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## **AI for Environmental Sustainability: Improved Weather Forecasting System Using Transformers and Modular Data Systems**

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# **AI for Environmental Sustainability: Improved Weather Forecasting System Using Transformers and Modular Data Systems**

*TREO Talk Paper*

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## **Abstract**

Artificial intelligence (AI) can offer solutions to address societal issues, including sustainability and climate change (Nishant, Kennedy, & Corbett, 2020). Weather forecasting plays a critical role in various sectors, including agriculture, transportation, disaster management, and energy production (Agyekum, Antwi-Agyei, & Dougill, 2022). Weather forecasting can help predict changing weather conditions quickly, essential for informed decision-making and effective resource allocation. The current study aims to explore potential solutions to the challenges faced in existing deep learning systems for weather forecasting and improve upon them.

The study focuses on improving the system introduced in “Rainfall Forecasting with Variational Autoencoders and LSTMs” (Neill, & Dogan 2023) in three main ways: expanding the systems for collecting and organizing training data, introducing a more rigorous and informative methodology for evaluating model performance, and testing a new transformer-based forecasting model. There are two primary motivations behind these goals. The first is to create a more robust, generic, and reusable system for comparison of forecasting models and datasets. The second is to test a newly developed model in that system while providing detailed and comparable feedback about model performance. The results have implications for both research and practice.

## **References**

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Agyekum, T. P., Antwi-Agyei, P., & Dougill, A. J. (2022). The contribution of weather forecast information to agriculture, water, and energy sectors in East and West Africa: A systematic review. *Frontiers in Environmental Science*, 10. <https://doi.org/10.3389/fenvs.2022.935696>