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DryAnatolia-Diff: Drought Scenario Generation for Southeastern Türkiye

1. Introduction

Climate change and water scarcity pose a major threat to arid regions. Southeastern Turkey is under increasing drought pressure due to high evaporation and low precipitation levels.

2. Objective

To generate realistic, future drought scenarios (2030-2050) using AI-based generative models trained on historical climate data.

3. Method

We use a conditional Latent Diffusion Model trained on NetCDF climate grids (temperature, precipitation, NDVI, etc.) to generate DSI (Drought Severity Index) maps under various emission scenarios.

4. Data Sources

- ERA5: historical reanalysis data - CMIP6: future SSP climate scenarios - MGM: national station data - DSI: groundwater and reservoir levels - MODIS: satellite-based vegetation indices

5. Turkey-Specific Relevance

The region has low rainfall and intense agricultural demand. Our project supports local drought adaptation by producing data-driven scenarios.

6. Sample Output

Example output DSI grid for July 2023 was generated and visualized using NetCDF and Streamlit tools.

7. Conclusion

DryAnatolia-Diff is a pioneering generative AI system focused on localized climate resilience planning in Turkey.