



GOAT Index 2.0 Algorithm

Dr Tom Crawford, University of Oxford

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Timings:

Research conducted July-September 2024

Player data taken up to the end of the 2023/24 season (including international competitions)

Sources:

Player goal statistics: Wikipedia

Player assist statistics: FBRef

Player titles: Wikipedia

Player awards: Wikipedia

UEFA league coefficients: Transfermarkt

Explanation of calculations

STAGE 1 - calculate total points scored across categories 1-5 (Goals, Assists, Club Titles, National Team Titles, Individual Awards) following the same methodology as GOAT Index 1.0 (points allocation explained below)

STAGE 2 - determine whether player follows the Ronaldo or Messi GOAT curve and use this along with totals from STAGE 1 to predict future scoring

STAGE 1 - GOAT INDEX 2.0

CATEGORY 1: GOALS

All competitions, domestic or international, club team or international team, are valued equally.

Goals x1

Number of club goals + number of international goals

CATEGORY 2: ASSISTS

Assists are half as valuable as a goal so +0.5 per assist. All competitions are valued equally. Assists are a new addition from GOAT Index 1.0.

Assists x0.5

Number of club assists + number of international assists

CATEGORY 3: CLUB TITLES

In general, league titles are twice as valuable as domestic cups, UCL is twice as valuable as a league title, Copa Libertadores is valued similarly to a European domestic cup, and World Club Cup is approximately half as valuable as a domestic cup. All valuations of competitions are unchanged from GOAT Index 1.0.

League titles

UEFA country coefficient for the season the title was won

eg. La Liga title 2023/24 = 89 points, Premier League 2022/23 = 110 points

Domestic cups

UEFA country coefficient for the season trophy was won / 2

European cup/Champions League

Sum of top 2 UEFA coefficients

eg. UCL 2023/24 = 194 points

World club cup

20 points per title

Copa Libertadores

30 points per title

CATEGORY 4: NATIONAL TEAM TITLES

World cup is 1.5 times more valuable than a European Championship or Copa America, which are valued equally - this follows the scoring of GOAT Index 1.0. Points from each national team title are **multiplied by 3** when added to the final total, which means a World Cup is approximately twice as valuable as a Champions League title.

World cup

$$150 - 150/(\text{seeding}+1)$$

eg. World Cup 2022, Argentina 4th seed, so points = $150 - 150/5 = 150 - 30 = 120$

EUROs

$$100 - 100/(\text{seeding}+1)$$

Copa America

$$100 - 100/(\text{seeding}+1)$$

CATEGORY 5: INDIVIDUAL AWARDS

Scores are allocated based on the proportion of votes the winner receives out of the top 3 (this follows the methodology of GOAT Index 1.0). The scores are **multiplied by 5** when added to the total so they range in value between a Champions League and World Cup.

Ballon d'Or

$$\text{Votes for 1}^{\text{st}} \text{ place} / (\text{sum of votes for top 3}) * 100$$

