**AbStract**

The current generation of cellular networks is not able to cop up with the large number of devices available and the increasing data rates and much higher amount of the data which is continuously increasing. So, we need to upgrade to a new version of the mobile communication network which can easily handle these large number of devices and also can provide us with much higher speeds. In 5G networks (Fifth Gen. Cellular networks) these needs are met easily.

The fifth generation cellular networks can be uniquely described by three major features :

All over connectivity , very small latency, much higher data exchange speeds. Here we have discussed why we need 5G networks, how these networks will help overcome the difficulties of the existing cellular network technology. The basic aspects of the 5G networks and the limits of the current technology are also enlightened. The different features of the 5G networks which make it more powerful for the future of communication system networks are also discussed. The different architectures of the 5G cellular networks are also studied and the difficulties in the implementation of different architecture which are currently proposed such as the signal interference , privacy across channel , networks security etc.

This project basically focuses on the unsupervised machine learning techniques which can be used in the 5G cellular networks for minimising the latency problems. We have discussed the fog-networking in different heterogenous networks. We have shown a soft clustering method also for unsupervised machine learning is proposed which will detect the location of the fog nodes which will be upgraded from the LPN’s.this algorithm is much better suited than the K-means hard clustering of the fog nodes in small cells. By the algorithm we detect position of different nodes so as to minimise the latency of the networks. In the soft clustering method we determine the clusters such that the head node of each formed group becomes a fog node.

The method used in the clustering is used to dynamically find the location of fog nodes to be upgraded from various nodes of the het-nets so that it will help in minimising the throughput also, we assume that the number of nodes to be upgraded to a fog-node and the number of small cells are known to as as prior information. The algorithm is based on a soft cluster forming method in which small cells are clustered near fog nodes. The numerical outputs show us that this method will increase the throughput and reduces the latency present in the network.