

IoT CLASS ASSIGNMENT

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In the current IoT & WSN era we have a large number of connected objects & sensing devices which collect, transfer & generate a large amount of data. WSN can be classified as a network of small spread-out devices i.e., sensor nodes which work together to wirelessly transfer data/information to sinks. While IoT can be defined as the global network infrastructure which consists of various connected devices which rely on communication, sensory, information processing technologies, and networking.

While these systems face issues like topology, link failures, memory constraints, network congestion, scalability and coverage, management, hardware design, application design, communication protocols and privacy it has benefits like advantages over conventional networking solutions, such as reliability, accuracy, lower costs, flexibility, and ease of deployment self-organization, flexibility and processing capacity.

To help deal with this large amount of data generated/big data we can utilise ML & AI to deal with it.

AI is used for discovering patterns and making predictions from data based on statistics, data mining, pattern recognition, and predictive analytics. ML is used to build algorithmic models which are improved upon by learning from its past experiences.

By using these 2 fields we are able to utilise big data analytics to analyse and highlight the correlations that exist between two or more given situations, and to predict their different implications.

Generally, the learning performed by the machine can be categorized as memorization of information and learning from generalization where a model uses learned examples to recognize new scenarios.

ML algorithms consists of the following four categories: Supervised Learning, Unsupervised Learning, Semi-Supervised Learning, and the Reinforcement Learning:

Supervised: All data is labelled, and the algorithms learn to predict the output from the input data.

Unsupervised: All data is unlabelled, and the algorithms learn to inherent structure from the input data.

Semi-supervised: Some data is labelled but most of it is unlabelled and a mixture of supervised and unsupervised techniques can be used.

Reinforced learning: This method aims at using observations gathered from the interaction with the environment to take actions that would maximize the reward or minimize the risk.

To cope with the massive dynamic real time being generated through smart cities environment we can large amount of unlabelled data can be mixed with small amount of labelled data for better convergence of machine learning schemes, which is a lightweight machine learning approach.