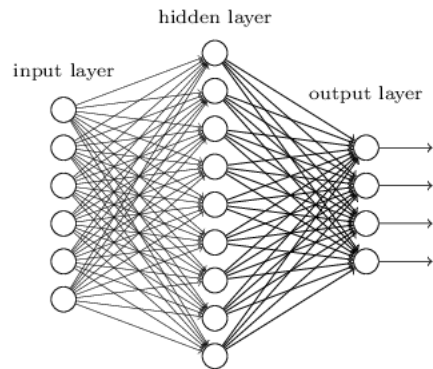


DNN

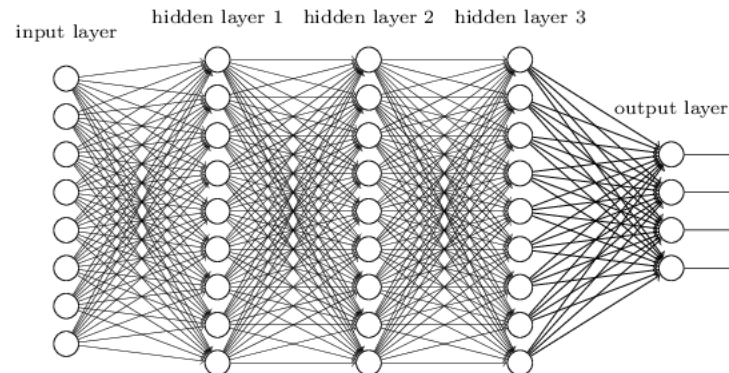
Mukesh Kumar

ANN vs DNN

"Non-deep" feedforward
neural network



Deep neural network



ANN vs DNN

- Artificial Neural Network (ANN):
 - **Depth:** ANNs typically refer to relatively shallow neural networks with one or a few hidden layers between the input and output layers. They may not have the depth and complexity associated with deep learning models.
 - **Applications:** ANNs have been used in various machine learning tasks and pattern recognition problems, including simple classification tasks and regression problems.

ANN vs DNN

- **Deep Neural Network (DNN):**
 - **Depth:** DNNs are a subset of ANNs characterized by their depth, which means they have many hidden layers (typically more than three). The increased depth allows them to model complex and hierarchical features in data.
 - **Applications:** DNNs excel in tasks that require handling large and high-dimensional datasets, such as image and speech recognition, natural language processing, and deep reinforcement learning.

HANDS-ON MNIST DNN

MNIST DNN

```
# Using Tensorflow Keras instead of the original Keras  
  
from tensorflow.keras.datasets import mnist  
from tensorflow.keras import Sequential  
from tensorflow.keras.layers import Dense
```

- Sequential and functional API
- Dense – densely connected layers

MNIST dataset

- MNIST is a collection of handwritten digits ranging from the number 0 to 9.
- It has a training set of 60,000 images and 10,000 test images that are classified into corresponding categories or labels.
- In Keras the MNIST dataset is preloaded in the form of four Numpy arrays.
- To use the MNIST dataset in Keras, an API is provided to download and extract images and labels automatically.