

Transformed-Based MAR Modeling to Predict Tensor Time-Series

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In our research, we have expanded previous autoregressive techniques to predict matrices within a time-series. Autoregressive techniques use previously known data points to predict future values within a time-series. Previously, these autoregressive models were able to predict time-series for single point data. Autoregressive models have also been expanded to predict a vector of data, giving a vector autoregressive model (VAR). Our transform-based matrix autoregressive model, \mathcal{L} -MAR, can accurately predict a time-series where the representation of data is given with a matrix. To achieve this, we apply a transformation across the matrix in one dimension, giving computational independence across that dimension. This allows us to separate the matrix into multiple, smaller VAR problems, where we can fine tune the parameters of our model to give the greatest accuracy. We can apply this technique to a variety of domains, such as being able to predict video frames and networks. Our model gives us greater accuracy when compared to other techniques, such as MLDS and \mathcal{L} -MLDS, while also allowing similar computational complexity.