

Low Rank Model for Analyzing Infant's Sleep

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This talk deals with an applied research project I collaborated with. The project's goal is to extract and analyze patterns in infant's sleep in a data driven manner, i.e. non-parametrically. The data comes from an app, where parents log the time of their baby falling asleep/awakening. Each baby's sleep is modeled as a matrix in a high dimensional space. Difficulties with the dataset are the small number of babies (absolute and in relation to the dimension), a lot of missing data and corrupted data.

For extracting the patterns, we use a matrix factorization approach (low rank approximation) with regularization, which successfully uncovers sleep patterns. We use the patterns as a feature representation, which drastically decreases the dimensionality of the data. Using this representation we conduct a further analysis, including predicting their future sleep behavior and clustering the babies.