

Developing a Dynamic Method to Improve the Successful Access Rate and Average Latency in LTE Networks Using Virtual Frames

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ABSTRACT

Service provisioning and request management in 4G telecommunications networks have faced a major challenge due to the increasing demand and massive access of the emerging machine type communications. The scarceness of physical resources, huge number, and simultaneous access of machine type requests may lead to the congestion at the access of LTE networks. Several approaches have been proposed to tackle the massive access problem by time barring or time distributing of access requests. In virtual-frame technique, the requests are spread in consecutive frames in order to increase the successful accesses. The length of virtual-frame which consists of some consecutive sub-frames, should be selected appropriately according to the network load to prevent the unwanted average delay of media access. In this paper, we propose a dynamic random access method using the code expansion protocols and the virtual farming technique to relieve the congestion problem in machine type communications on LTE networks. In the proposed method to sustain the network efficiency, the length of virtual frame and coding space are adapted proportionally according to the network load in two phases named as estimation and decision making. The simulation results of the proposed scheme show that during the congestion and when the number of available preambles are small the efficiency and average latency in the network are improved compared to the DACB as the traditional widely adopted technique in current 4G networks

Keywords: Machine to Machine Communication, Random Access Channel, Overload Management, Online Load Estimation, Virtual Frame.