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LEVERAGING OUTER SPACE TECHNOLOGY FOR CLIMATE CHANGE MITIGATION: ANALYZING THE FUTURE OF AI INTEGRATION IN GNSS FOR CLIMATE MONITORING

Abstract

Global Navigation Satellite System (GNSS) ever since its inception has proved to have a vast range of utility. But in the context of climate change, the GNSS constellation has proved to be a strong ally of humans towards the common goal of curbing climate change. Climate monitoring one of the most important use cases of this technology helps with tracking sea level rise, glacier movement and changes in land use, atmospheric monitoring and weather prediction. Overall, GNSS's precision data helps with informed decision-making and efficient resource management for people involved in the technical field as well as policymakers. While increasing the predictability of climate disasters is a goal, the integration of Artificial Intelligence (AI) and Machine Learning (ML) with GNSS has the potential to deliver unprecedented results. ML algorithms used to process data collected by the ground-based receiver also bring in an arsenal of predictive models, improved accuracy and resolution of GNSS data and data fusion to identify the correlation between different variables. Climate data remains the key to mitigate and adapt to climate change. AI's integration with the capabilities of GNSS enhances humanity's ability for climate monitoring by providing more accurate, timely and actionable information on changing weather patterns. However, there are 'n' number of legal implications and challenges that we already face with regard to the use of AI. This paper aims to contemplate and understand any and all challenges that we might face with AI integration with GNSS in outer space while adhering to the basic principles of international law. The paper also explores the multipath challenges ranging from data ownership and sharing to regulatory challenges and issues of international cooperation. The paper also addresses how the GNSS-based localisation and the associated use of Industry 4.0 technologies will improve knowledge, characterization and performance of climate change mitigation.