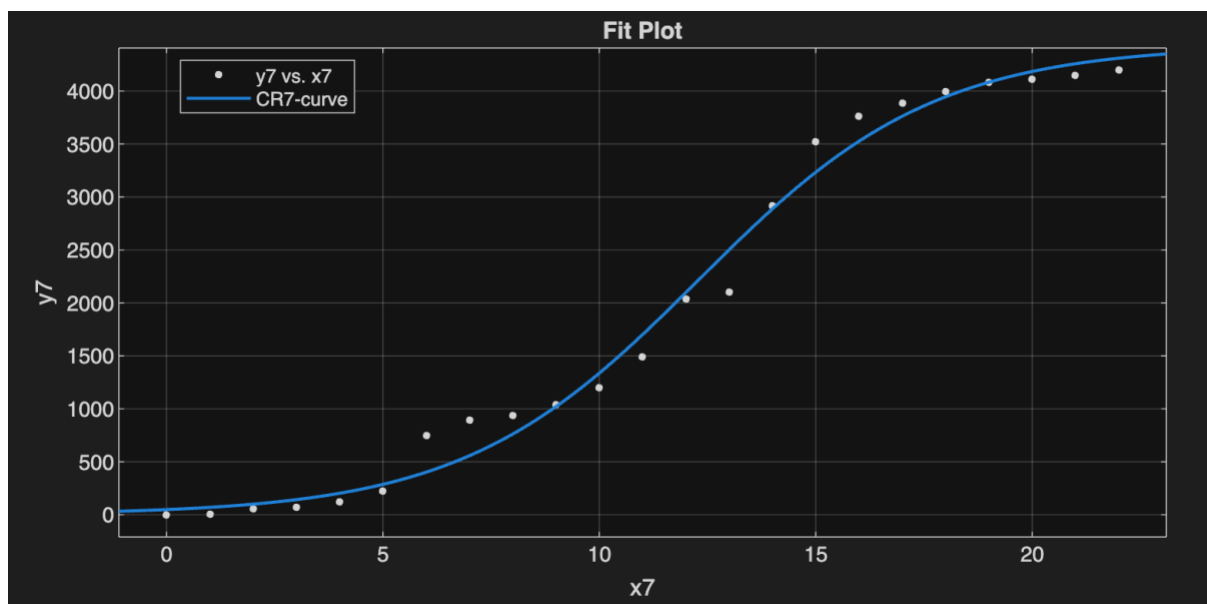
Kopa Trophy

$$\text{Votes for 1}^{\text{st}} \text{ place} / (\text{sum of votes for top 3}) * 100$$

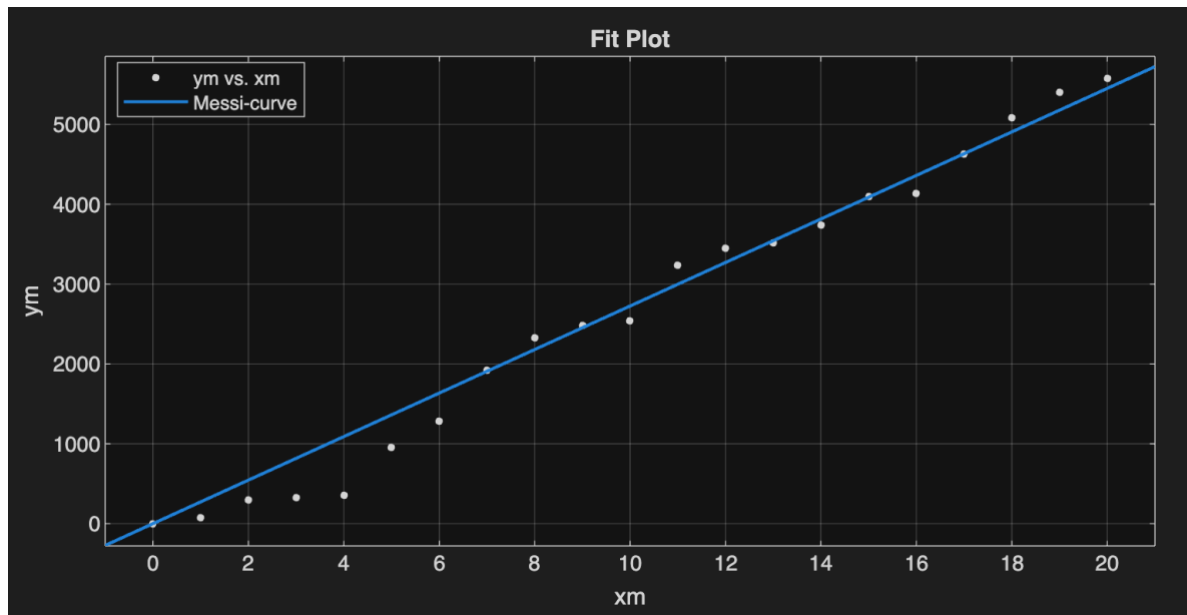
eg. 2018 Kopa Trophy for Mbappe = $110 / (110 + 31 + 18) * 100 = 69$ points

STAGE 2 - GOAT CURVE

Ronaldo curve: s-shaped (sigmoidal) with lower points scoring at the beginning and end of career, likely due to starting at a smaller club and then transferring to a larger one.

