

## Ant Based Cross Layered Optimization Protocol for WMSN with Fuzzy Clustering

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### ABSTRACT

Wireless Multimedia Sensor Network (WMSN) is embedded with large number of Audio, Video and scalar sensor nodes which can able to retrieve the multimedia information from the environment. WMSN has several challenges such as life time of the network, Memory requirement, Coverage, Bandwidth and QoS metrics. Hence selection of routing algorithm is crucial in WMSN. Again interdependencies of the protocol layer cannot be neglected to improve the network performance. Clustering in WMSN is challenging task in order to increase network lifetime and to improve the communication. Hence Fuzzy clustered Ant based cross layer protocol (FCAXL) is proposed. In this paper performance analysis of ant based cross layer optimization protocol with fuzzy clustering based on number of nodes and packet size is done. Simulation results shows that Fuzzy clustered ant based cross layer optimization protocol performs best as compared to AntSenseNet routing protocol, Cross layer routing protocol and Ant based cross layer routing protocol in terms of QoS parameters such as Throughput, Packet delivery ratio and delay. Hence the life time of the network increases.

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## 1. INTRODUCTION

Wireless sensor networks are comprised of large number of scalar sensor nodes which can sense physical parameters like temperature, pressure, humidity, sound and light and can exchange the information. Advancement in technology has led to the multimedia sensor nodes which are capable of sensing audio as well as video data. These multimedia devices are embedded in the sensor node. Such type of networks is called as wireless multimedia sensor networks. These networks can sense and transfer the scalar as well as multimedia data i. e. image, audio, and video streams in real time as well as non-real time communication. These networks have additional features like high bandwidth requirement, tolerable delay, low jitter, low packet loss which imposes the additional challenges on the designer. WMSN is in the need of on time reliable data delivery to achieve Quality of Service. Multimedia data is delay sensitive [1] and sensitive to packet loss also which may result in jitter and decreases the throughput.

Selection of routing protocol plays an important role for WMSN networks. Main objective of the routing protocol is to minimize the end to end delay, jitter and to increase the packet delivery ratio in turn to increase the throughput at low energy cost. These networks are generally event based networks. For event based networks proactive approach is used in which each node monitors its neighboring links and update changes accordingly [1]. Sensor nodes communicate with each other to detect events depending on the application, to collect and process data, and to transmit the sensed information to the base station by hopping