

Adam Mickiewicz University, Poznań

An AI-driven approach to adapting the Expected Goals (xG) model to women's football

Project implementation related to research project IDUB No. 134.

Tomasz Lipowski, Tomasz Piłka

Why do football teams need analysis?



How does it help?



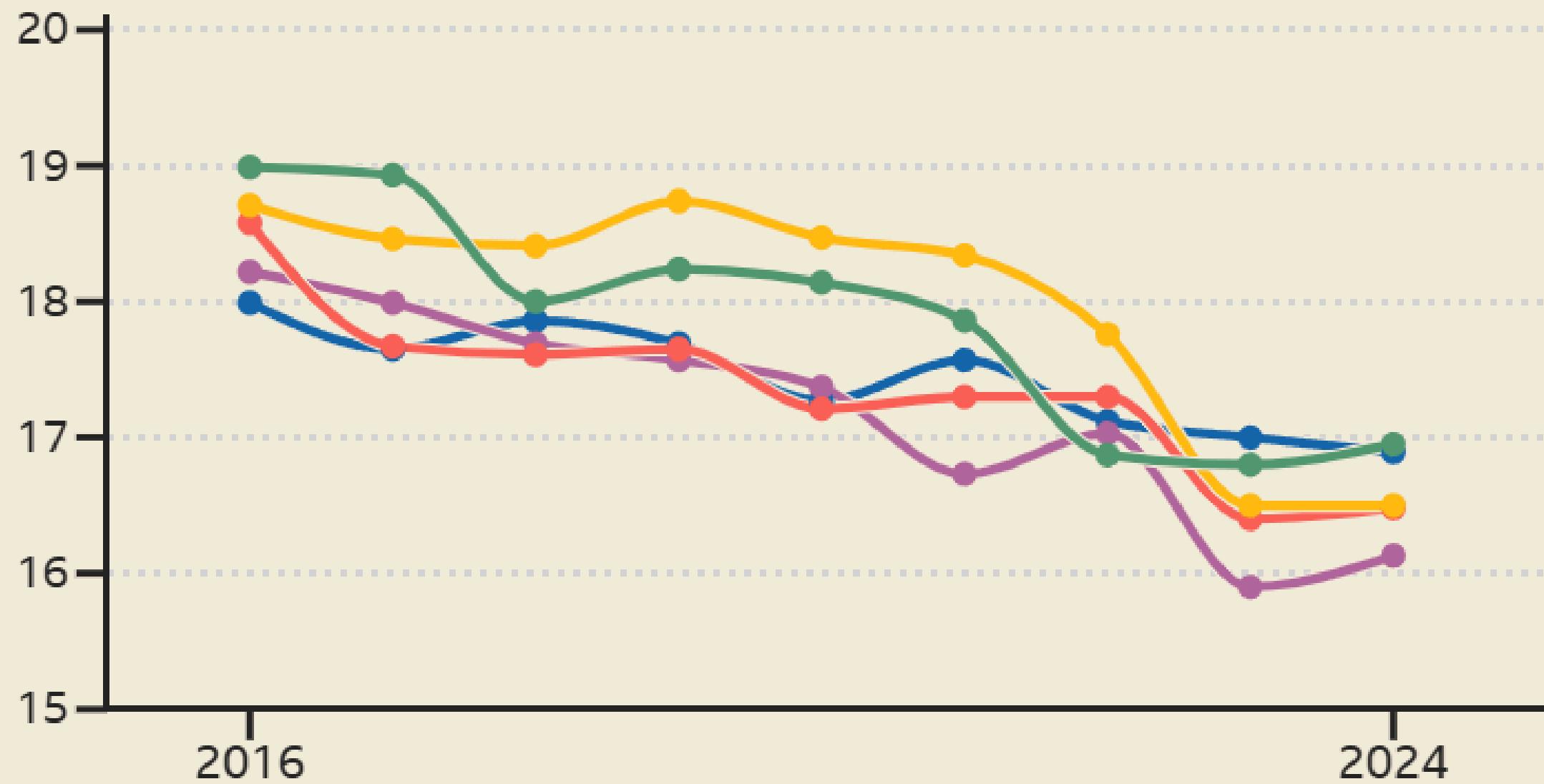
How does it happen?



