A Deep CNN-Prophet based Drought Early Warning System using Dam Images and Climate Data

Musila Cynthia Katole

134653

Supervisor name: Deperias Kerre

Submitted in Partial Fulfillment of the Requirements of the Bachelor of Science in Informatics and Computer Science at Strathmore University

School of Computing and Engineering Sciences

Strathmore University, Nairobi, Kenya

January 2024

Declaration

I, Musila Cynthia Katole, hereby declare that this concept submitted for the award of a degree in Bachelor of Science in Informatics and Computer Science, is my own original work and has not been submitted to any other institution of higher learning. I further declare that all sources cited or quoted are indicated and acknowledged by means of a comprehensive list of references.

Supervisor

Name: Deperias Kerre

Signature: 

Date: 07/01/2024

Student

Name: Cynthia Musila

Signature: Cynthia Katole Musila

Date: 07/01/2024

Abstract

Droughts pose a significant global challenge, impacting society and the environment. Low precipitation, crop damage, and water scarcity are among the consequences of drought. Both natural factors, such as reduced rainfall and climate variability, and human activities, including ineffective water management and climate change, contribute to the occurrence and severity of droughts. Current methods for detecting and monitoring droughts, such as satellite remote sensing, hydrological monitoring, rainfall monitoring, and drought indices, have limitations that hinder their effectiveness. Spatial and temporal resolution issues, restricted coverage, and delays in data availability are some of the challenges these approaches face. To address these limitations, this research proposes an innovative IT solution for drought detection using images of natural dams and climate data specifically temperature and humidity integrated with neural networks and a time series analysis algorithm. By harnessing advanced Artificial intelligence technologies and using high-resolution images, the proposed system aims to improve the accuracy early hydrological drought detection. The application will develop a monitoring system integrating AI algorithms and time series analysis integrated with the CRISP-DM development methodology based on some drought instances. By analyzing real-time data and utilizing neural networks, the system can identify patterns and indicators of drought more accurately and promptly. This will enable proactive measures and prompt response to mitigate the impacts of droughts. In conclusion, the proposed IT solution offered a novel approach to address the challenges of drought detection and monitoring. By leveraging AI and imagery, the system has the potential to revolutionize drought monitoring, providing more accurate and timely information for proactive decision-making and effective mitigation strategies.

Keywords: Drought detection, Localized monitoring, Dams, Neural networks, AI, Early warning system.

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