

UMetaDAO3: Blockchain-Enabled Metaverse Framework for Building Urban Decentralised Autonomous Organisations (DAOs) to Democratise Societies

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Abstract

Decentralised Autonomous Organizations (DAOs) are digital entities governed by their members collaboratively on a fairness basis through smart contracts with token-based (allowing transactions with ownership and voting rights) and value-added systems on the blockchain, eliminating the need for centralised control or intermediaries. They are designed to automate decision-making processes and resource allocation based on community-driven consensus, and data sovereignty within a trustworthy ecosystem in a trustless world considering semi-honest parties or honest but curious parties, leading to the collective will of the organisation. They represent a novel approach to governance, where rules and decisions are encoded into self-executing smart contracts that operate transparently, autonomously and without the need for human intervention using the terms of the agreement written into codes.

The incorporation of DAOs into urban cybercommunities with no clear organisational hierarchy poses numerous challenges such as cybersecurity breaches with illegal activities and privacy breaches where accountability or legal liability cannot be associated with any executives or board members, unlike traditional corporations. Attackers, using Sybil attacks, can create multiple identities to acquire an excessive amount of voting power within DAOs. Moreover, fake DAOs can be generated easily using their open-sourced transparent contracts to exploit their organisational associated influence to deceive communities. More importantly, transactions, running on decentralised blockchain ledgers, may not be traceable regarding data sovereignty despite the use of tokenisation mechanisms.

This research aims to develop a framework (i.e. UMetaDAO3) that can build metaverse communities with societal initiatives. UMetaDAO3 integrates subject-based DAOs into the Web3 and urban metaverse ecosystems by providing metaverse cybercommunities with self-evolution through autonomy using an incentive-based joint decision-making voting mechanism to support shared goals. UMetaDAO3, running on the Ethereum infrastructure with wider group intelligence, protects the integrity and equity of its users, safeguards their privacy and safety, and enables them to democratise their skills, talents and services globally with their avatars using metaverse immersive devices. UMetaDAO3, enabling interoperability between different DAOs and other blockchain networks, employs a new proof-of-identity mechanism using metaverse immersive devices and meta-humans (3D avatars) - pseudo-physical presence as a proof-of-participation by enabling DAOs to collaborate, share resources, and create more complex, interconnected ecosystems.

Citizens are unhappy with their politicians' unsatisfactory policies and are more eager to take part in decision-making processes in their urban life. A new way of governing the communities and countries would be possible with the UMetaDAO3 framework with safe and reliable voting mechanisms by incorporating the communities directly into decision-making phases with individual and/or community influence and eliminating the delegates/governors/politicians who are proven to be not the voice of the people they are supposed to be representing. Building more democratised societies is the target of this research with the development of the UMetaDAO3 framework.

Index Terms— Decentralised Autonomous Organisations (DAOs), metaverse, Web3, metaverse immersive devices, proof-of-participation, proof-of-identity, avatars.

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