Trends in football

Average shot distance (m) across Europe's top 5 leagues

■ La Liga ■ Premier League ■ Bundesliga ■ Ligue 1 ■ Serie A



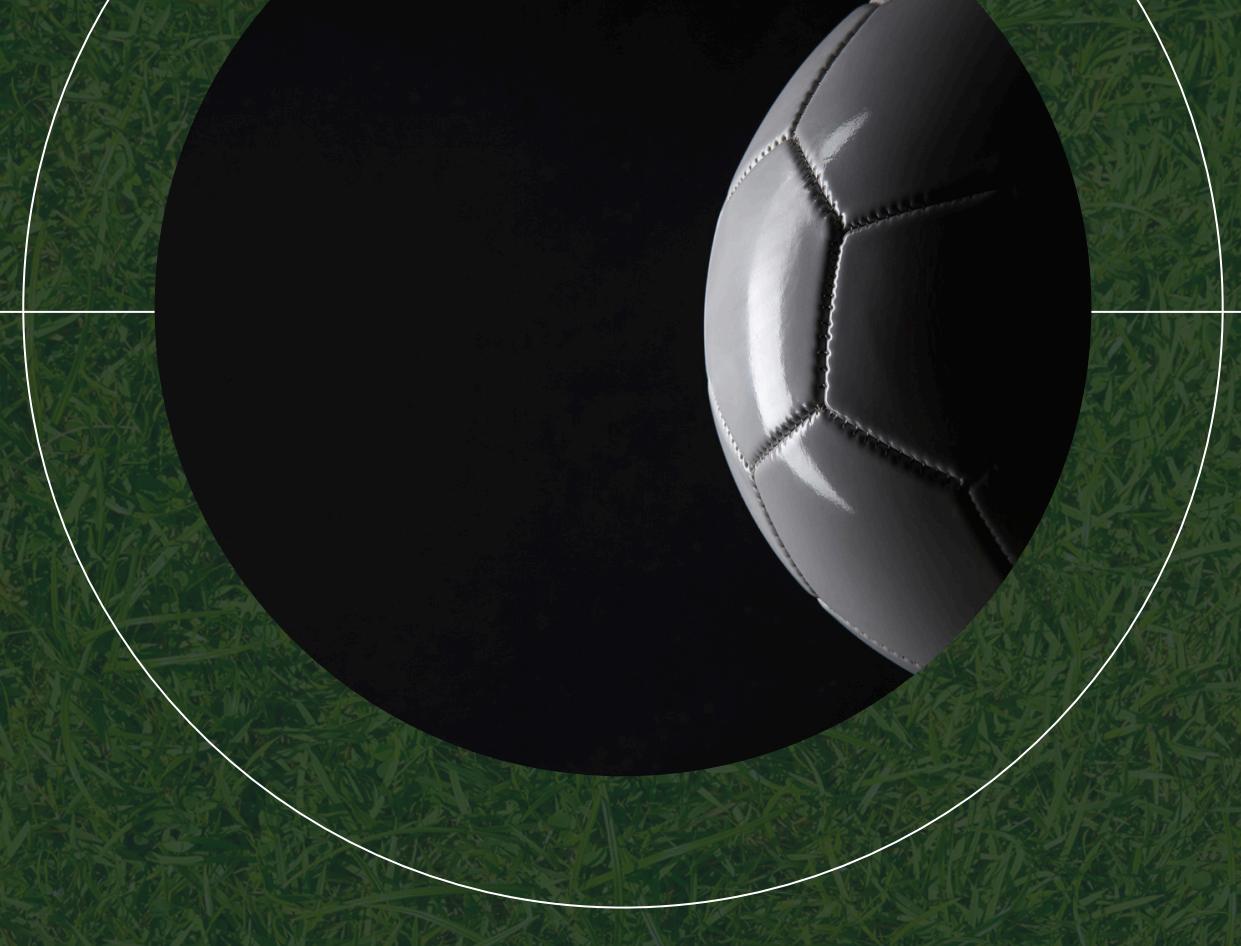
Source: [Driblab](#)

