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Implementing the Effective File System of Secondary Memory Management in Wireless Sensor Networks

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*Abstract:-***This paper will present the importance of the wireless sensor network. These are playing significant role in research domains. Thousands of sensors are fabricated in a multi-hop wireless sensor network for computational operations, communication process, and sensing. The following are the major areas of applications where WSNs are used border security and surveillance, medical care, agricultural sector, traffic and transport monitoring, process control, fire monitoring and son on. Since, these networks are having wide range of real-time applications along with distributed embedded system. Hence, these systems need highly vibrant environments for huge computational operations and communications, must suit the parameters like resource limitations and limited communication capabilities, timing constraints. WSNs combines the sensing, computation, and communication into a single miniature component, that will have a sensors, a processing unit with restricted computational power and limited memory, a communication device may be a radio transmission control or optical transmission control and a battery for providing power source. There are many gaps in researching of memory management for WSN in associate concurrent applications. Management of real-time traffic needs lots of memory for emerging new applications in this area. So, it becomes a challenge to design effective memory management techniques. Finally, this project will specifically propose a efficient memory management technique for different operating systems to handle the such applications in WSNs.**

*Keywords:-***Memory Management Technique, Wireless Sensor Networks, Sensors, Operating Systems.**

I. INTRODUCTION

WSNs ability and power lies in deploying large number of small nodes, which are assemble and configure themselves[1]. The memory management system refers the allocation and de-allocation of memory blocks for various processes in the process control block, in classical model operating systems.The WSN bridges the gap between hardware and applications, and plays a vital role in constructing efficient, reliable and scalable distributed applications. The sensors components consists of RAM, internal flash and external flash[4]. The memory management scheme in WSN is one of the most significant design issues for operating systems[7]. Memory allocation in classical operating systems,are having the following technique either dynamic or static.Memory management in the traditional sensor system used very little or no existence by assuming that only single application is running[5]. Since, the emergence of application domains for WSNs, provide the schemes for executing multi-threaded concurrent processes, such as real-time traffic coordination, multi-threaded designs, and multimedia streaming. Hence, the management of memory for WSNs becomes tedious process for these applications[2]. To overcome these drawbacks related wireless sensor networks, we discussed elaborately with various approaches for WSN's memory management.

II. OBJECTIVES

The importantgoals of this project is the structure of the file system proposed in the operating system used in the WSN. For example in TinyOS the memory management uses static memory management and provide single level file system. Virtual memory was not supported by this OS and supports hardly the secondary storage management. The next goal is the effective usage of memory for new application domains with real-time traffic and thelast one is allocation of memory efficiently for multi-threaded concurrent process.

III. METHODOLOGY

The wireless network needs to communicate with a wireless link, protocols which are designed from the raw electro-magnetic signals. A transmitter must carefully modulate the RF carrier while receiver performs demodulation and signal analysis. In this project we propose an effective implementation of file system for secondary storage memory management in wireless sensor networks for efficient usage of newly emerged application domains. The proposed system consists a portable controller, a wireless sensor node, PC interface, wireless sensor interface, and a wireless

sensor planner/network planner. A new way of maintaining and controlling of hierarchical file system with internal usage of indexes are used for efficiency and effectiveness of the storage environment. The large database is also proposed to handle the multimedia data like video, audio, images, graphical data, scalar sensor data. Further more, virtual memory management for multiple concurrent application domains in WSNs. The Fig. 1 shows the block diagram of simple wireless sensor network.

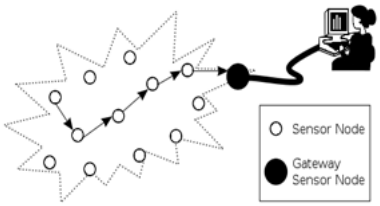

Fig. 1.1 A simple WSN

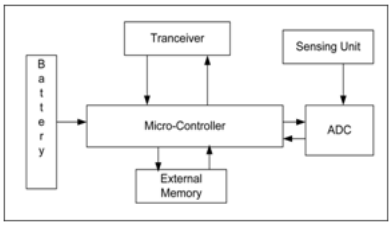

Fig. 1.2 ADFD of WSN

The Fig. 1.2 will give the complete structure of WSN, which will have a micro controller connected to external memory and transceiver, ADC and the power supply unit.the basic structure of the WSN built on thousands of nodes, connected to one sensor. Each sensor node is having several parts; typically a radio transceiver with an antenna, which may be internal or external, a microcontroller, and an electronic device for interacting with the sensors and power supply unit such as battery. Depending on the complexity of the sensor nodes, the cost may vary from hundreds to thousands dollars. Based on the communication bandwidth, computational power, memory storage, energy constraints the size and cost of sensor nodes depends. We proposed several example modules in discussion of wireless sensor networks which are i) smoke sensor; ii) temperature sensor; and iii) alcohol or gas sensor. The following Fig 2 will show the data flow in WSN.

