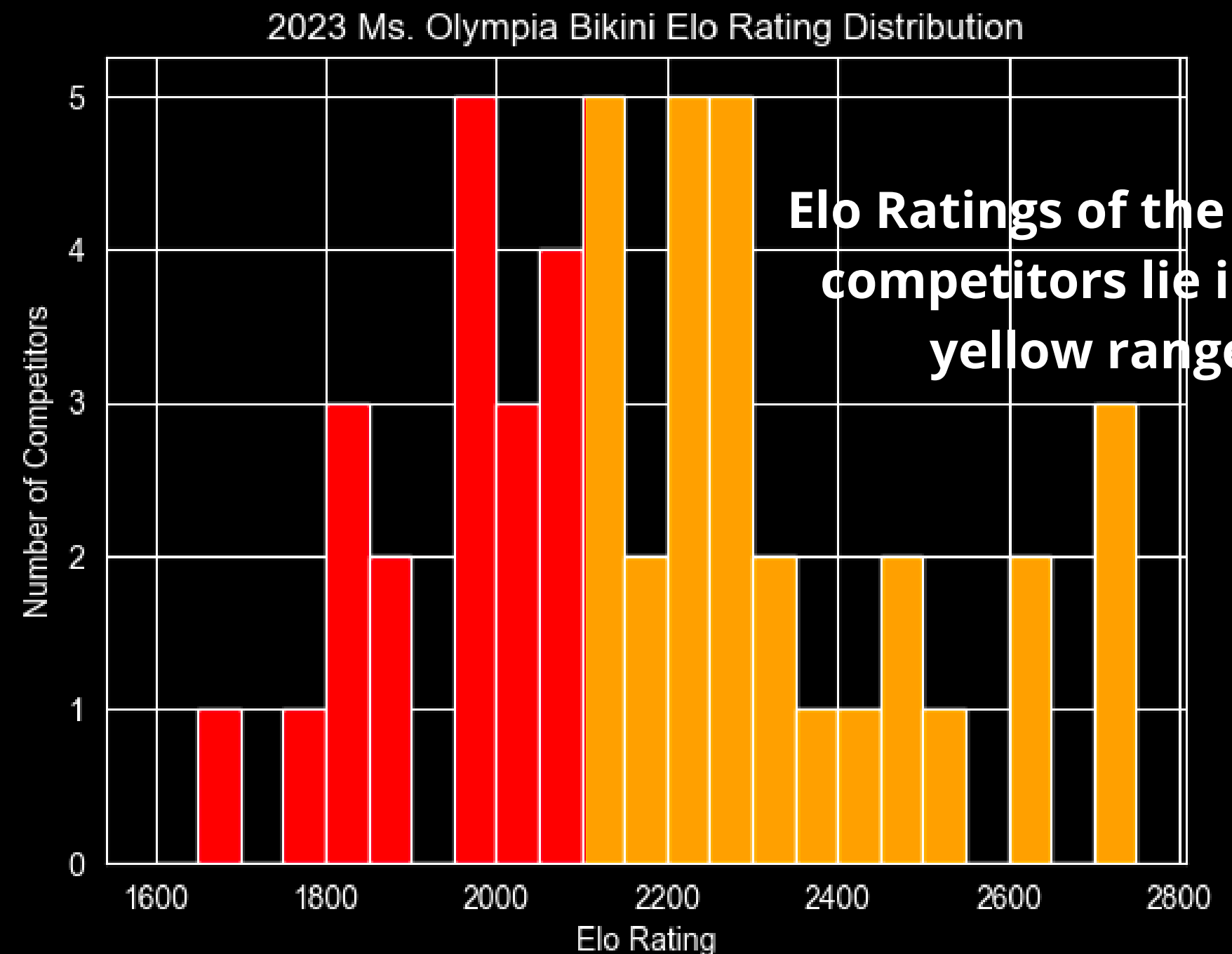
Each new amateur competitor is assigned an initial Elo Rating of 1500.

02

Before each competition, the probability that one competitor will rank higher than another is calculated according to their Elo Ratings.

