UTSA Geological Sciences

and

Institute of Water Research, Sustainability and Policy (IWRSP)

Seminar Presentation

By

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On

Friday, October 16, 2020
4:00 P.M.

"Prediction of Evapotranspiration and Future Droughts, and Projection of Groundwater Levels and Springs Flow Using Machine Learning Models"

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Abstract

We demonstrate the use of Machine Learning (ML) models in predicting and projecting hydroclimatic processes. The first part of the talk focuses on implementation of probabilistic ML models to predict the reference crop evapotranspiration, actual evapotranspiration, and lake surface evaporation using standard hydroclimatic datasets. In this example, the ML models are used to avoid computationally-involved Penman-Monteith equation, overcome uncertainties in pan data and coefficients, and offset high capital and operational costs of Eddy Covariance towers. The second part of the talk focuses on ML-based evaluation of the likelihood of recurrence of historical severe droughts (e.g., 1950s Texas drought) and the projection of resultant groundwater levels and springs flow for the period 2020 - 2100. In this example, the analyses are based on the local temperature and precipitation data statistically downscaled from global circulation models coupled with the socioeconomic pathways established by the climate change research community to facilitate the integrated analysis of wide range of vulnerabilities, mitigation, adaptation to future climate changes.