Quantify Influence: the Algorithm used by X Rank to Rank Crypto X Accounts

Maksym Bevza (max@wallchain.xyz)
Yurii Kyparus (kyparus@wallchain.xyz)

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Abstract

This paper presents X Rank, a metric designed to solve the problem of fake followers and engagement on the X platform. X Rank assigns a score from 0 to 1000, based on how connected accounts are to a set of influential "seed accounts."

The metric considers key actions like retweets, follows, and comments, using a Crypto Twitter Connectivity Graph (CTCG) to track relationships between accounts. The algorithm applies exponential decay to prevent manipulation by repetitive actions or inflated follower counts.

1 Introduction

X Rank evaluates accounts based on their connection to a curated set of influential "seed accounts" and considers meaningful interactions such as retweets, follows, and comments. By leveraging the Crypto Twitter Connectivity Graph (CTCG), the system models relationships between accounts and employs an algorithm with safeguards against common exploitations, such as repetitive actions or artificial follower inflation.

The paper is structured as follows: Section 2 explains the intuition behind the ranking system. Section 3 describes how scores are distributed among accounts. Section 4 details the algorithm's design and its safeguards against abuse. Section 5 introduces the Crypto Twitter Connectivity Graph. Section 6 outlines the mathematical contributions of actions to the rank. Section 7 discusses the algorithm's convergence process, and Section 8 highlights future research opportunities. X Rank aims to replace traditional metrics with a more reliable measure of influence.

2 Intuition

To tackle the problem, we began by identifying the key individuals who shaped the industry. We created a longlist of candidates and conducted a poll to reduce bias within our team.

These individuals were assigned a maximum score of 1000, representing the highest level of X Rank.

To calculate the ranks for other X accounts, we measure their proximity to these "seed accounts." If another account is well-connected to all the seed accounts, it is likely to achieve a score close to 1000.

The algorithm is robust enough to handle variations in the seed sample and consistently converges to similar results.

3 How Numbers Are Distributed to Other Accounts

Actions on X that matter from the algorithm's perspective include:

- Quote Tweet and Retweet
- Follow
- Comment

X Rank and **Influence Number** are synonymous in the context of this algorithm.

Each of these actions involves an "influence share." When account A performs these actions on account B, they "share" a small portion of their influence number with B.

"Influence share" does not reduce account A's influence number; it only adds to B's.

4 Key Aspects of the Algorithm

The rank of an account does not decrease due to its actions (e.g., following 1 million bot accounts will not lower your rank).

Each action has a distinct level of significance from the algorithm's perspective.

- Retweeting a person's tweet - high significance.
- Following a person - medium significance.
- Commenting on a person's tweet - low significance.

5 Crypto Twitter Connectivity Graph

Wallchain has developed the **CTCG** - Crypto Twitter Connectivity Graph, where nodes represent accounts and edges represent actions. Each edge corresponds to an action performed by account A on B.

This is a multi-graph with cycles. Multiple edges can exist from A to B, but at most three in one direction, each representing a different type of action.

6 How Each Action Contributes to the Rank

The total rank comprises three components:

XRank = RankRetweets + RankFollowers + RankComments

- **RankRetweets**: max = 500
- **RankFollowers**: max = 350
- **RankComments**: max = 150

6.1 Retweet

Retweets have a significant influence on the spread coefficient. However, two decay factors apply to retweets:

1. Each additional retweet from the same person has a smaller coefficient, decreasing *exponentially*. This ensures an upper limit on the influence that account A can impart to account B.

An exponential decay parameter α determines how quickly subsequent retweets from the same account diminish in influence:

$$\text{SubRankRetweet(A,B)} = C_1^{\text{retweet}} \cdot XRank(A) \cdot \sum_{n=0}^{\text{cnt}} e^{-\alpha n}$$

Where: - C_1^{retweet} is the initial retweet coefficient, - α is the exponential decay parameter, - *cnt* is the number of retweets from account A on posts by account B.

2. Another exponential decay parameter β controls how quickly the influence from multiple accounts retweeting the same content diminishes:

$$\text{RankRetweet(B)} = C_2^{\text{retweet}} \cdot \sum_{m=0}^{\text{r}} \text{SubRankRetweet}(A_m, B) \cdot e^{-\beta m}$$

Where: - C_2^{retweet} is the global retweet coefficient, - β is the exponential decay parameter, - r is the number of unique accounts retweeting account B, - A_m is the m-th retweeter of account B, sorted by descending $\text{SubRankRetweet}(A_m, B)$.

This system ensures that retweets always increase the rank, but the increase becomes marginal as $n \to \infty$ and $m \to \infty$.

6.2 Followers

The RankFollowers value is capped at 350.

Each follower contributes to the rank, with an exponentially decreasing signal across all followers. This ensures diminishing returns as the number of followers grows:

$$\text{RankFollowers(B)} = C_1^{\text{followers}} \cdot \sum_{m=0}^{r} XRank(A_m) \cdot e^{-\beta m}$$

Where: - $C_1^{\text{followers}}$ is the initial follower coefficient, - β is the decay parameter for follower contributions, - r is the number of unique followers of account B, - A_m is the m-th follower of account B, sorted by descending $XRank(A_m)$.

6.3 Comments

The RankComments value is capped at 150. The methodology is similar to the calculation for retweets and is therefore omitted.

7 Convergence

During recalculations, the algorithm begins with the seed group of X accounts and iterates multiple times. Currently, 40 iterations are performed to propagate signals throughout the network.

Each iteration involves sparse matrix multiplication and sorting to rebuild matrices for the next step. We are working on removing the need for sorting to ensure the ranking system converges when iterations continue indefinitely.

With pure matrix multiplication, we aim to derive an analytical solution rather than relying on iterative methods.

8 Future Work and Research Opportunities

In the future, the obtained matrix can enable deeper analysis of Crypto Twitter connectivity.

Potential applications include generating neural network embeddings for profiles, identifying similar behaviors, and compressing information within the matrix.

These applications can support research in the field of AI agents, providing valuable insights into Twitter's information flow and network dynamics.