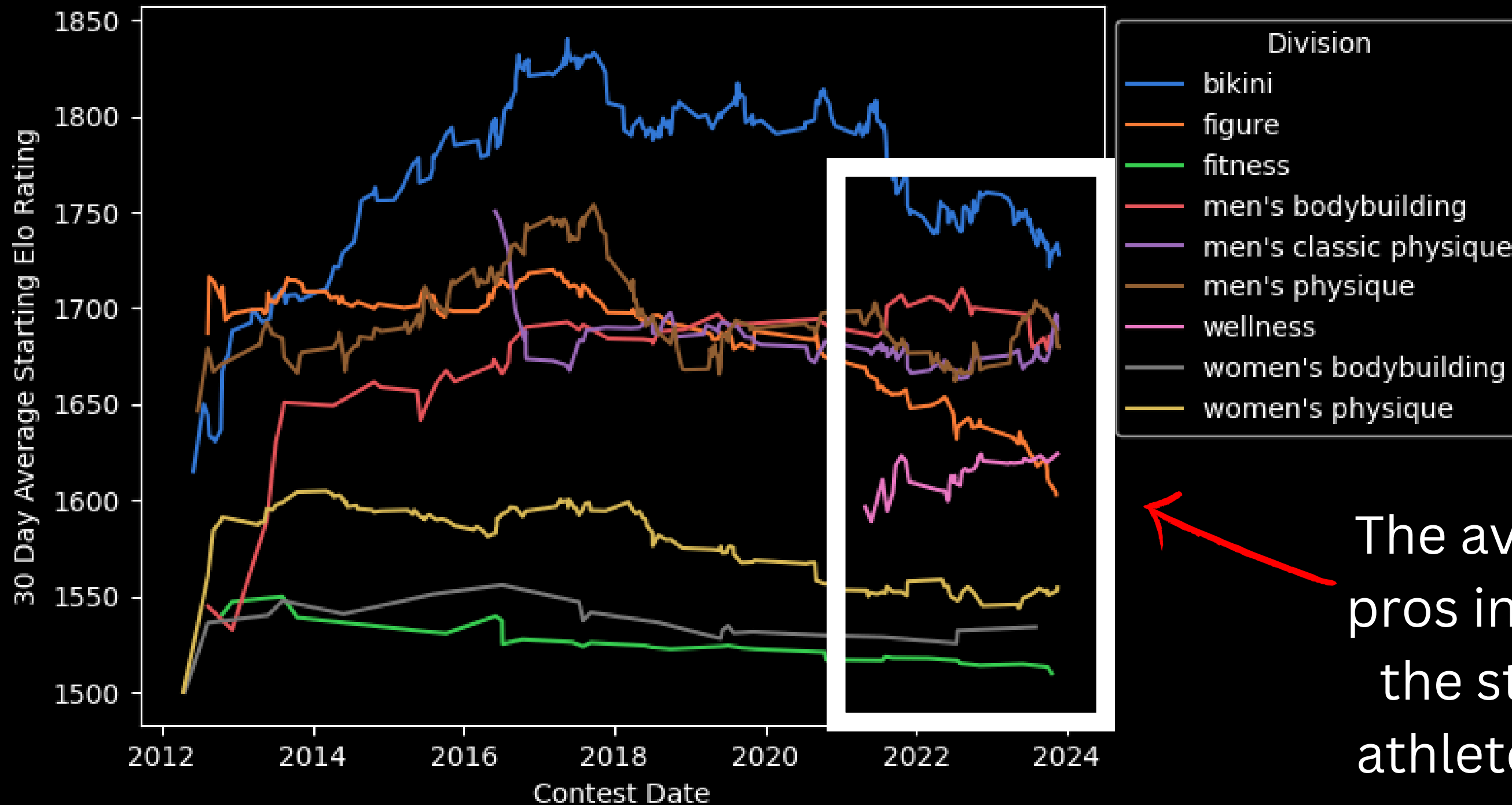
03

After the competition, each competitor's Elo Rating is updated based on the actual outcome and prior probability.



