

55th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE
ACTIVITIES (D5)

Knowledge management in the digital transformation (2)

Author: Mr. Peter Okello
Kenya Space Agency, Kenya

LEVERAGING ON OPEN SOURCE DATA AND MACHINE LEARNING TO MODEL URBAN
GROWTH

Abstract

The world has been undergoing a significant urbanization process over the last few decades. There has been a shift in the kind of settlements that occur in both rural and urban locations over time. In today's society, metropolitan areas have a higher population density than rural ones. Even in the future, this trend is projected to continue. The complex issue of urban expansion and the resulting sprawling pattern can be better understood through dynamic spatial modeling. While land use change is widely regarded as the most important factor determining urban growth, modeling land use changes has long been the focus of urban growth research. Computer-based algorithms have lately been utilized to evaluate and forecast changes in land cover and land use in metropolitan areas. This paper aims to demonstrate the use of spatial data and machine learning algorithms to model the land cover and land usage of an urban setting and utilize the results to create a simulation of how the city will look in the future. Using a specified area of interest, the study shall utilize Google Earth Engine and Landsat series data to model the temporal land cover maps, then subject the products to a cellular automata model to generate the simulated urban coverage. This type of modeling technique will allow relevant authorities to visualize and analyze the future of their actions and policies using spatial data obtained from these models. As a result, contributing to a better knowledge and communication of the fundamental dynamics of land cover and land use transitions that influence urban expansion.