

ABSTRACT

Non-Fungible Token (NFT) plays a transformative role in the digital asset market, revolutionizing how ownership and value are exchanged in decentralized ecosystems. Understanding NFT transaction dynamics is essential for analyzing trading patterns and how user interactions shape market behaviors. Existing studies analyze single blockchain or specific NFT collections, limiting a broader understanding of different blockchains to support NFT transactions. We compare Ethereum-based NFT's and Polygon based NFT's network dynamics using network analysis as the implementation method of graph analytics to examine the distinct network structures and market behaviors. This study collects 2,819,578 NFT transaction data, including 806,995 from Etherscan and 2,012,583 from Polygonscan between May 2022 and May 2024. The methodology employs network properties, temporal degree analysis, and network metrics, including centrality and modularity, to evaluate user interactions and assess network efficiencies. The findings reveal that the temporal average degree shows Polygon-based NFT higher node connectivity at certain periods, while Ethereum-based NFT remains more stable. The average weighted degree reveals higher early transaction activity in Polygon-based NFT. Centrality analysis highlights single dominant nodes in both networks. Polygon-based NFT demonstrates higher activity reflected by network density and tightly clustered interactions with higher modularity. Ethereum-based NFT exhibits a more interconnected structure and cohesive community clusters with lower modularity. These findings offer valuable insights into blockchain selection and optimization in the NFT market, emphasizing the comparative understanding of network dynamics across different ecosystems.

Keywords: non-fungible token, network dynamics, graph analytics, network analysis, network metrics