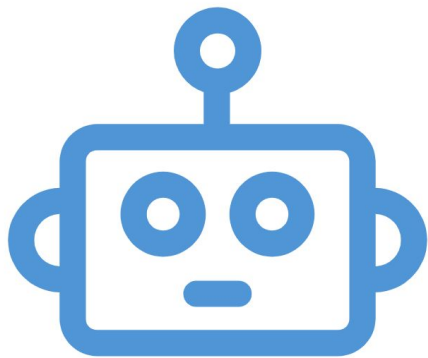


Twitter Bot or Not?

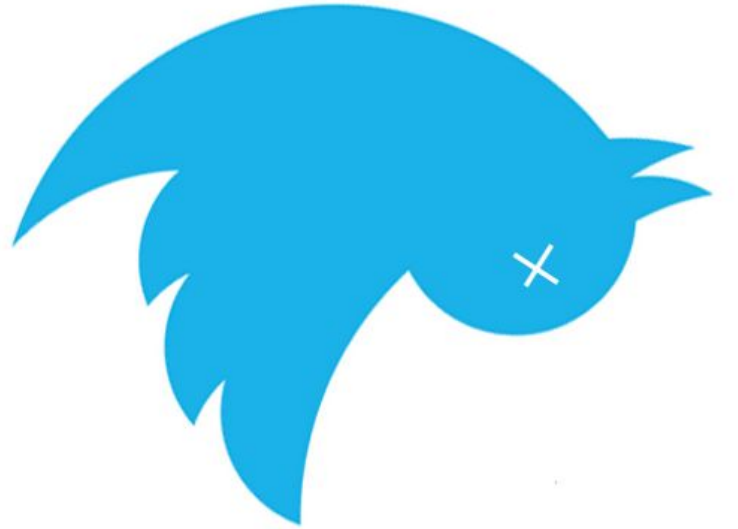


Why do we care about bots?

A **Twitter bot** may autonomously **tweet, retweet, like, follow, unfollow,** or **direct message** other accounts

Which can mean...

- Spreading **misinformation**
- **Scams** and **exploitation**
- **Degrading** social **trust**
- Social media **platform deterioration**
- **Increased polarization**



Twitter account-level features

Profile images

Network size

Date & time created

User activity

The image shows a Twitter profile page for a user named kris doenlen (@scrapfishies). The profile picture is a circular image of a man with a mustache and sunglasses. The header image is a photo of a man's face inside a squirrel-shaped cutout. The profile name is kris doenlen, and the handle is @scrapfishies. The location is Oakland, CA, and the website is github.com/scrapfishies. The user joined in July 2020. The profile shows 65 Following and 2 Followers. The navigation bar at the bottom includes Tweets, Tweets & replies, Media, and Likes. Annotations with orange dashed arrows point to various features: 'Profile images' points to the profile picture and header image; 'Network size' points to the '65 Following' and '2 Followers' text; 'Date & time created' points to the 'Joined July 2020' text; and 'User activity' points to the navigation bar.