Starting Elo Rating for Pros

Elo Ratings at Time of First Pro Competition



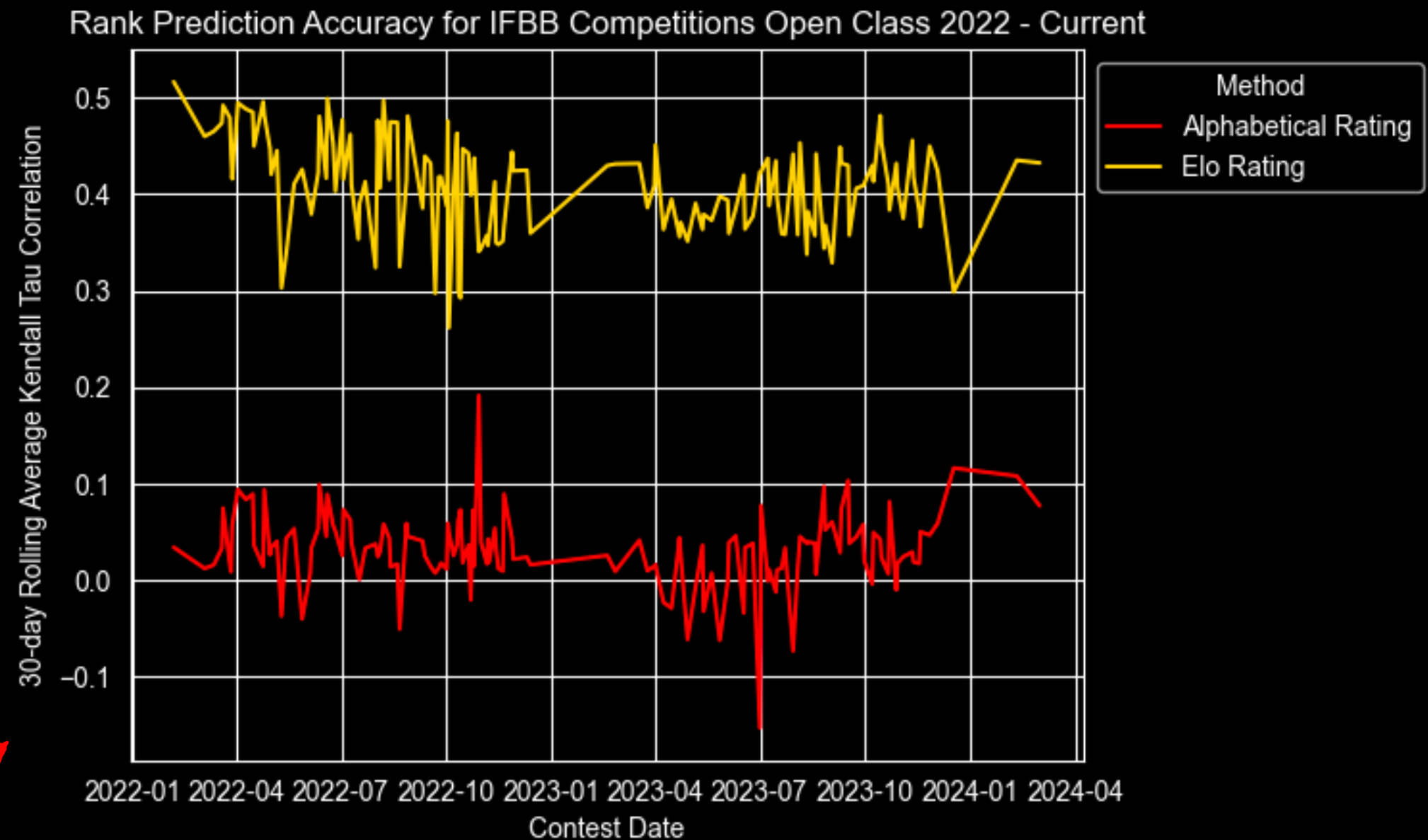
The average Elo Rating for new pros in each division is used for the starting Elo Rating of pro athletes with no amateur data.

PREDICTION ACCURACY

Kendall Tau Correlation Coefficient measures the similarity between **predicted** and **actual** rankings.

