

In recent years, rapid advancements in technology, such as space technologies, artificial intelligence (AI), and information and communication technology (ICT), have had a significant impact on society. However, they have also brought challenges to the planet, including natural and man-made disasters that occur more frequently and with greater severity. Extreme weather and climate change are among the most critical challenges we face today.

To address these challenges, scientists have come up with an ambitious initiative called Destination Earth (DE), which aims to create a set of digital twins of Earth's systems, including the atmosphere, oceans, and land surfaces. Digital twin refers to the creation of a virtual replica of a physical object or system, which can be used to simulate and predict its behavior and response to different conditions.

However, creating an accurate digital twin of Earth's systems requires real-time data from sensors and weather models. To achieve this, the proposed research project aims to use a multidisciplinary approach, which means bringing together different fields of expertise. This includes the use of AI-powered Global Navigation Satellite System (GNSS) remote sensing and digital twin techniques.

GNSS remote sensing involves using data from satellite systems to monitor and study Earth's systems, such as the atmosphere and oceans. This data can be used to improve weather and climate models, which are critical for predicting extreme weather events and understanding the impacts of climate change.

Digital twin techniques will help to create a more accurate virtual replica of Earth's systems, which can be used to simulate different scenarios and test potential solutions to address the challenges we face.

The proposed research project is expected to have a profound impact on society, including international frontier development and the full capacity exploitation of emerging technologies. Ultimately, the goal is to improve the quality of life for everyone by using the latest technologies to address the challenges we face and create a more sustainable future.