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David Murrugarra* (murrugarra@uky.edu), Department of Mathematics, University of Kentucky, Lexington, KY 40506. *Improving RNA secondary structure prediction via state inference with machine learning and deep learning methods.*

RNA state inference is the task of determining which nucleotides of an RNA sequence are paired or unpaired in the secondary structure of an RNA, which can be studied by different machine learning techniques. The state inference is a binary classification task on each nucleotide which is different from determining the full secondary structure consisting of sets of nested base pairs. Successful state inference of RNA sequences can be used to generate auxiliary information for data-directed RNA secondary structure prediction. This talk will discuss different approaches for improving RNA secondary structure prediction via the Nearest Neighbor Thermodynamic Model (NNTM) using machine learning and deep learning methods for state inference. This talk will also highlight the challenges such as overfitting and the need of data for state inference from using methods such as hidden Markov models (HMM) and recurrent neural networks (RNN) as well as the benefits of using these methods on different classes of RNA. (Received September 10, 2020)