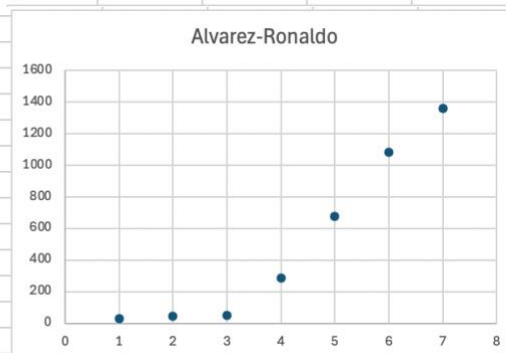
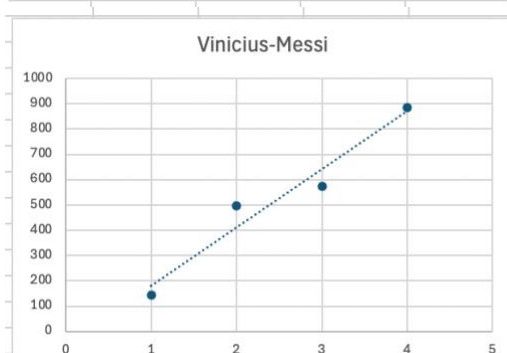
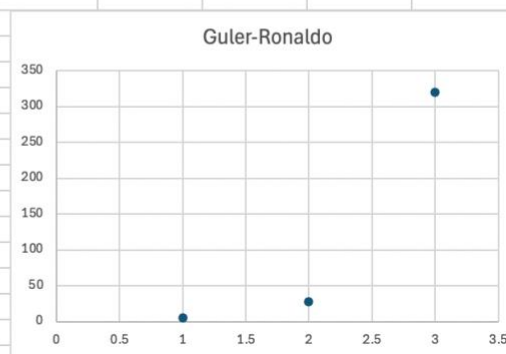
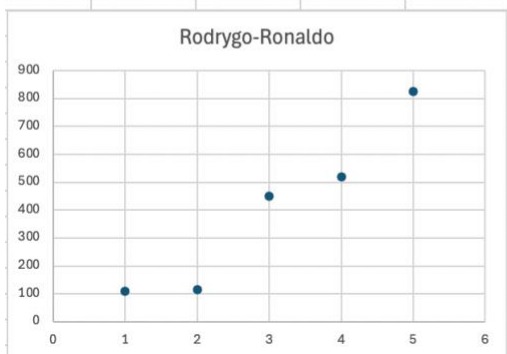
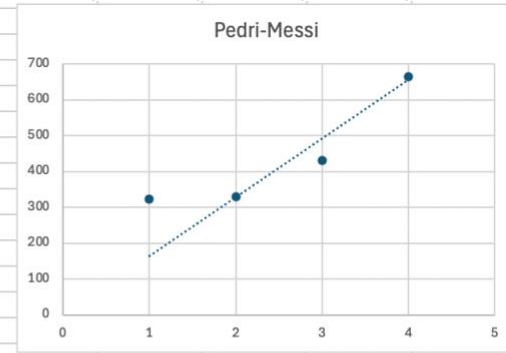
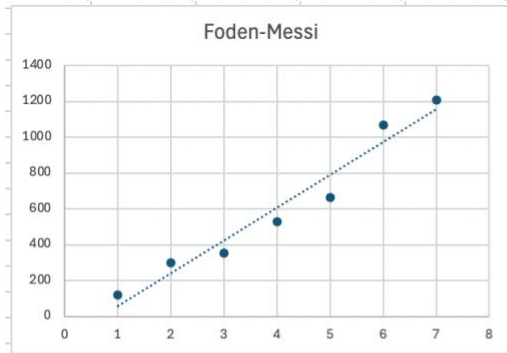
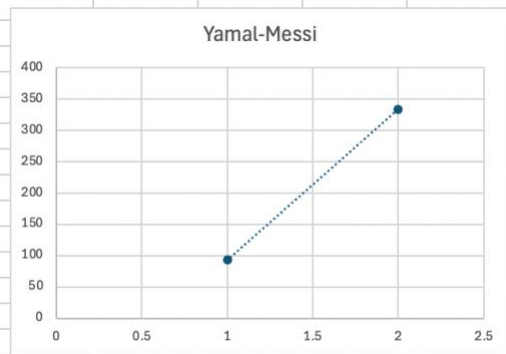
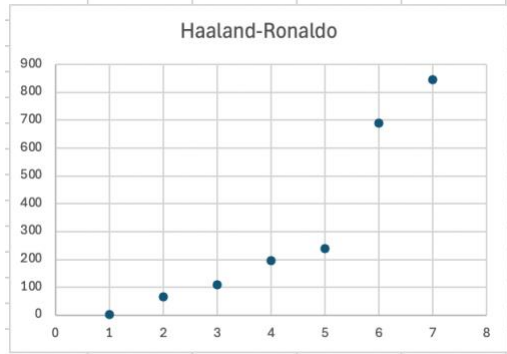
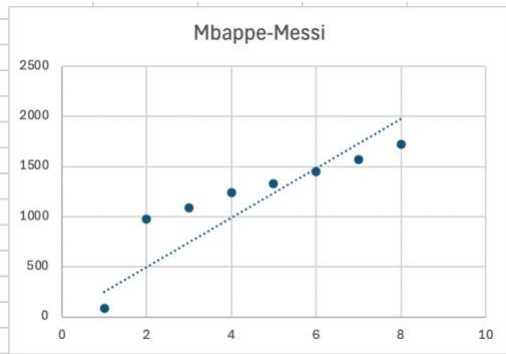
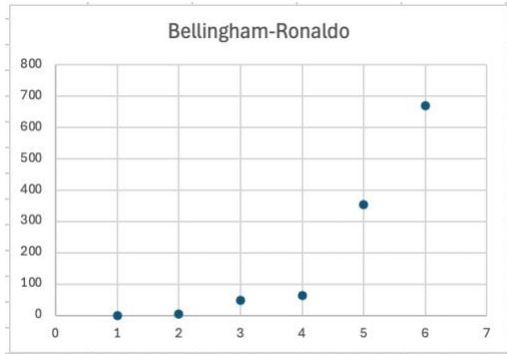


