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Monitoring Animals Farm Using Internet of Things Technology

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Abstract:- Internet of things (IoT) technology is becoming a part of our life ,we can find it in civil and military applications, smart cities, medicine applications and mentoring greenhouse, etc. We build a new module of wireless sensors network(WSN) with hyper techniques, so we plan to use electronics devices as Zigbee , Lora and RFID in one system to avoid the disadvantages from every single device. especially we used Lora to cover long distance area. For manipulating data coming from sensors we suggest to use Arduino Uno because They are compacted together, so the researcher is designing a small module to carry all components as smart node. This research focus elastically on IoT application in livestock located in the Republic of Sudan, to investigate wireless sensor networks (WSNs) model for cows monitoring with three goals prevent cows , monitor cows health and control the dairy process.. The proposed model is intended to simplify real-time data transfer, so the farmer or decision-maker can easily manage his big data through cloud system or mobile application.

Keywords:- *Internet of Things, Wireless Sensor Network, radio-frequency identification, Zigbee.*

I. INTRODUCTION

In our country Sudan we are working to transfer laboratory experiences of IoT technology to the farms and cows fields. The contribution of our paper is designing a simple framework for monitoring cattle through animal identification (RFID) and tracking system in exacting landscape using IoT organizations with latest technology in wireless communication[11]., the great growth in electronic devices like smart phones help us to use Internet of Things (IoT),here we proposed a hyper system which used for connecting the different devices like sensors to transfer packet data. All these devices may equip with radio-frequency identification (RFID), parallel with ZigBee and Lora devices, establish the communication between them and efficiently access as a remote system [2]. We thing always to fulfill the requirement of the implementing the health monitoring software and hardware that observe the health condition of an animal as well as to avoid the epidemics of animal diseases. Various researchers [3] have used wireless networks with a mounted WSN devices to track separate animal activity and to monitor the health condition online.[4].These experiments have been examined and dealt with. Some laboratory tests and farm attempts have been carried out to evaluate the performance of the proposed WSN model and their protocol. The outcomes of experiments are revealed in useful information and graphics through free or paid mobile application software.

However, there is a need to integrate all the available sensors and create an well-organized online monitoring system so that animal health status can be monitored in real time, on another hand we also focus on saving cattle from theft as we know the impact of stock This paper discusses the scope of different wearable technologies for animals, using advanced techniques to keep animal (cows) save and healthy. The paper considers all recent developments in the field of WSN and their applications for animal health. In this hyper system, we describe and propose a complete monitoring existence set and effective healthcare monitoring system designed by using the IoT and RFID tags. The finding results of this paper show the strong output against various medical dangers [5].Finally we find the simple methods of control in this study to gather information in Real-time so sensors can so send data at real time. leading to online monitoring of remote keys.

So (IoT) devices are help to increase productivity and monitor the health of crops and livestock The predictive of our (IoT) model allows us to prevent stock theft and keep it healthy in farms especially in Sudan, South Sudan and Africa in general[6].The final goal of our paper is to design an economic network system that uses alternative low-cost, low power consumption sensor nodes to facilitate a real-time health monitoring application. To achieve this goal, firstly, we plan to design a hyper network which consists of different types of technologies (Lora, ZIGBEE, RFID) and good antenna should be designed to improve the performance of radio coverage in the whole farm field. [7].

II. RELATED WORK

Pawlowski A, Guzman Simulation of greenhouse climate monitoring and control with the wireless sensor network[8]. where mention how they used WSN in the irrigation system to control the plant in the greenhouse, which it can optimize the usage of water and fertilizer [9]. SAM: in this reference the paper focusing on both the hardware and software to regulate to the positioning experiments which contain movement, radio path nosiness, short transmission range of sensor nodes and limited energy resources so main

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goal of "SAM" project is to combine hardware, software with internet techniques [10]. Admela Jukan. proposed a systematical analysis of smart technologies used in animal control which put animals: domestic, farm and wild animals. In three main categories.

III. METHODOLOGY AND DESIGN

We try to investigative Sleep/wake-up Algorithm, which that is consider as serious issue in Wireless Sensor Networks (WSNs) because of the limited energy of sensor node and their battery is not rechargeable. The explained algorithm is to keep the sensor energy for long time by applied sleep/wake-up algorithm. This is achieved by keeping sensor on sleep mode when it is not used. This paper research, applied self-adaptive sleep/wake-up Algorithm. This method enables each node to decide automatically its own operation mode (sleep, listen or transmission) in each operation in a decentralized process. Here we proposed hardware Components of WSN model as shown below (figure-1). The main system consists of two subsystem Data Acquisition which uses just for collecting data from environmental data secondly Data Analysis which used as web software that analyzes the collected data for the end user to find it as useful information:

