Efficient Data Uploading Based on Network Coding in LTE-Advanced Heterogeneous Networks

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(Pt9)Abstract—**LTE-Advanced heterogeneous networks enable a uniform broadband experience to users flexibly anywhere in the network by using a mix of large and small cells -- i.e., macro, pico, femto and relay stations. In this paper, we propose a novel network coding-based for mobile content uploading, where multiple user equipments upload their own content toward the eNodeB in LTE-Advanced relay networks. Network coding has been considered as a promising solution in next generation networks because of the significant improvement in the transmission rate and reliability. The network coding enables an intermediate node having the capability of encoding incoming packets rather than simply forwarding. However, the advantages come at the cost of high computational, storage costs and coding vector overhead. The two former drawbacks can be solved easily by the fast development of current smart users and relay with high capability on computation and storage. The last issue of coding vector overhead still remains as many packets are encoded together using a linear combination since each packet needs to carry a large size of the header to store the information of the coding vector. We propose random overlapped chunked code for enhancing the transmission rate and reliability under the constraint of coding vector overhead. Furthermore, the encoding and decoding processes can be operated with low complexity. The complete transmission consists of two phases: users upload the content to the relay; the relay performs the proposed random overlapped chunked code of different coming streams from users and forwards the network-coded packets to the eNodeB. For performance evaluation, we run various simulations along with analysis to show that our proposal outperforms current schemes in terms of decoding probability.**

(Pt9)Keyword—**Network Coding, Heterogeneous Networks, LTE-A, Internet of Things**

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