Messi curve: straight line with consistent points scored each season, likely due to playing for one of the bigger teams for the whole of their career.



For each player, the data available for their career so far was used to determine whether their career path is more likely to follow the Ronaldo or Messi shaped curve. This was then used to make a prediction about their future score, based on the total points scored so far in their career as calculated in STAGE 1. The allocation of each player in the top 10 to a Ronaldo or Messi curve is displayed below.

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RESULTS

This is the table of points totals for each category, which can be shown on screen during the explanation of STAGE 1 of the algorithm.

	GOALS	ASSISTS	CLUB TITLES	INT TITLES	AWARDS
Kylian Mbappe	327	65.5	592	393	345
Alvarez	88	19	542	711	0
Jude Bellingham	56	21.5	320	0	275
Erling Haaland	245	24	576	0	0
Vinicius Junior	82	31.5	771	0	0
Lamine Yamal	9	7	93	225	0
Rodrygo	58	17	751	0	0
Arda Guler	16	5	299	0	0
Phil Foden	90	31	1086	0	0
Pedri	21	7.5	142	225	270

The next table shows the final results from the GOAT algorithm 2.0. The Min/Max columns represent the uncertainty in trying to predict future performance based on past data (95% confidence intervals). For players with fewer professional seasons, eg. Lamine Yamal, the range of the scores varies much more than for the players that are well-established.

	MIN	MAX	SCORE
Kylian Mbappe	75	97	86
Alvarez	67	100	84
Jude Bellingham	68	95	82
Erling Haaland	67	95	81
Lamine Yamal	49	92	71
Vinicius Junior	57	78	68
Rodrygo	53	74	64
Phil Foden	54	71	63
Arda Guler	34	91	63
Pedri	41	71	56

TOP TRUMP STATS

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This table shows the 'top trump stats' for each player, as well as their GOAT curve shape, Max/Min values and final scores.

