DESIGN AND ANALYSIS OF MODULATION TECHNIQUES AND ROUTING PROTOCOL FOR WIRELESS SENSOR NETWORK

[1]Shruthy K N, [2]Dr. G. F. Ali Ahammed
[1]Masters Student, [2]Associate Professor and Course Coordinator
[1]Department of Digital Electronics and Communication Systems,
[1]VTU PG Center, Mysuru, India

Abstract: **Wireless Sensor Network is the set of homogeneous or heterogeneous sensor nodes those can sense the data from different sensing areas of the network. There are different modulation schemes for enhancement of data transmission and different routing protocols exist to find the efficient route to transmit the data from the sensor node to control center. In this project, we present the analysis and comparison of different modulation schemes for the best result over the created heterogeneous network (WSN+Wi-Fi). And performance comparison of two routing protocols i.e. AODV and DYMO used in the network. A well-known network simulator QualNet 6.1 is used to design networks to study and analyze the performance matrices of mentioned protocols. The Performance matrices used are PDR, throughput, End to End delays and Average Jitter's.**

IndexTerms **– Qualnet 6.1, AODV, DYMO, ASK, BPSK, QPSK.**

I. INTRODUCTION

In a wireless technology, wireless sensor network is a new area. It is a technology, applications and protocols or here it is defined as a dedicated sensor along with a group of spatially dispersed sensors that is used for monitoring and recording the various physical conditions of the environment and then organizing the collected data at a central location. WSN's are most of the time used to measure the environmental conditions such as humidity, temperature, sound, wind, pollution levels etc.

WSN is a wireless connectivity where, here it makes use of spontaneous networks information so that the sensor data can be wirelessly transported. WSN generally contains a group or a collection of built nodes where here it contains several hundred or sometimes even thousands where each node is connected to one sensor. Each sensor network node has several parts like radio transceiver with an internal antenna or connection with an external antenna and also with a microcontroller and here it also contains an electronic circuit for interfacing with the sensors and usually it contains an energy source such as battery or an embedded form of energy harvesting.

Here the WSN it makes use of cross layered approach. Whereas first traditional approach was in practice. In the traditional layered approach the main problems where, here in this layered method the different information cannot be shared among different layers, where by this each layer will be not having complete information of the other layer. Optimization of the entire network cannot be guarantee here. And it cannot adaptor it does not have the capacity to change to the environmental changes. The traditional layered approach for wired network is not applicable to wireless networks because of the interference between the different users, fading, access conflicts and the change of environment. So here the cross layer approach came into existence to make the optimal modulation where to improve the transmission performance such as energy efficiency, data rate, quality of service etc.

II. METHODOLOGY

In this section we discuss the proposed methodology used in QUALNET simulator to simulate the scenario. The work is divided into following main steps.

Step 1: The first step is the modelling or scenarios, this means to create network model on the canvas area.

Step 2: The second step is to select ZIGBEE and draw the application between different Nodes from source node to destination node etc.

Step 3: Third step is to apply routing protocols for Ad-hoc network scenario.

Step 4: Fourth step is to apply physical effects and simulate the network scenarios.

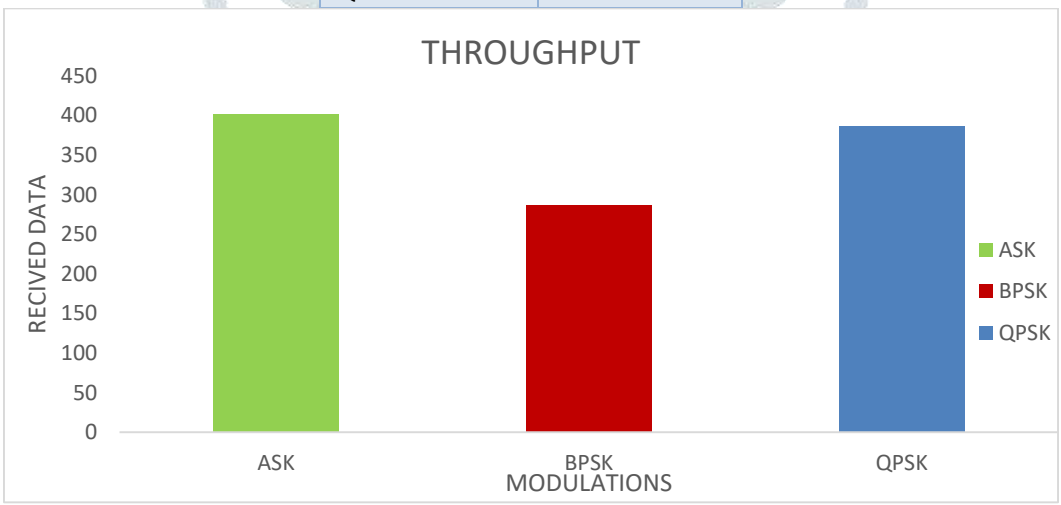
Step 5: Fifth step is comparing the performance analysis of various Ad-hoc network routing protocols and DYMO protocols