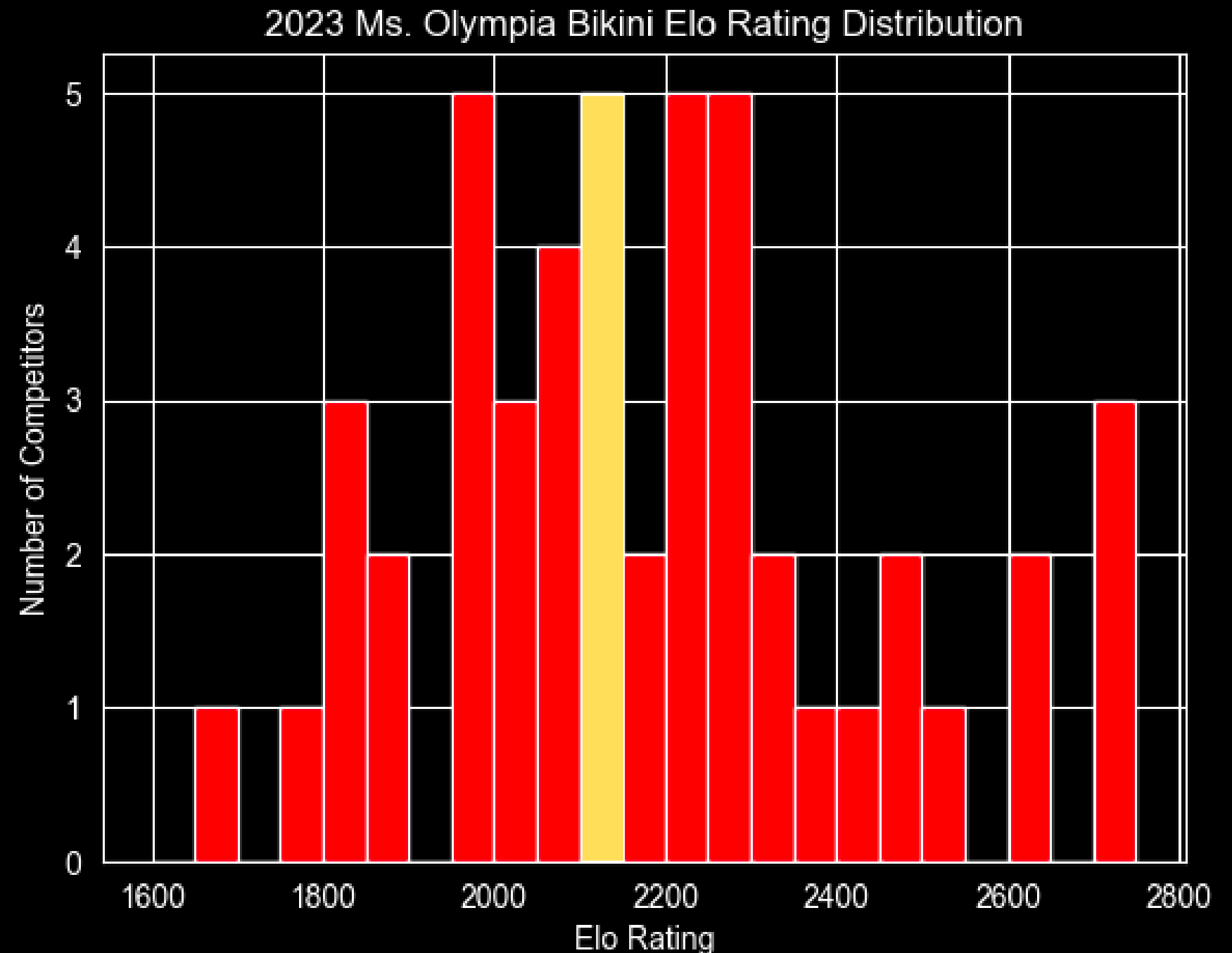
The measurement is based on the number of **inversions** required to obtain one ranking from another.

Rankings from **Elo Ratings** require much fewer inversions than **alphabetical ordering**.



