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Model Estimation for Learning from Chained Agriculture Datasets

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ABSTRACT: Agriculture Information Systems in their current state are capable of collecting high dimensional rich quality data from a large number of sources like sensing, monitoring and specialized testing. Ranging from coarse level features in data like location and weather details to fine level details of chemical compositions in the soil, there is a rich availability of data with validated features. Moreover, with the digitalization of agriculture markets, there is huge availability of data defining economics in the same scope. The two linked together can potentially provide an objective sequence defining features affecting consumption of agriculture produce. Another link that can be created beyond consumption is with the help of health and nutrition datasets. Similarly a fourth link can be generated for data concerned with physical activity and performance depending on health and nutrition. Therefore, it can be observed that a well modeled system aggregating data at different stages can be used to study causality as well as draw inference from pieces of data affecting a broad range of objective questions. While the links between datasets discussed above can potentially create an observable causal relationship, it is however very difficult to obtain datasets that span along the entire chain. This paper proposes a model estimation architecture that uses datasets at different stages of this chain and learns latent features that can be used to construct the distributions at each stage as well as being able to train according to any objective questions at any stage in the chain. The model presents a feature-based structure that learns embeddings independently from a dataset. The second structure then combines these derived embeddings of different datasets along the chain and trains a new combined model for learning any associated objective question. The system uses neural learning modules at each stage trained via backpropagation.

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