Step 6: Last step is to view and analyses final results

III. RESULTS

Here in this part we discuss the simulation result of modulation techniques and routing protocol for wireless sensor networks. Performance is done on qualnet simulator tool. The results are discussed based on the performance metrics such as average jitter, throughput, average end to end delay, packet deliveries are compared and then the final simulation results is obtained.

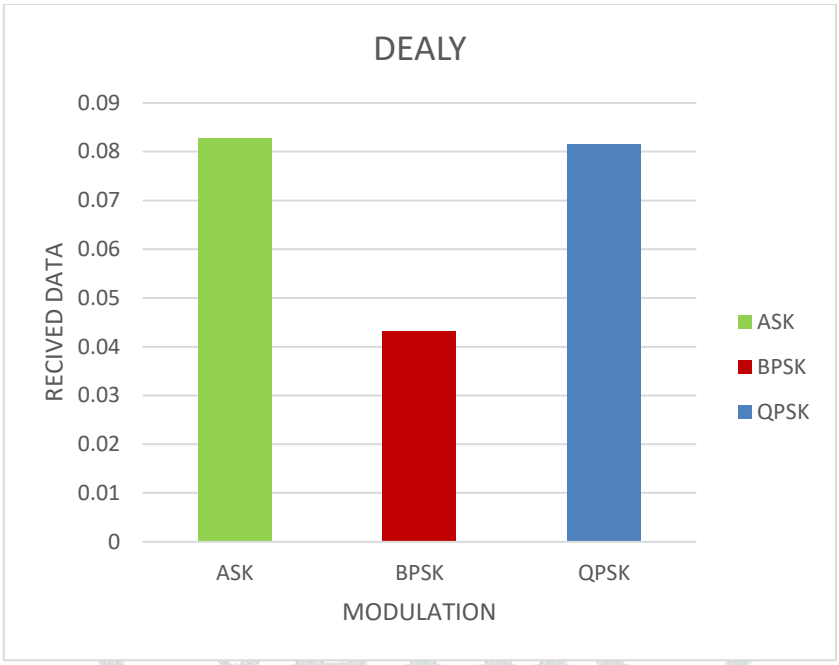
MODULATIONS	THROUGHPUT
ASK	402
BPSK	287
QPSK	387



Here QPSK modulation technique makes server to receive more data compared to other 2 modulation techniques. QPSK is better compared to ASK and BPSK. For Throughput, ASK has more throughput compared to other two techniques. So ASK gives better performance.

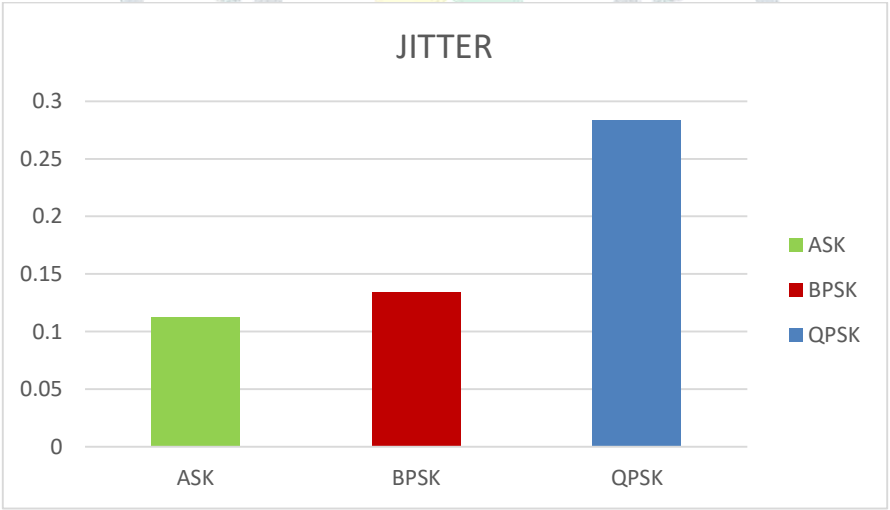
MODULATIONS	DEALY
ASK	0.0827096
BPSK	0.0431563

QPSK	0.0814623



Here BPSK has 0.431563 where delay is less and packet reception is less.

