Path Loss Failure Analysis of Unknown Wireless Devices using Software Defined Radio (SDR)

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Abstract*: *The efficient method for detection of unknown wireless devices using software-defined radios (SDR) in wireless communication is proposed to analyze the power loss. SDR analyze the position of unknown parameter and their transmission of power and energy by sensing the carrier frequency and measuring the signal concerning the Received Signal Strengths (RSS) method. RSS based positioning techniques are useful for implementation of low complexity, and they are susceptible to path loss in the programmable field environment. The RSS based techniques evaluate the position of object and transmission of power from unknown devices by assuming the value of path loss failure before estimation. However, the location of the estimation accuracy depends on the discrepancy of the path loss exponent (PLE) of the object. The novelty of the proposed method introduces a novel approach for path loss failure analysis and calculates the power saving of unknown devices in SDR.

Keywords* : *Software Defined Radio (SDR), Received Signal Strengths (R), Path Loss Exponent (PLE), position and transmission power

I. INTRODUCTION

Software-defined radios are an essential part of communications, even when people feel it is effective. When people thinks of a radio, i.e. an FM/AM radios during their travel, hand-held radios, or CB radios for communication, it propagates its accuracy. Furthermore, radios are more important in society to gather information up to date. For any progress, in software-defined radio, the smart-device, Bluetooth earpieces talk on the phone and Wi-Fi adapters within computer, and are highly favorable devices. Generally, radio device is a device which uses electromagnetic waves to transmit or receive information without wifi are highly useful.

Similarly, radios implemented from the pieces of hardware effective communication can achieve quickly. These radios can refer as hardware-defined radios for discussion only because of the radio dependent on the hardware kit such as electronic and electrical components [8]. For the past few years, the usage of Software-defined radio (SDR) seems to be more, the form of communication in which a piece of software determines the type of radio which significantly improve the performance. This software-defined radio (SDRs) is developed technology with a advantage of captivating the radio developers and researchers. In the last ten years, this field (i.e.) wireless communications has grown at a fast pace [9]. Almost the electronic circuits has implemented some wireless device, in form of cellular technologies like CDMA, LTE technologies, Bluetooth, Wi-Fi, and to have effective communication in Software-defined radio.

II. LITERATURE REVIEW

The position of unknown wireless devices and the transmission of power by sensing carrier frequency and measuring the received signal strengths to obtain high accuracy in the signal strength.[2] The author proposed an efficient FPGA based Software-defined radio (SDR) implements with high flight termination system. However, the wireless network deploy in an industry often begins gradually with new technologies over time in the network; among them, many use a non-licensed spectrum of transmission to avoid licensing[1].In this research, an efficient method of detecting unknown devices using software-defined radio (SDR) receivers is proposed to estimate the accuracy in signal strength indicator. It's a kind of implementation of the digital signal in FTS in SDR domain [3]. As a result, this software operates using different radio hardware configurations. However, hardware radios use physical components that can be easily modified [4]. The still nature of hardware radios for certain implementation, limitations and applications studies for future study. First, the different hardware setup used for each and every radio technology significantly amounts of space, especially in the communication of signaling purpose [5]. The particular structure needs several radio technologies to implement the hardware with low cost and efficiency is enormous. Second, the deployed device becomes highly expensive for systems needs to use many different radio networks. Still, the other standards protocol in various regions in which a single phone can operate in different locations as implemented by the hardware devices 6]. The current setup limits the use of cell phones which do not have physical contact both in size and cost. Next, the hardware circuit analyses the protocol to use cell phones as a communication device. They need to support the idea that radio doesn't easily update old standards when new technology is more advanced [7].