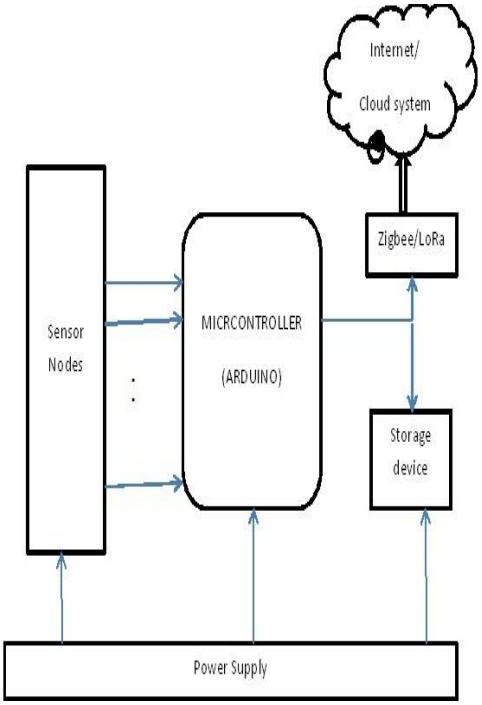

Fig 1

A. Software

Here We build a simple algorithm to cover our proposed system requirements. we use it to improve the performance of WSN so that algorithm uses the multiple paths as alternative paths in order to forward the additional message from the source to base station by using specified techniques . See Figure-2.

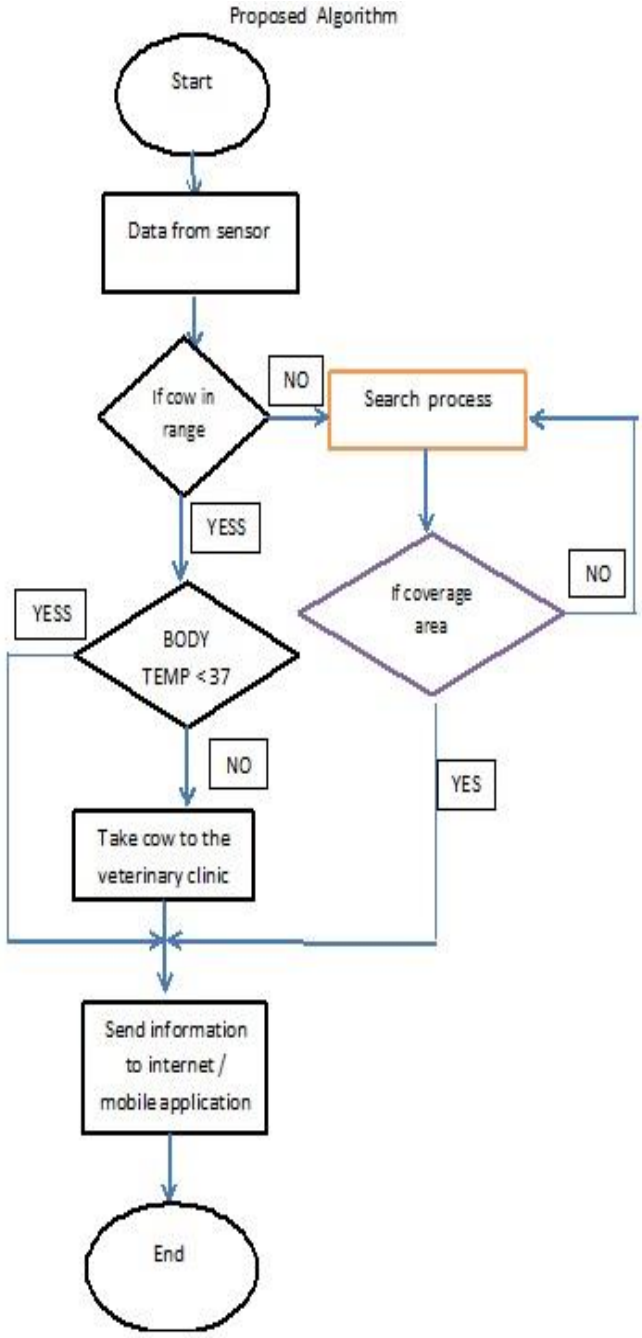

Fig 2

B. Hardware Components

For our proposed paper we have designed a hyper module consist of Zigbee device ,LoRa device and RFID all components in one full integrated module connected with controller for processing upcoming data from sensors, this proposed design is easy for installation and maintenance .The module use the Zigbee wireless sensor networks in real-time acquisition of the parameters of temperature, humidity, the system works according to above mentioned algorithm see the hardware components in figure-3