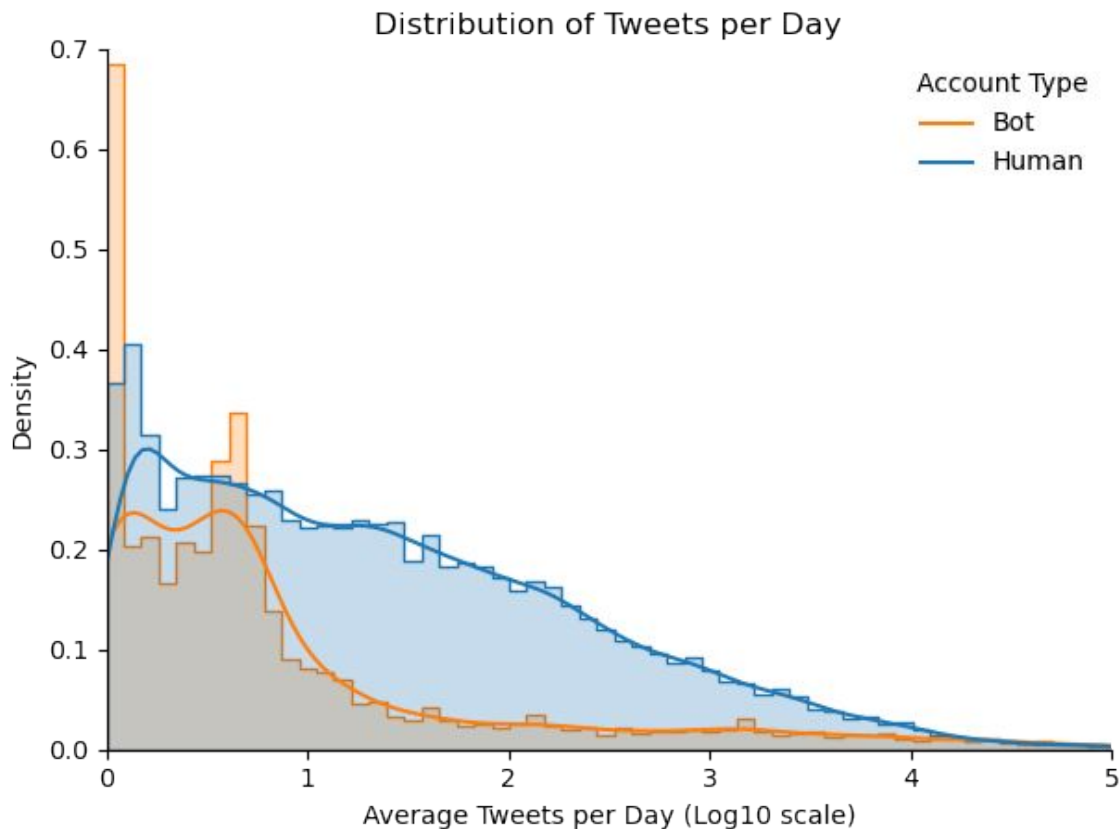
kris doenlen
@scrapfishies

📍 Oakland, CA 🔗 github.com/scrapfishies 📅 Joined July 2020

65 Following 2 Followers

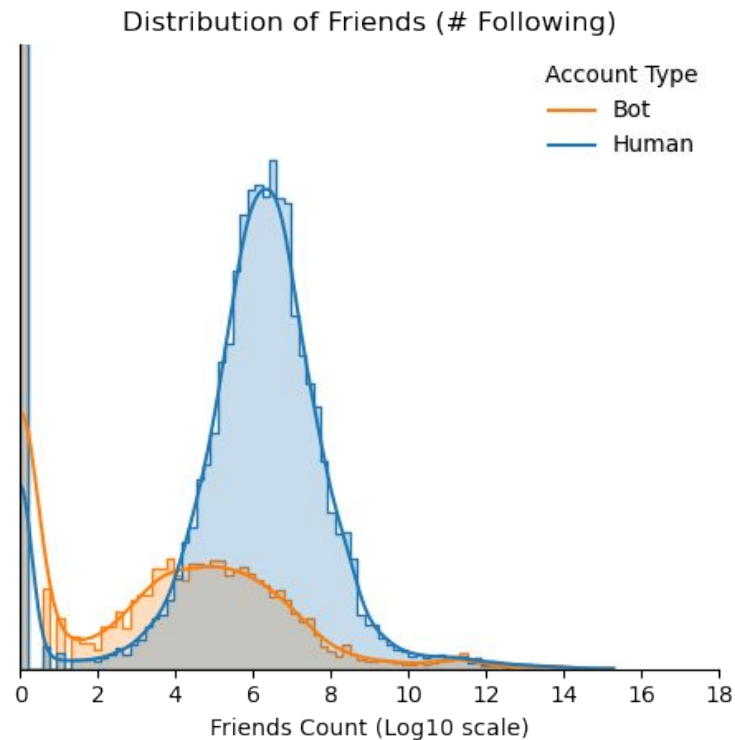
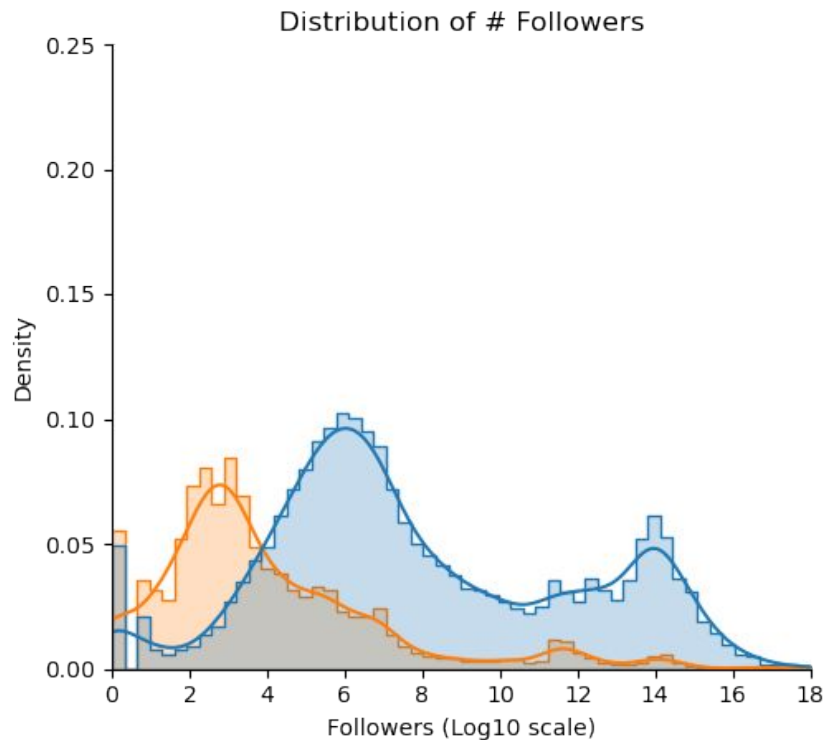
Tweets Tweets & replies Media Likes

