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**Minimum entropy coding of hierarchical mixture data** NATHANIEL MADDUX, JOHN RALSTON, University of Kansas — Many types of data consist of hierarchical mixtures of signals. For example, a fetal electrocardiogram is a linear combination of the maternal and fetal cardiac signals, each of which is composed of signals originating in different muscles and nerves. Linear combinations of the signals are sensed by several electrodes, yet the hierarchy of the component signals is hidden. In this talk, an intuitive geometric picture of hierarchical mixture data is developed by use of synthetic data. Results are shown of minimizing, through gradient descent, the entropy of a code for a synthetic hierarchical mixture dataset. The use of invariant subspaces of a linear operator to express a code for a hierarchical mixture is discussed. The approach is applied to the classification of multi-domain proteins by their essential dynamics. Nine teacup shaped "proteins" are constructed by combining 3 differently shaped bodies with 3 differently shaped handles. The impulse response function of each teacup is treated as a vector, the set of vectors is decomposed as a hierarchical mixture, and results are discussed.

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