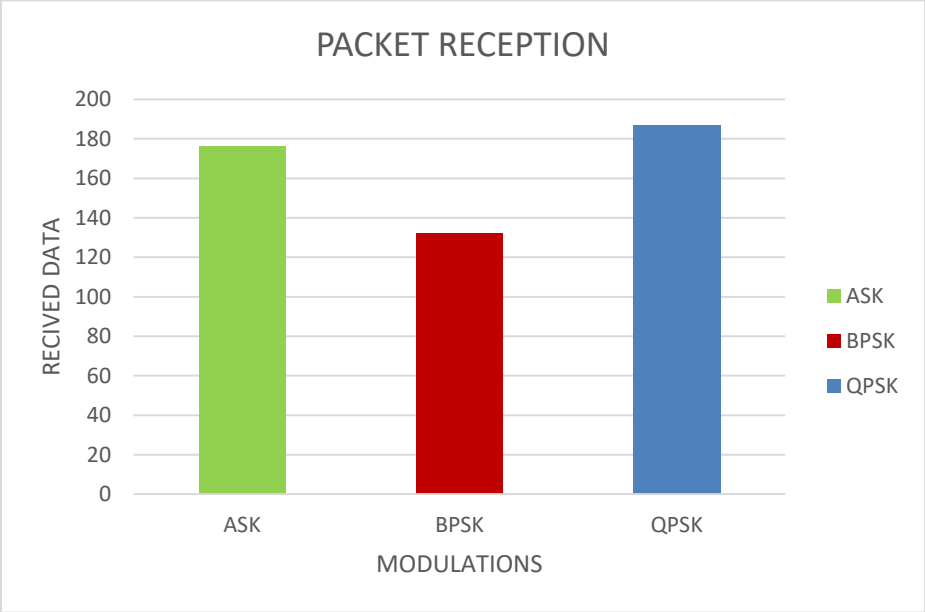
MODULATIONS	JITTER
ASK	0.112251
BPSK	0.133846
QPSK	0.283715



Here ask gives better jitter. Jitter means there is a timing difference in the packet to the destination. Delay means time taken to send the packet. Variation in the arrival packet is called jitter.

MODULATIONS	PACKET RECIPTION
ASK	176

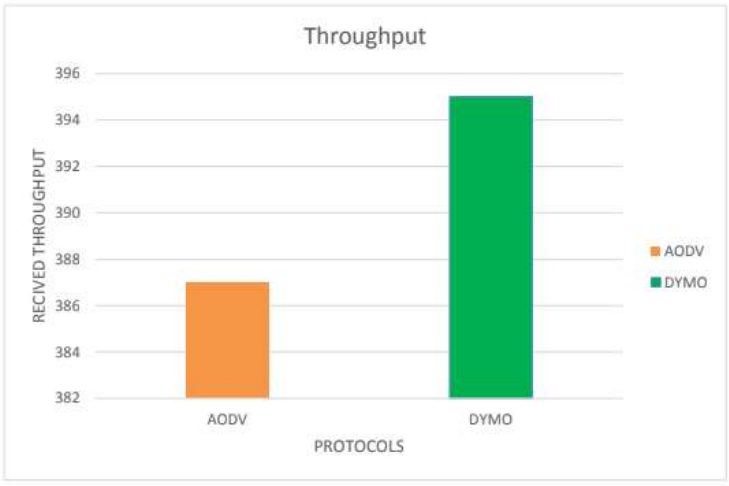
BPSK	132
QPSK	187



Here QPSK has more packet reception

Column1	AODV	DYMO
Total packet Sent	199	199
Throughput	387	395
Delay	0.814623	0.169004
Jitter	0.283715	0.128776
Packet Reciption	197	190

Protocols	Throughput
AODV	387
DYMO	395



Here DYMO receives more data compared to AODV.DYMO has more throughput compared to AODV.