Bots behave differently...



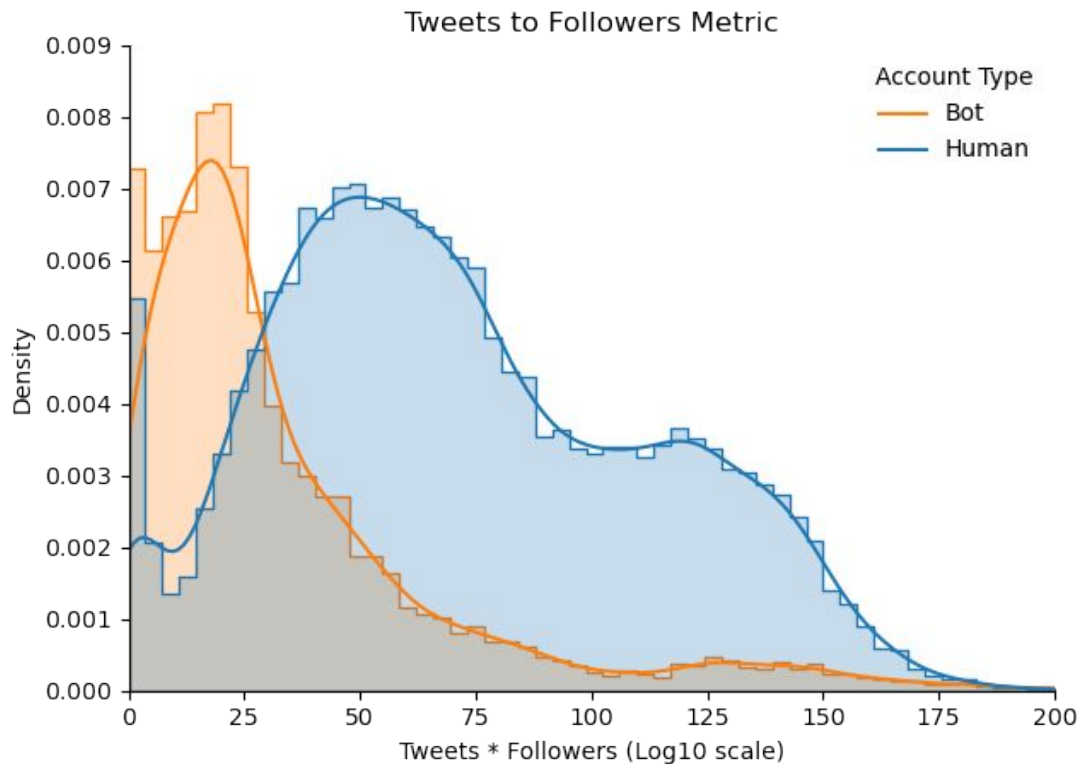
...and their networks look different, too