	Goals	Assists	CLUB titles	INT titles	AWARDS	CURVE	MIN	MAX	SCORE
Kylian Mbappe	100	100	48	53	100	Messi	75	97	86
Alvarez	31	33	50	90	3	Ronaldo	67	100	84
Jude Bellingham	34	66	52	33	80	Ronaldo	68	95	82
Erling Haaland	100	49	62	4	48	Ronaldo	67	95	81
Lamine Yamal	11	43	30	100	0	Messi	49	92	71
Vinicius Junior	33	64	83	19	14	Messi	57	78	68
Rodrygo	28	42	97	0	10	Ronaldo	53	74	64
Phil Foden	31	54	100	23	1	Messi	54	71	63
Arda Guler	20	31	96	0	0	Ronaldo	34	91	63
Pedri	13	23	23	50	78	Messi	41	71	56

The total for 4 of the STAGE 1 categories (Goals, Assists, Club titles, *National team titles) was divided by the number of seasons the player has been active to give an average number of points obtained per season. This number was then scaled with the maximum of any player on the list to give a score out of 100.

*For the Top Trumps section only, youth titles (eg. U15 and U17 tournaments) were also included. Each title was awarded 10 points, with major trophies (eg. U17 World Cup) awarded 20.

For the 5th and final category of Individual awards, the highest ranking of a player during voting for the Kopa Trophy or the Ballon d'Or was used. If the player won the award, the points scored are the same as for Stage 1. If the player lost the award to Messi or Ronaldo, the points scored are the same as for Stage 1 (eg. Haaland 2023 Ballon d-Or runner-up to Messi). For all other awards, the number of points awarded was calculated as the number of votes the player received divided by all votes down to that position in the list (eg. Vinicius Junior placed 4th in the 2019 Kopa Trophy with 17 votes, and so was awarded $17/(58+49+41+17) * 100 = 10$ points). The points for individual awards were not averaged per season, and only the highest placing of non-winners was used. The final total was then scaled with the maximum of any player on the list to give a score out of 100.

'BEST' SEASONS

	BEST Season			
Mbappe	2017-18	890	better than any of CR7 or Messi seasons	
Alvarez	2021-22	406	388 previous season for WC	
Bellingham	2023-24	317	UCL	
Haaland	2022-23	451	treble	
Yamal	2023-24	241	EUROs	
Vinicius	2021-22	351	UCL + La liga	
Rodrygo	2021-22	333	UCL + La liga	
Foden	2022-23	409	treble	
Guler	2023-24	292	UCL	
Pedri	2020-21	324	Kopa	

APPENDIX

List of all players initially considered for inclusion on the shortlist.

Name	Age	Notes
Kylian Mbappé	25	Kopa Trophy winner 2018
Matthijs de Ligt	24	Kopa Trophy winner 2019
Erling Haaland	23	
João Félix	24	
Jude Bellingham	21	Kopa Trophy winner 2023
Jamal Musiala	21	Kopa Trophy runner-up 2023
Eduardo Camavinga	21	Kopa Trophy runner-up 2022
Lamine Yamal	16	
Pedri	21	Kopa Trophy winner 2021
Florian Wirtz	21	
Endrick	17	
Arda Güler	19	
Kobbie Mainoo	19	
Warren Zaire-Emery	18	
Gavi	19	Kopa Trophy winner 2022
Alejandro Garnacho	20	
João Neves	19	
Harvey Elliott	21	
Xavi Simons	21	
Rasmus Hojlund	21	

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Vitor Roque	19	
Mathys Tel	19	
Levi Colwill	21	
Rico Lewis	19	
Evan Ferguson	19	
Conor Bradley	21	
Jaden Sancho	24	
Phil Foden	24	
Joško Gvardiol	22	
Bukayo Saka	22	
Alphonso Davies	23	
Vinícius Júnior	24	
Victor Osimhen	25	
Curtis Jones	23	
Gabriel Martinelli	23	
Julian Alvarez	24	
Rodrygo	23	
Aurelien Tchouameni	24	