

Practical – 8

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Aim: Introduction to Deep Networks

Theory:

Deep Networks:

Deep Learning is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called artificial neural networks.

Deep learning is a machine learning technique that teaches computers to do what comes naturally to humans: learn by example. Deep learning is a key technology behind driverless cars, enabling them to recognize a stop sign, or to distinguish a pedestrian from a lamppost. It is the key to voice control in consumer devices like phones, tablets, TVs, and hands-free speakers. Deep learning is getting lots of attention lately and for good reason. It's achieving results that were not possible before.

In deep learning, a computer model learns to perform classification tasks directly from images, text, or sound. Deep learning models can achieve state-of-the-art accuracy, sometimes exceeding human-level performance. Models are trained by using a large set of labelled data and neural network architectures that contain many layers.

Architectures:

Deep Neural Network – It is a neural network with a certain level of complexity (having multiple hidden layers in between input and output layers). They are capable of modelling and processing non-linear relationships.

Deep Belief Network(DBN) – It is a class of Deep Neural Network. It is multi-layer belief networks.

Steps for performing DBN :

- a. Learn a layer of features from visible units using Contrastive Divergence algorithm.
- b. Treat activations of previously trained features as visible units and then learn features of features.
- c. Finally, the whole DBN is trained when the learning for the final hidden layer is achieved.

Recurrent (perform same task for every element of a sequence) Neural Network – Allows for parallel and sequential computation. Similar to the human brain (large feedback network of connected neurons). They are able to remember important things about the input they received and hence enables them to be more precise.

Conclusion: Hence, successfully performed Introduction to Deep Networks.