BBC



XG

**Expected
goals**



Gender-Specific xG Model Improves Accuracy

Data collection

Competition Name	Year/Season	Gender	Number of Matches	Number of Shots
La liga	2015/2016	male	380	9071
Fa Women's Super League	2018-2021	female	326	8239
FIFA World Cup	2022	male	128	3068
Women's World Cup	2019, 2023	female	116	2891
National Women's Soccer League	2018/2019	female	36	1034
UEFA Women's Euro	2023	female	31	871

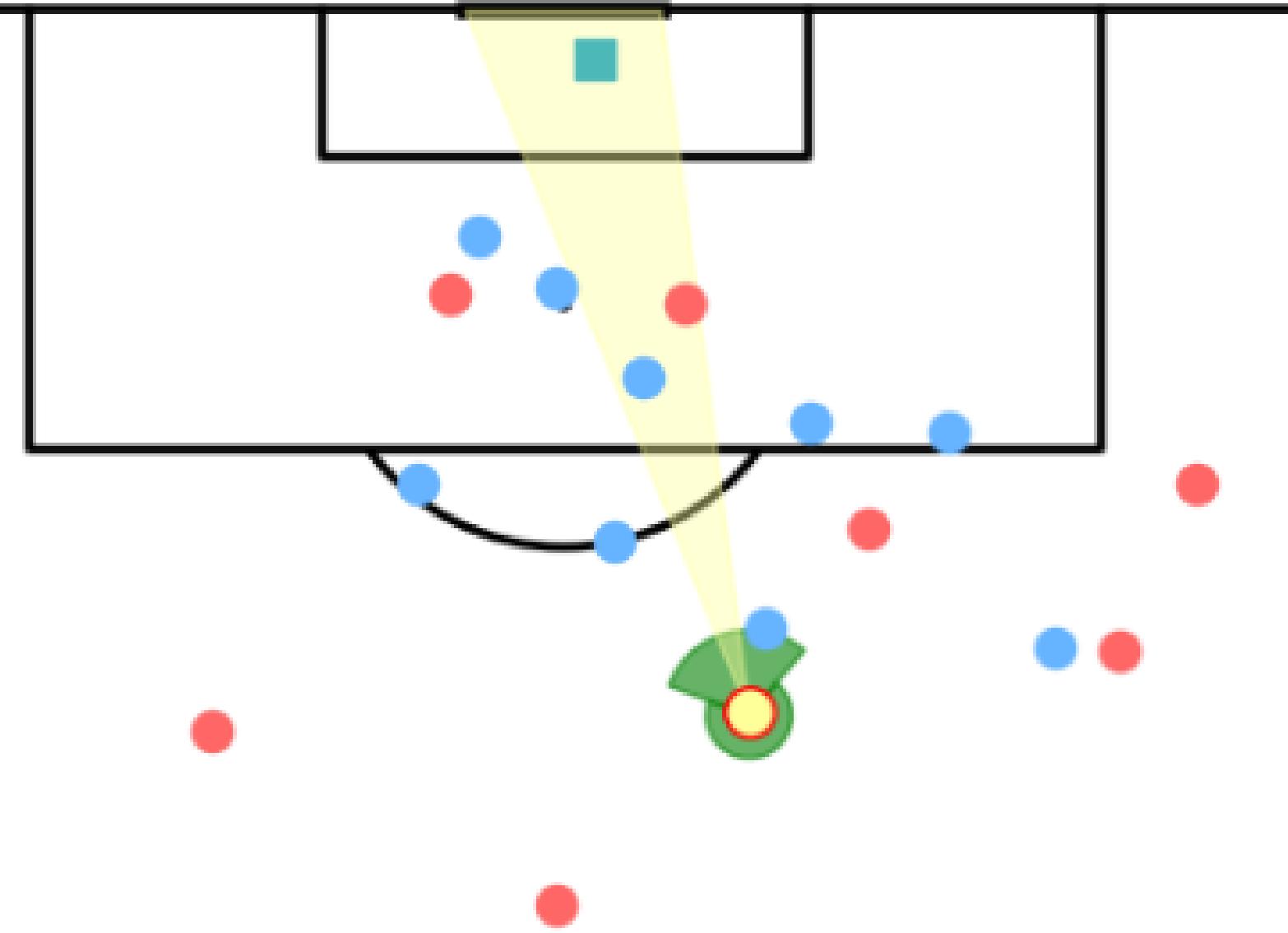
Shot parameters

Attribute	Value
shot type	Open play
shot body part	Right foot
shot technique	Normal
shot aerial	False
under pressure	False
distance (m)	29.8
angle (degrees)	15.67

Additional parameters

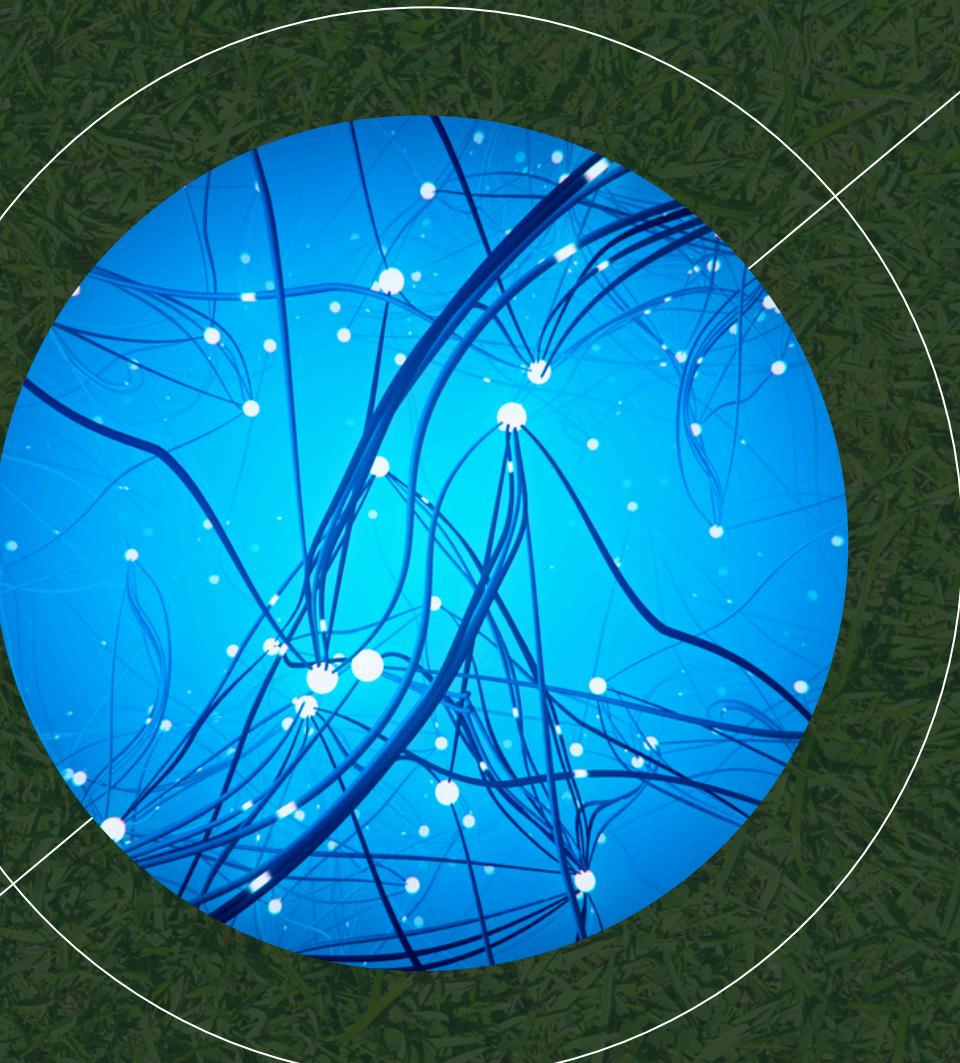
Attribute	Value
goalkeeper in shot keeper cone	True
players in shot keeper cone	3
opponent players in shot keeper cone	2
players in the box	6
pressing	0

