**Transformed-Based Tensor Auto-Regressive Modeling to Predict Tensor Time-Series**

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With the massive influx of 2-dimensional observational data, new methods for analyzing, modeling, and forecasting from said data need to be developed. The current research aims to accomplish these goals through the intersection of time-series modeling and multi-linear algebraic systems. In particular, the current research (aptly named the -Transform Auto-Regressive (-TAR) model) expands previous autoregressive techniques to predict data where sample observations result from matrices (2-dimensional data structures) as opposed to scalar or vector data. To achieve this, we apply the -transformation in either one or two dimensions (depending on the spatial correlation within the data), giving computational independence across that dimension. This allows us to separate the matrix into multiple, vector auto-regressive sub-problems, where we can fine tune the parameters of our model to give the greatest accuracy. We provide experimental results by modeling video sequence data and forecasting future frames within the video. Our model gives us greater accuracy when compared to other techniques, such as MLDS and -MLDS, while also allowing similar computational complexity. Future research will focus on modeling and analysis of large spatio-temporal networks (such as social networks and online communities) for modeling, analysis, and forecasting network interactions and anomalous behavior.