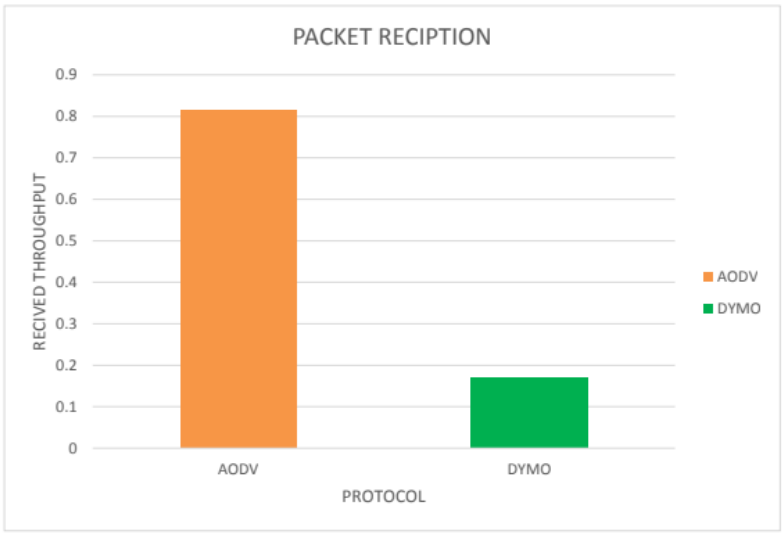
Protocols	DELAY
AODV	0.814623
DYMO	0.169004

Here AODV has best average end to end delay. AODV is best because it consumes less time.

Protocols	JITTER
AODV	0.814623
DYMO	0.169004

Here AODV has more jitter.

Protocols	PACKET RECIPTION
AODV	0.814623
DYMO	0.169004



Here AODV has more packet reception

CONCLUSION

From a Practical simulation work, a WSN with WIFI network is simulated using the routing protocols like Reactive protocols (AODV, and DYMO); the main parameters that are considered for the analysis is Throughput, End-To-End delay, Average jitter. The performances of this protocol were investigated with variable node densities and traffic conditions.

QPSK modulation technique makes server receives more data compare to ASK and FSK. ASK has higher throughput compared to other two modulation techniques. So it is beneficial to choose this modulation technique for WSN with WIFI network.

REFERENCES

[1] Jun- Zhao Sun, "Mobile Ad Hoc Networking: An Essential Technology for Pervasive Computing," Proceedings of International conference on info-tech and info-net, Vol-3, pp. 316-321, 2001.

[2] Elizabeth M. Royer and C- K Toh, "A Review Of Current Routing Protocols for Ad-hoc Mobile Wireless Networks," IEEE Personal Communications Page(s) : 46-55,1999 .

[3] Md. Shohidul Islam, Md. Naim Hider, Md. Touhidul Haque and Letan Miah, "An Extensive Comparison among DSDV, DSR and AODV Protocols in MANET," IJCA (0975-8887) Volume 15- No. 2, February 2011.

[4] Priyanka Jangir and Saurabh Mishra, "Performance Comparison of DSDV, AODV and DSR for Mobile Ad-hoc network by varying network size," Conference on Advances in Communication and Control Systems 2013 (CAC2S 2013).

[5] Mukesh Kumar Garg , Dharam Vir, Dr. S.K. Agarwal, "Simulation Analysis of AODV, DSR and ZRP Routing Protocols in MANET using QualNet 5.0 Simulator," International Journal of Scientific and Research Publications, Volume 3, Issue 3, March 2013 ISSN 2250-3153.

[6] Subramanya Bhat.M, Shwetha.D and Devaraju.J.T, "A Performance Study of Proactive, Reactive and Hybrid Routing Protocols using Qualnet Simulator," International Journal of Computer Applications (0975-8887) Volume 28– No.5, August 2011.

[7] Shaily Mittal and Prabhjot Kaur, "Performance Comparison of AODV, DSR and ZRP Routing Protocols in MANET's," International Conference on Advances in Computing, Control, and Telecommunication Technologies, 2009.

[8] Luis Girone's Quesada, "A Routing Protocols for Manets," Master of Science in Comm. technology thesis, Norwegean University of Science and Technology, Department of Telematics, 2007.

[9] Monika, Sanjay Batish and Amardeep Dhiman, "Comparative Study of AODV, DSDV and DSR Routing Protocols in Vehicular Network Using ns2," International Journal of Scientific & Engineering Research, Volume 3, Issue 6, June-2012, ISSN 2229-5518.