- Shooter
- Pressing Area
- Keeper Cone
- Defender
- Goalkeeper
- Attacker



My XG

- Logistic regression as the baseline model
- Multilayer Perceptron with 3 hidden layers 64, 64, 32 using a ReLU activation function
- Output layer with 1 neuron using a sigmoid activation function
- Optimizer - Adam
- Loss function - binary cross-entropy
- Evaluation is performed using log loss

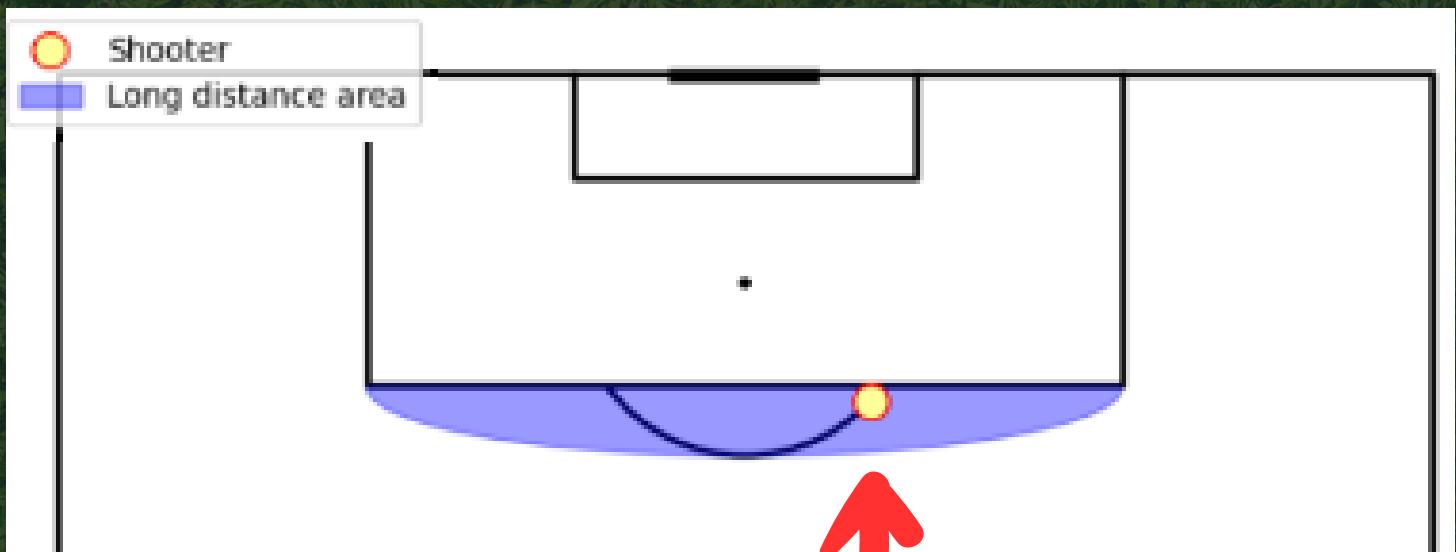


Results

Model	Log loss
My xG with original attributes	0.273
StatsBomb xG	0.265
My xG with extended attributes	0.260

Features	Importance (%)
angle degrees	33.47
distance	28.30
pressing	2.94
players in the box	2.72
players in shot keeper cone	2.66
opponent players in shot keeper cone	1.45

Differences in long-range shots



This is not a
long-range shot

Statistics	Female	Male
Long-range shots	3507	3554
Long-range goals	129	87
Long-range accuracy	3.68 %	2.45 %
Long-range frequency	26.90 %	29.28 %
Long-range goals/all	0.99 %	0.72 %

Explanation