Distribution of Followers & Friends



Model construction and selection

Feature Engineering

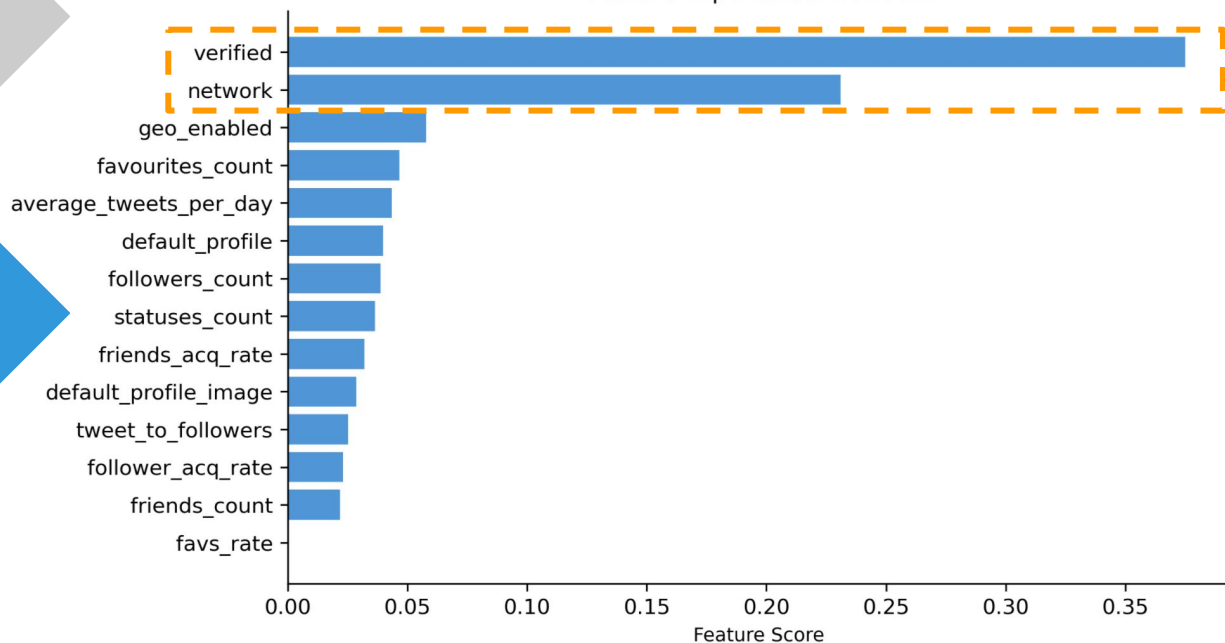


Model construction and selection

Feature Engineering

Feature Selection

Feature Importance: XGBoost

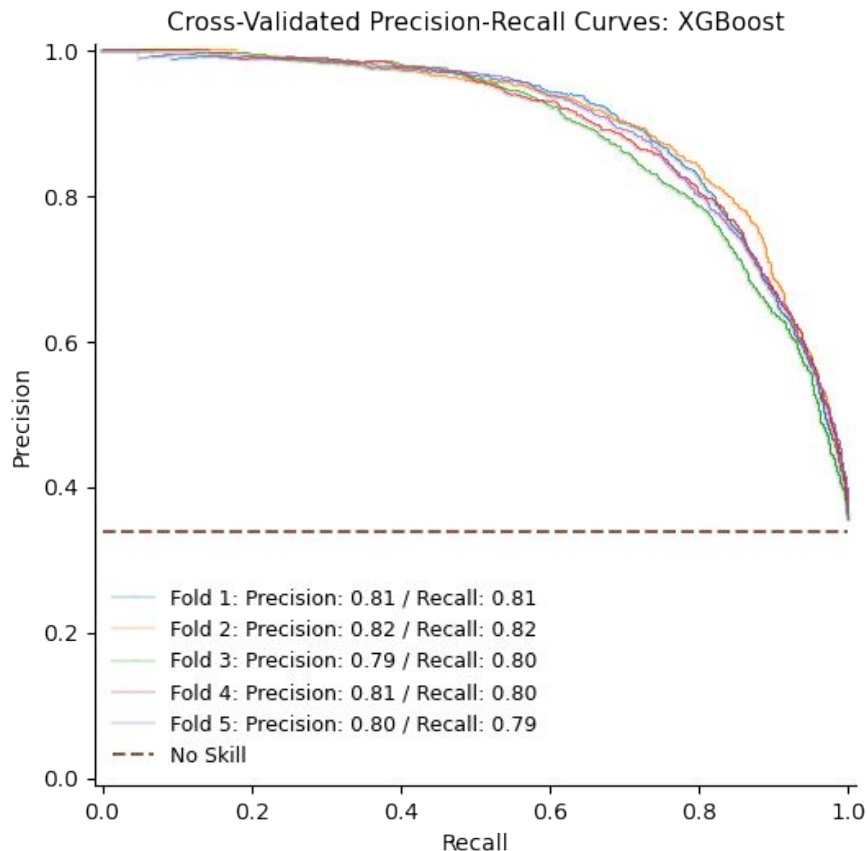


Model construction and selection

Feature Engineering

Feature Selection

Parameter Tuning



XGBoost model results

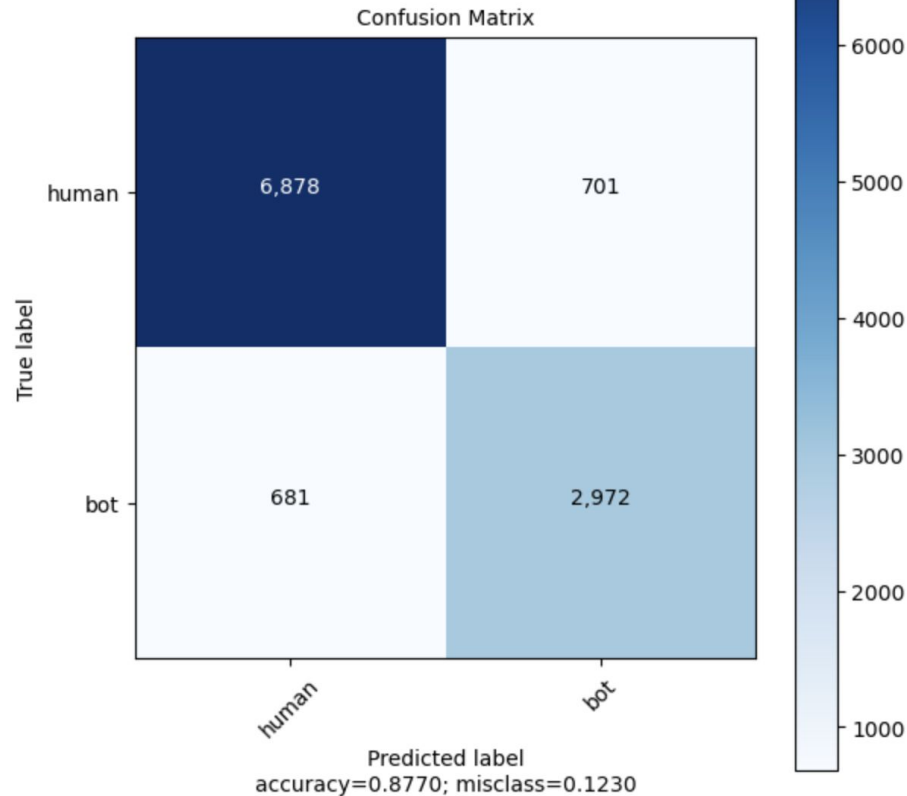
Metric	Test Score (%)
--------	----------------

Accuracy	87.7
----------	------

Precision	81.3
-----------	------

Recall	80.9
--------	------

ROC AUC	93.4
---------	------





Twitter Bot or Not

Enter a Twitter handle



scrapfishies

nytimes

willdoenlen

atotalpirate

aoc

sdf

Twitter Bot or Not by Chris Doenlen |    

Final thoughts

Not all bots are bad!

- Sometimes they're **creative, helpful**, or **funny**
- It all depends on **how they were *designed***
- **Bot awareness is key**

Suggestions for future work

- Tweet-level features
- **Build a bot to detect bots**
- Classify *types* of bots (political, fake followers, trolls, financial, spammers....)

Thank you!