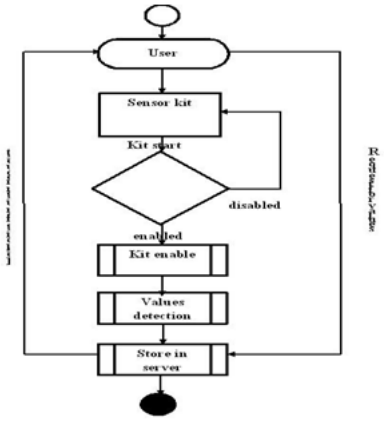

Fig 3: Smoke Sensor

Fig 4: Alcohol Sensor

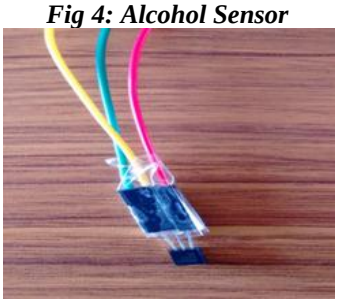

Fig 5: Temperature Sensor

Fig 6: GPS Receiver

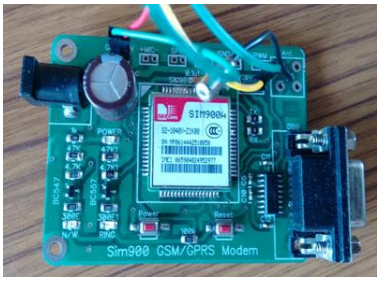

Fig 7:Sim900 GSM/GPRS Modem

Fig 8: Converter

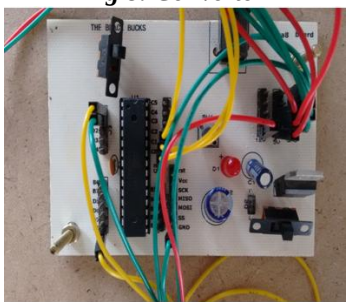

Fig 9: Processor

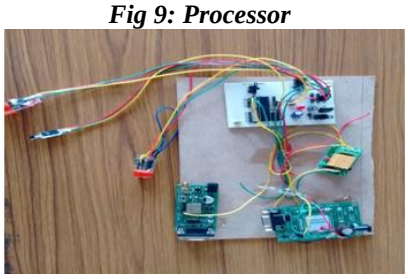

Fig 10: Kit

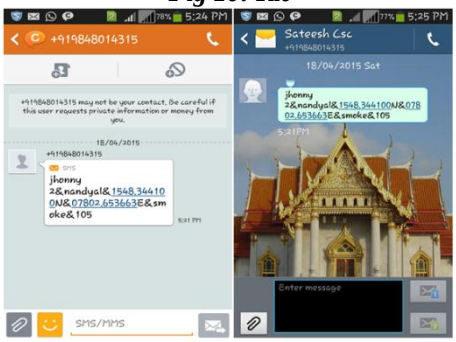

Fig 11:Message in the mobile

IV. CONCLUSION

Still there is a lot of improvement and further more investigation is needed to produce stronger real-time, efficient, and effective memory management techniques for WSNs. Furthermore, while integrating WSNs with cloud computing, more attention is required for resolving the problems which are arise. This project discussed the issues related to memory management technique for consideration, while designing the operating system's file system for wireless *sensor networks. It is also* discussed elaborately, the challenges and further research gaps and opportunities in operating system design with reference to memory management mechanism for wireless sensor networks. For the large storage of data of emerging application domains, the sensor node needs huge secondary storage is required to accommodate such huge data. The computational power must also needsto be improved to help the sensors to retrieve multimedia data. So we concluded this discussion with an architecture that meets the requirements of wireless sensor networks strictly.

V. REFERENCES

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