MR. OLYMPIA OBSERVATIONS

Competitor Name	Placing	Elo Rating	Elo Rank
Jennifer Dorie	1	2733	1
Maureen Blanquisco	2	2639	4
Ashley Kaltwasser	3	2708	3
Lauralie Chapados	4	2708	2
Elisa Pecini	5	2615	5
Aimee Leann Delgado	6	2491	7
Ariana Brothers	7	2133	25
Ashlyn Little	8	2323	12
Daraja Hill	9	2542	6
Jourdanne Lee	10	2408	9



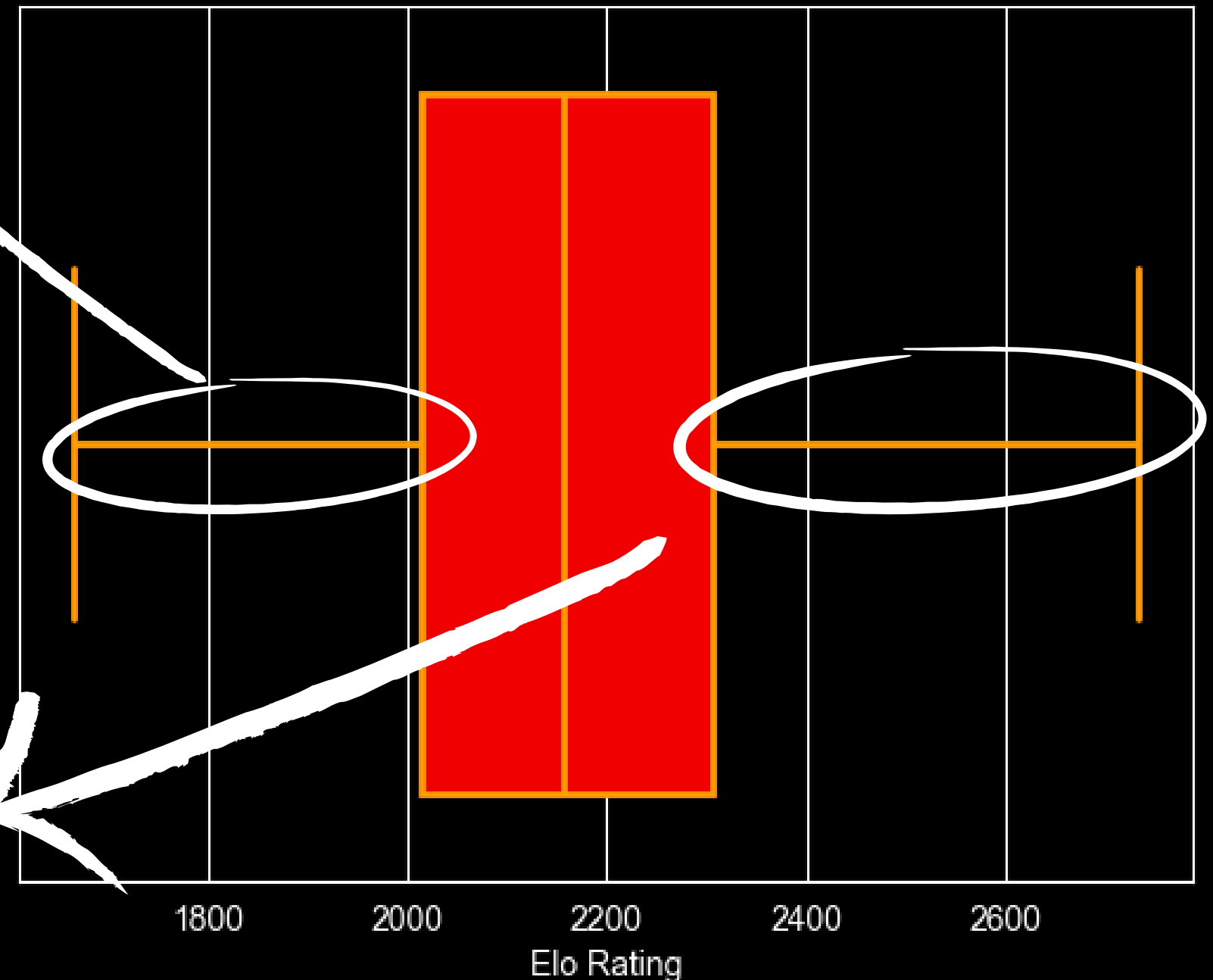
Ariana came back in 2023 after a 3-year off-season.
Elo Ratings do not favor long off-seasons,
although these typically benefit competitors.

MR. OLYMPIA OBSERVATIONS

All lower quartile bikini competitors ranked 16 and qualified by winning a show **outside of the United States**.

10 of the 12 upper quartile bikini competitors ranked in the top 11 and all 12 qualified by winning a show **in the United States**.