Chris Doenlen

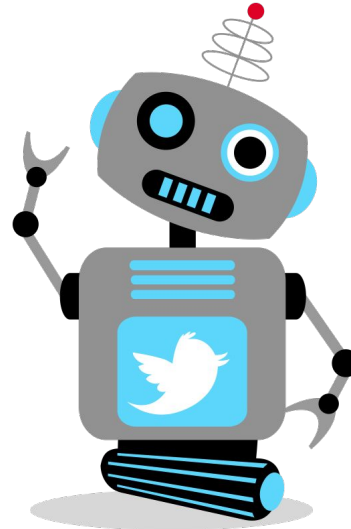
[Twitter Bot or Not](#)

[GitHub Repository](#)

scrapfishies@gmail.com

[@scrapfishies](#)

(Probability of being a bot: 23.9%)



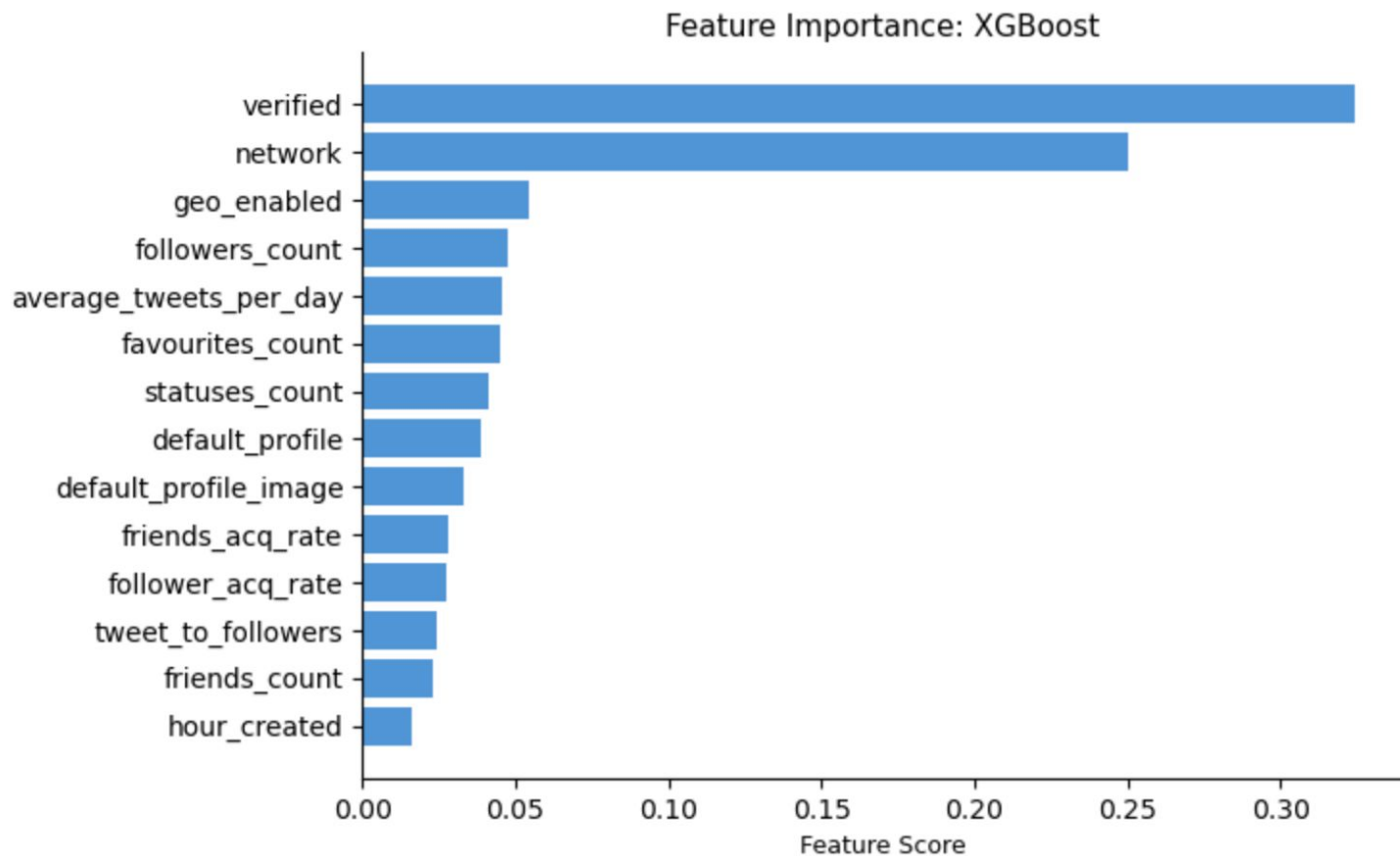
Appendix

Try out the live app: [Twitter Bot or Not](#)

