NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Computer Science and Engineering
College of Engineering

Unified, User and Task (UUT) Centered Artificial Intelligence

Metaverse Edge Computing

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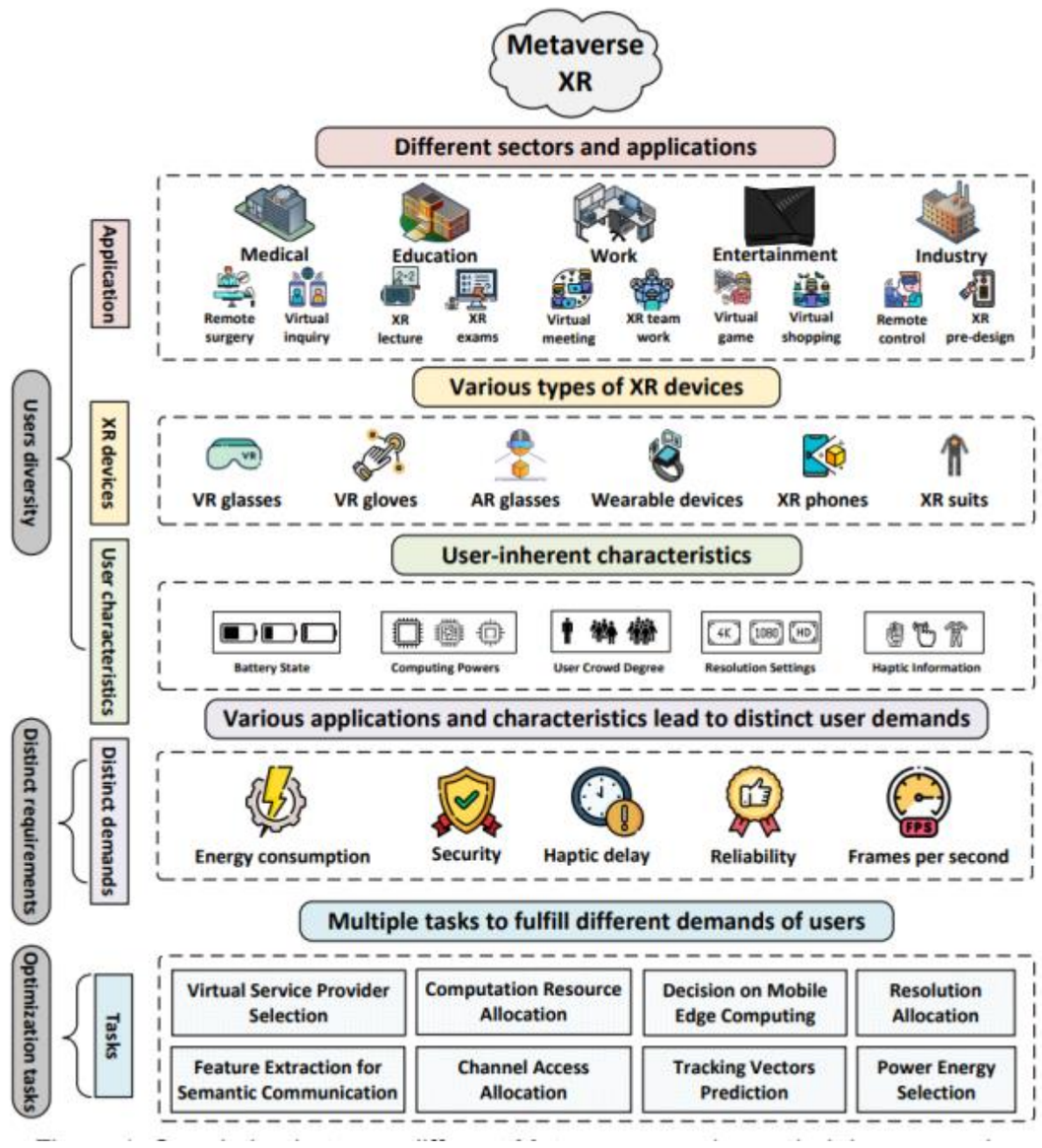
Project Objective:

As the Metaverse becomes increasingly popular, there is a growing demand for mobile edge computing (MEC) to enable real-time processing and communication for Metaverse applications. Variations in user resource demands arise from differences in Metaverse applications and XR device hardware specifications, as well as user preferences and characteristics. Metaverse applications span across various sectors, each with different levels of computation and communication demands.

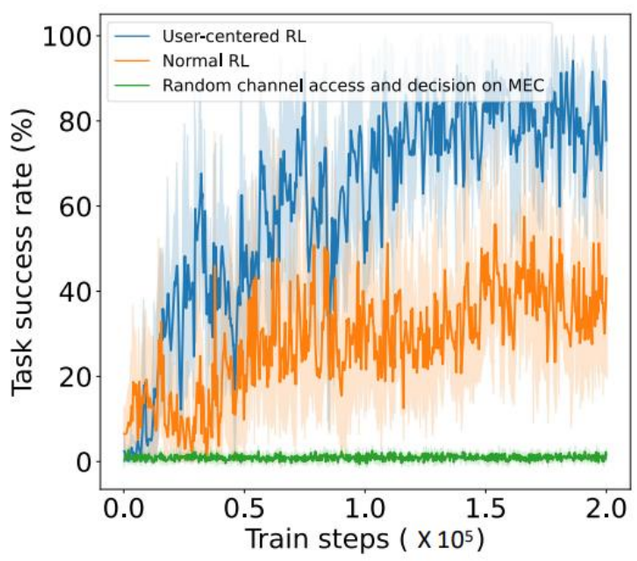
To meet the computation and communication demands of users, a Unified, User, and Task-centered AI-based MEC for Metaverse applications must be enabled. Several MEC must be optimized to provide users with a personalized, seamless, and hyper-realistic experience.

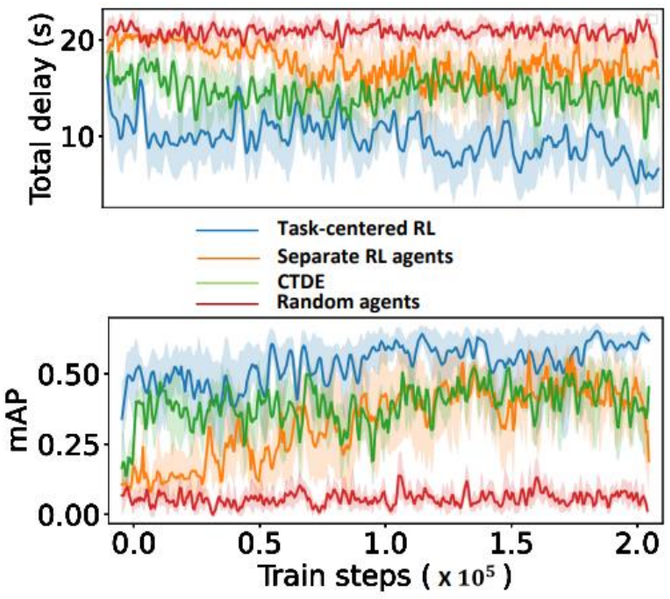


Results Analysis:

User-centered Reinforcement Learning (RL) achieved a much higher task success rate when compared to the traditional RL algorithm.

Task-centered RL managed to achieve the highest object detection score at the lowest transmission latency.





Conclusion:

By combining both approaches, a Unified, User, and Task-centered AI-based MEC for Metaverse applications can be built, which can optimize the user's experience while simultaneously achieving the desired task or objective. The system can adapt to the user's preferences and behavior while ensuring the task is performed efficiently and effectively.