Metaverse and Artificial Intelligence for Next Generation Educational Technology Platforms

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December 4, 2022

This project uses Metaverse and Artificial Intelligence to develop an educational technology platform and training programs that are challenging to offer in real-world setting. MetaEducation has the potential to radically transform the teaching and learning landscape. It's power, though rudimentary is already realised with the use of VR, AR, XR, and MR in existing educational platforms. It has been cheaper, easier, and safer to provide STEM education using these, rather than risking training in real-life scenarios. Trainee neurosurgeons and pilots are a good example. Artificial Intelligence will ensure that the Meta-Education platform follows the rules prescribed by the Teacher. Artificial Intelligence is also the enabler of simulation based STEM training. For learners to be able to get the feel of training in the authentic world, Artificial Intelligence is needed to ensure learners are able to work and learn with intelligent NPC tutors, peers, and other learners.

1 Introduction

Many modern technologies come to life from science fictions. Metaverse is one of such new technologies. The term was firstly coined in the novel Snow Crash in 1992 and the Metaverse concepts were described more vividly in great details in the movie Ready Player One in 2018 by the famous director Steven Spielberg [Mys22] [PK22]. Metaverse has become more and more available for everyone in our daily activities. More than 60% American teenagers play Roblox, an online video game in which gamers interact with the virtual environment and with other people via their avatars. The recent investments from big tech companies such as Meta, new brand name of Facebook Inc, draw more attention from the Computer Science research community.

However, the research on applications of Metaverse, especially in Education, is still in its infancy [KH21] [HC22] [Tli+22]. Following the emergence of Metaverse, we are in need of a complete educational platform which could provide immersive learning

experience to the students. Once such platforms are available for billions of learners on daily basis, the platforms should be self-operation with minimum human monitoring effort. The learners should be able to access the platforms any time and anywhere with as real as possible experience. We can learn and find the solutions to solve this problem from the gaming industry. With the support of AI technologies, Massive Multiplayer Online Games like Warcraft or Smite populate army of bots which are indistinguishable from the real players. AI technologies seem to be the only solution to provide intelligent NPC (non-player characters) teachers, students in the virtual 3D classrooms.

This research project will explore the possibilities to apply the combination of Metaverse and Artificial Intelligence to build the next generation educational technology platforms.

2 Significance and impact of the research

In developing countries, millions of students desire to go aboard to get the high-quality education from the developed Western world. RMIT and many international universities have contributed significantly to realize the dreams of the young generations by establishing many campuses with modern infrastructures and facilities. The students also benefit from world-class teaching staffs with great experience working at top-notch education institutions. However, such opportunities are only available for students from rich families who are able to support 3-4 years studying on-campus. The project would create the virtual reality of the educational environment of top universities which are available and affordable for students and learners from the less developed areas.

The MetaEd platform would significantly reduce the cost of risking trainings such as pilot trainings.

3 Research Methodology

The research project will be realized through four phases.

Conduct literature review In the first phase, we will conduct a literature review on the fields of AI and Metaverse to find out all possible solutions of AI techniques which can be applied in Metaverse to create intelligent NPC tutors and learners.

Design and architect the MetaEd platform In the second phase, we will propose the architecture for the MetaEd platform. We aim to build a large-scale, highly secure and easily maintainable which can be used by billions of learners and educators daily.

Build the MetaEd platform with AI support In the third phase, we will implement the platform based on the architecture built in the second phase and the collected techniques or innovative methods applying AI to simulate the real classrooms with intelligent NPC tutors and learners.

Deploy the MetaEd platform in large-scale In the final phase, after the whole platform is completed, we will deploy the platforms for universities in Vietnam and Australia. Then, we will perform an empirical study to show the impact of the

platform on improving the education quality in both developing and developed areas.

4 Resources and Facilities

In this section, the resources, facilities and equipment that are necessary for the research program The research project requires intensive use of VR, AR, XR, and MR devices. The researchers need to be equipped with latest devices to be able to apply all new features of the hardware technology. The researchers need to interact and get support frequently with the participants of the classes and courses that would apply Metaverse in their teaching.

5 Relevant Related Work

In this section, identified related work is described. Some research papers raise the open research questions for this topic. Some research built a simple prototype and proposed simple architecture for Metaverse of one university campus. There is a need to build complete an educational platform using Metaverse. In such platforms, we need to provide an virtual environment in which users can interact with the platform and have as real as possible learning experience.

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