Sources & References

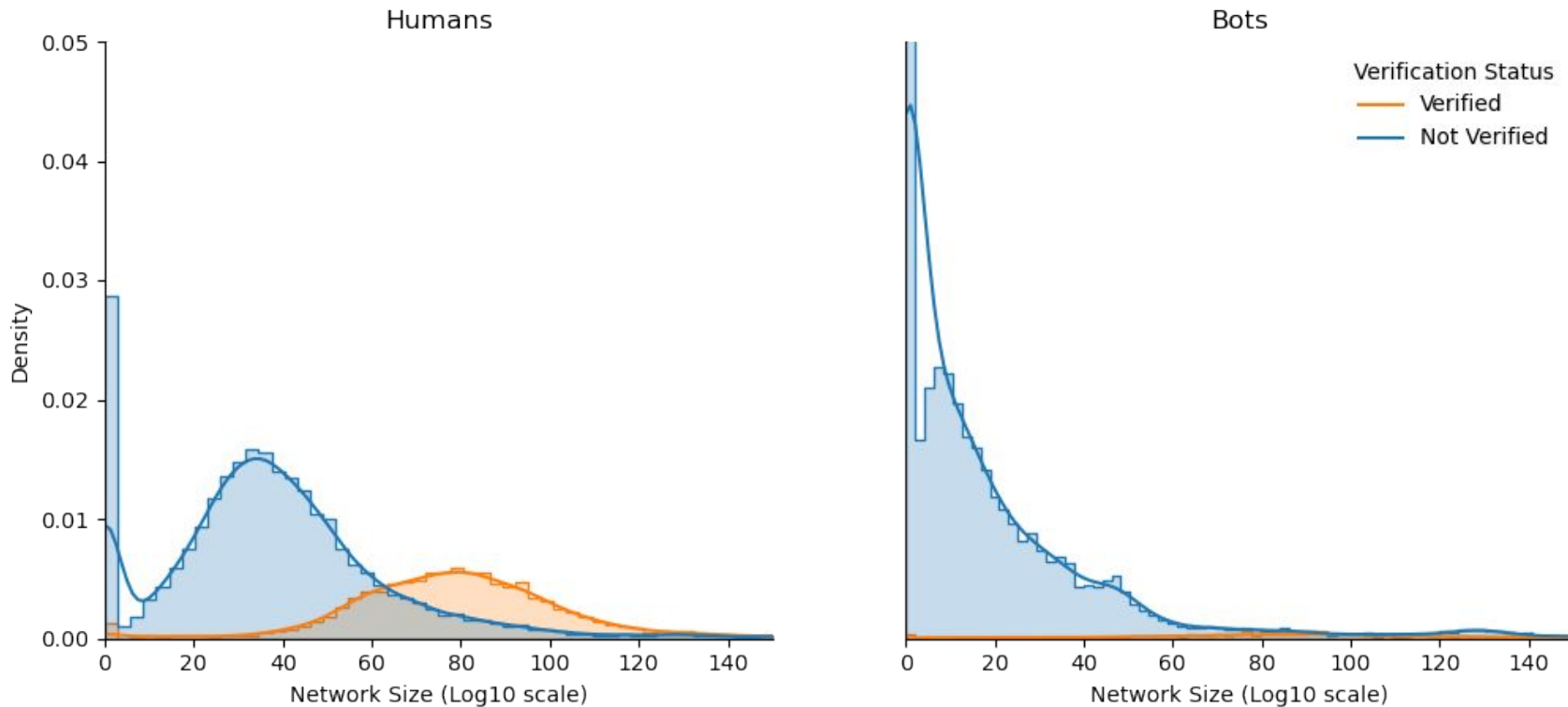
- [Kaggle: Twitter Bot Accounts](#)
- [Bot Repository](#)
- [Tweepy](#)
- [Twitter](#)

Appendix: Final XGBoost model features



Appendix: Top model features

Network Size by Verification Status



Appendix: Final XGBoost model performance curves