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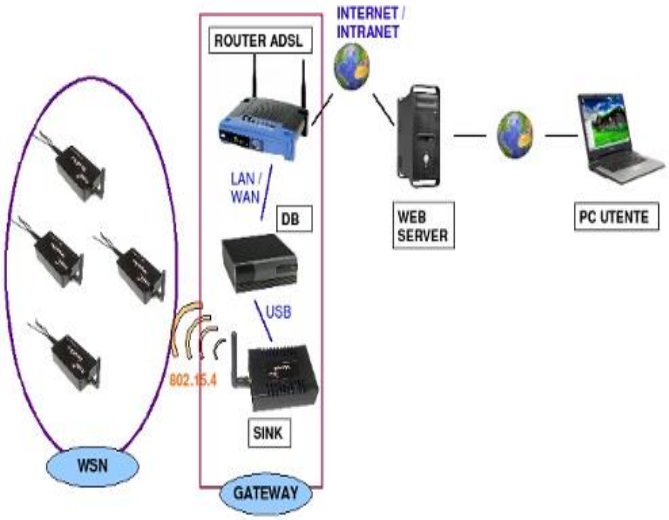

Fig 3

C. Configuration of Xbee Module

Before we can start using XBee Wife, we need to set up it to connect to the WiFi network. This is a simple process with the XCTU program, we can follow these steps:

- 1.Connect XBee to XBee Explorer(board), and connect Explorer to your computer.
- 2. Open XCTU. It should open on the Computer Settings tab. There, we must choose a COM port for XBee Explorer and ensure port settings look like below figure:

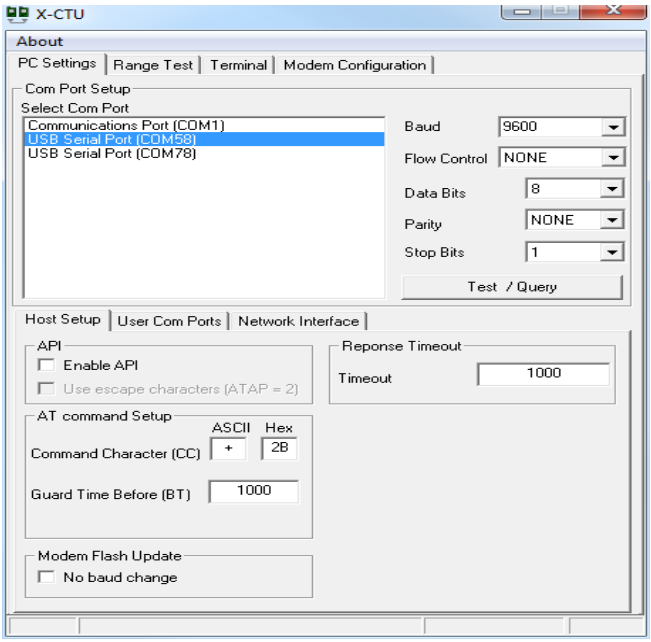

Fig 4

- 3. Click over to the "Modem Configuration" tab. And click "Read" to display your XBee WiFi's stored settings. If we successfully did the all steps of configuration so This is means we're communicating with the XBee.

D. Results And Finding

The scenario for finding result start with data download from surround environment sending by Sensors which are located on the animal's body with different position ear, neck and Udder for dairy cattle.If the temperature in value is increased, when it compared to the threshold value, then the system activates alarm to switch on,so the cow need to send to the veterinary clinic , also in case sensing value is abnormal or missing one the cows then it is immediately transferred to farmer to take necessary steps to save the animals and to increase their production.. With the help of attached RFID tags embedded with sensors, it is very easy to track the animals both in and out of the zone.The aim of this IoT solution is to overcome these big data by using alternative cheap, low power consumption sensor nodes able to providing real-time communication in an easy way.The use of WSNs was proposed as the means for connecting these sensors data sources without the need for direct human intervention, When we connect the sensors on the cattle's body it will give the body temperature, heart Beat and be using this result (graphs) ,so Physician would be able to recognize the body cases of the cattle and he also be able to discover which cattle's are harming. The health status of the animal can be known from anywhere using internet/mobile applications.

E. Results Discussion

Depending on above scenario we have seen many lab experiments.The sensors contained in proposed modules have made a larger volume of data available at no additional cost to farmers. This has add a new challenge of how to analyze and use the generated data.There is still no standardized solution for simple IoT application in our country ,for example, there is a big gap between agricultures process and weather information from the meteorological stations of national centerThe main advances in our work have occurred in automatic data collection, with no interference from the human. This increases the volume of data which the farmers need it.

IV. CONCLUSION AND FUTURE WORK

In this paper, a smart multi-level design for real-time remote animal monitoring was presented, which consist of, (Zigbee and Lora). Lora here for long distance because the ZigBee limit to maximum 100 m,in this Paper, we have presented the optimizations of performance in advancing WSNs over two important sides. At a certain side, we specified the problem of decreasing consuming of energy in WSNs, including energy consumption for hardware. This was achieved by using the ZigBee technique to set up nodes on WSN, so that it will make the nodes of WSN able to sleep mode or wake up mode which results in the battery achieving efficiency of energy.On the other side, we addressed the problem of efficient node placement for saving animal and control their health with economy and green environment.

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