Elo Rating Distribution of 2023 Ms. Olympia Bikini Competitors

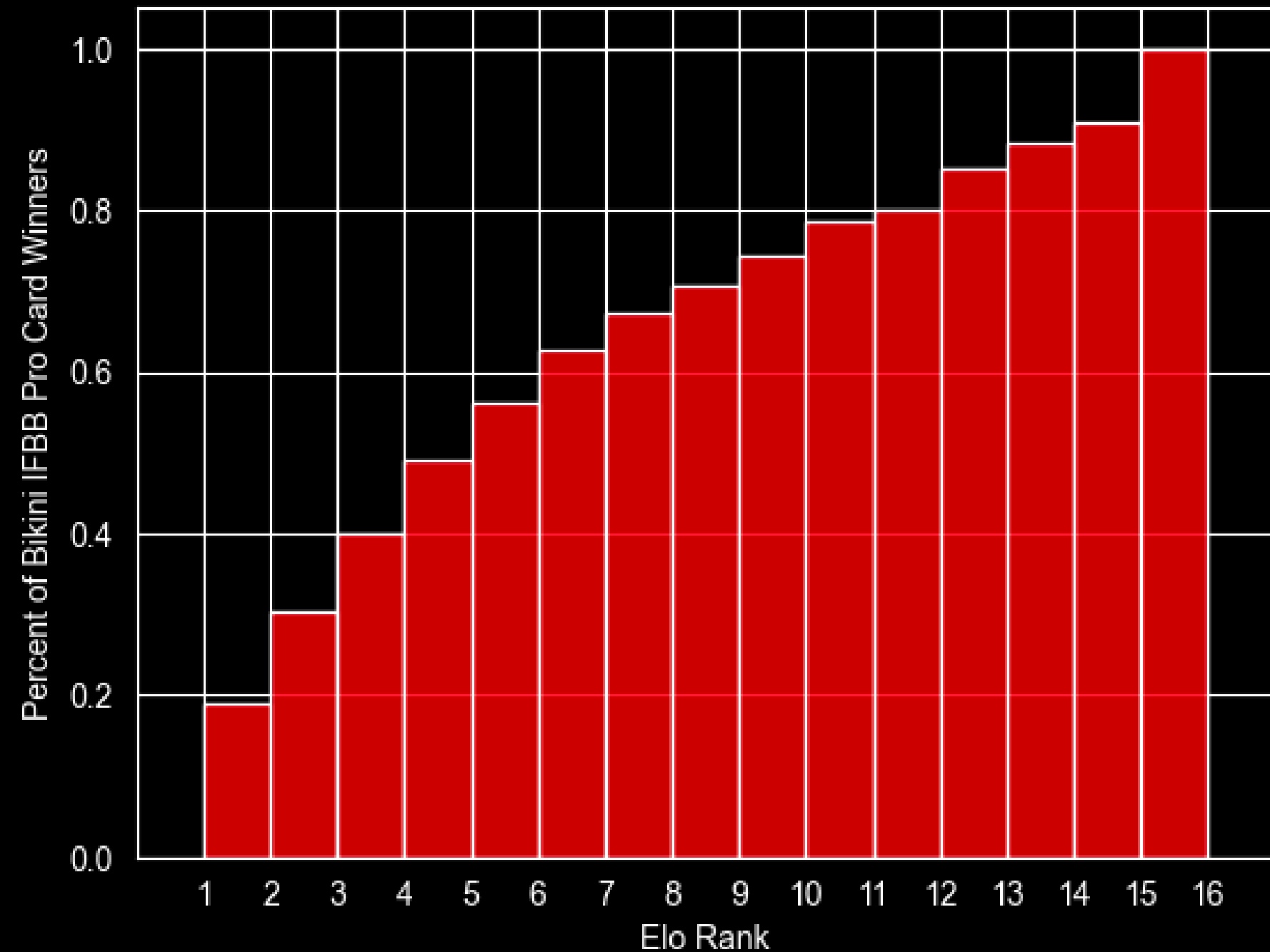


FUTURE WORK

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OCR methods on Scorecards

Elo Rating Prediction of Bikini IFBB Pro Card Winners



Improve Predictions of Pro Card Winners

THANK YOU



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