**Deep Learning:**

Deep learning is a subset of machine learning but have astonishing features that machine learning does not have. Deep learning is a modified form of neural network i.e. it has multiple hidden layers that makes it capable of adapting the behavior and architecture of human brain. So what makes deep learning unique and an emerging field? The paradigm started with AI which changed the mechanical way of doing heavy work, then comes the machine learning which gave the machines to learn things without being explicitly programmed but there were many hurdles like manual feature extraction, efficiency of program etc. So deep learning makes it possible to automatically detect the features.

[2] Machine learning techniques are being widely used to develop an intrusion detection system (IDS) for detecting and classifying cyber attacks at the network level and the host-level in a timely and automatic manner. However, many challenges arise since malicious attacks are continually changing and are occurring in very large volumes requiring a scalable solution. There are different malware datasets available publicly for further research by cyber security community. However, no existing study has shown the detailed analysis of the performance of various machine learning algorithms on various publicly available datasets. Due to the dynamic nature of malware with continuously changing attacking methods, the malware datasets available publicly are to be updated systematically and benchmarked. The continuous change in network behavior and rapid evolution of attacks makes it necessary to evaluate various datasets which are generated over the years through static and dynamic approaches. A unique DNN architecture for NIDS and HIDS is composed of an input layer, 5 hidden layers and an output layer. The hierarchical layers in the DNN facilitate to extract highly complex features and do better pattern recognition capabilities in IDS data. Each layer estimates non-linear features that are passed to the next layer and the last layer in the DNN performs the classification.

[2] DL approach for Intrusion Detection System. Link:https://ieeexplore.ieee.org/document/8681044

**Working:**

Deep learning model have thin but deep neural network. The advantage of being deep is more feature detection because more number of layers and hence more weights can be configured by Back propagation technique. Deep learning requires the large labeled data and heavy GPU processors for its working. It builds a memory during its learning in the form of associated weights which then are used in its field working. For its training, we does not require training it on manually extracted features, instead we will only give it raw data. The deep learning model will automatically learn the required features in the data. The programmer only requires programming the deep learning model.