Structure-Aware Deep Learning: Using Information Filtering to Guide Architecture Design

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Deep learning architectures are often designed through heuristic choices rather than principles derived from the structure of the data they model. This talk presents an approach in which information filtering methods are used to extract meaningful dependency structures from complex systems and leverage them to guide architectural design decisions.

Rather than treating all input features as architecturally equivalent, the proposed approach processes groups of related variables jointly, using the filtered structure to organise interactions within the model. Embedding these structural insights enables architectures that more faithfully reflect the compositional organisation of the data, yielding learning systems that are more structured, interpretable, and efficient.