

# Creating Privacy Aware Digital Identity in the Metaverse Ecosystem

Saurav Sthapit, Anita Khadka

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# Metaverse

- ▶ represents a virtual universe, a fully immersive and interconnected digital realm.
- ▶ people can interact with computer-generated environments and other users in real time.
- ▶ the metaverse has evolved from a futuristic idea to a tangible possibility:
  - ▶ Virtual Reality (VR)
  - ▶ Augmented Reality (AR)
  - ▶ Artificial Intelligence (AI)
  - ▶ Blockchain
  - ▶ Non-Fungible Token (NFT)

# Why

Why should we care about the digital identity in the **Metaverse**?

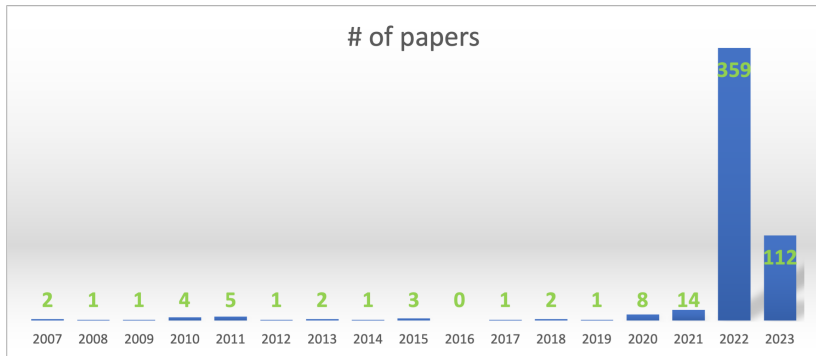
- ▶ **personal data on users** is increased. In addition to the traditional user data, data points including eye-tracking, physical reactions, and haptics are added.
- ▶ **Harassment and abuse**: Although Metaverse is a virtual world, but that doesn't mean that it's immune to harassment and abuse.
- ▶ **worth \$1600 billion by 2030<sup>1</sup>**

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<sup>1</sup>Sara Qamar, Zahid Anwar, Mehreen Afzal, A systematic threat analysis and defense strategies for the metaverse and extended reality systems, Computers & Security, Volume 128, 2023, 103127, <https://doi.org/10.1016/j.cose.2023.103127>.

# Trends from the Literature

- ▶ Keywords **Metaverse** and **Digital Identity**.
- ▶ Number of papers: 530
- ▶ Lack of accessibility to a wide range of users, including those with disabilities or limited resources.



# Threats to Privacy

There are many known threats and many others are yet to be discovered. Here are a few:

- ▶ data collection and sharing by the service provider,
- ▶ identity theft and Impersonation attacks,
- ▶ privacy data leakage during, communication, data processing or storage,
- ▶ loss of NFTs, crypto-currency and virtual goods etc., and
- ▶ linkage to the real world.

# Solution

As the threats to privacy are multi-faceted, the solutions are too.  
For example,

- ▶ privacy-by-design,
- ▶ standards and legislation,
- ▶ digital footprints protection, and
- ▶ Machine Learning (ML) and Reinforcement Learning (RL) based detection.

Thank you !