EXPLORING DATA MINING AND MACHINE LEARNING METHODS FOR HYDROLOGY

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Climate change and its far-reaching consequences are one of the defining challenges of our generation. Our understanding of the global climate system has steadily increased over the past several decades, as has our ability to implement its fundamental processes in ever-more complex physics-based climate models. Yet significant knowledge gaps remain in some of the most crucial areas of societal need, for example, modeling hydrologic and hydraulic processes and hence projections of hydrometeorologic extremes and their impacts. We are developing computational data analysis techniques and tools that help bridge this gap between what physical climate models can provide (i.e., relatively more credible projections of certain variables like temperature and pressure at coarse resolution and global scale) and what end users need (i.e., projections of variables like precipitation at regional to local scales, which is relatively less reliable in global models). In particular, we draw upon methods from the statistical data mining and machine learning domains and adapt them for the context of providing improved estimates of hydrological variables at relevant spatial and temporal scales.