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III. METHODOLOGY

The existing method implemented with a field-programmable gate array (FPGA) based Software defined radio (SDR) to Flight termination system (FTS) for analyzing the high signal strength Implementation of new types of software for digital FDS in SDR format for reduced signal strength indicator. The implemented design procedure replaces multiple platforms based SDR system with a single platform to analyze the growth of the communication system. The guarantees reconfigurable are highly portable devices with interoperable for signal, mobile for handheld devices, and handy system to maintain the errorless, bug-free, and reliable method for implementation purpose. Real-time flight termination requires a exceptional ruggedized, secured, and dependable floor for a signal platform. That is the reason why, FTS is implemented in FPGA to reduce the error in signal strength and signal strength indicator. To reduce hardware resources with small size and enable the future renovation, effective optimization technique has applied for further processing. Lab view is a high-level language used to simulate and implement the system in a real-time environment. This method is validated with subsystems at different stages of processing at different parameters and is recognized as an integrated system in the real-time communication system environment. The output of the analysis will not be accurate because of RSSI. So the novel system is proposed to overcome the disadvantage of existing policy. The existing system works on lab view software which low-cost error-free device.

IV. PROPOSED SYSTEM

The proposed method of detection can find the nearest position of the device under RSS measurement errors for a specific application concerning the parameter specified with the entire environment. The proposed method also implements a new process for PLE estimation and correction for communicating with other devices with high accuracy. By adopting the system, it can measure the optimum position of a machine and its transmission power saving and energy saving. The proposed method will better analysis the estimation of accuracy compared with the existing ones. The system consists of PIC 16f877a microcontroller interfaced with 2x16 Liquid Crystal Display (LCD), Global Positioning System (GPS), ZigBee (As a transmitter from unknown parameter), a Temperature sensor (LM35), and Humidity sensor (DHT11)

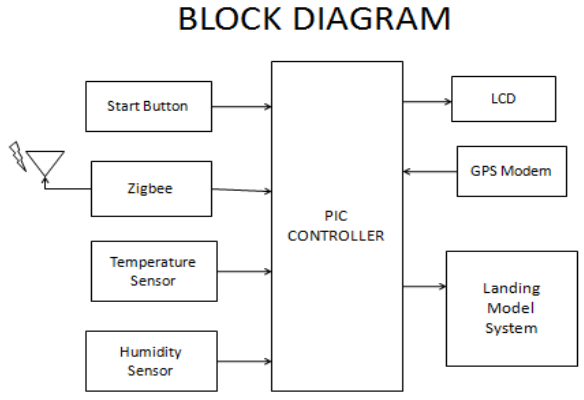

Fig. 1. Block diagram of a ZigBee Transmitter

So a signal is sent from a ZigBee transmitter in one end and the signal is received using ZigBee receiver from the other end and by using the Software defined radios (SDR) the position of the transmitter as well as the Signal Strength is calculated by using the path loss exponent (PLE) calculation.

V. RESULT AND DISCUSSION

The contents So, In order to find the signal strength and position of the device under RSS measurement errors for a specific application concerning the parameter specified with the entire environment controller is interfaced with ZigBee which is used to receive the signal from the unknown parameter and their transmission of power.

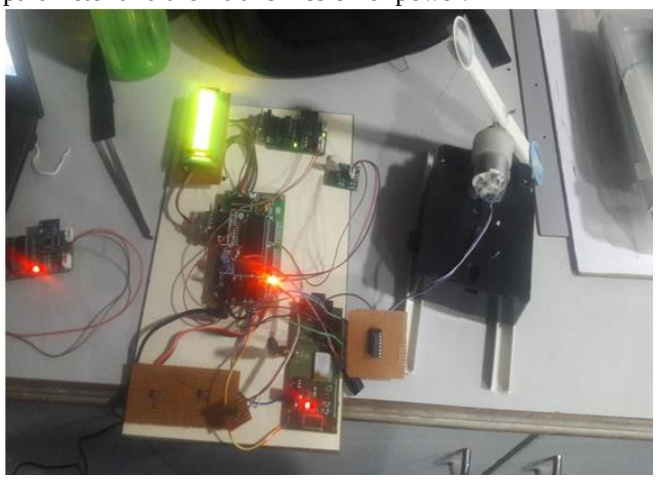

Fig. 2. Prototype of the transmitter

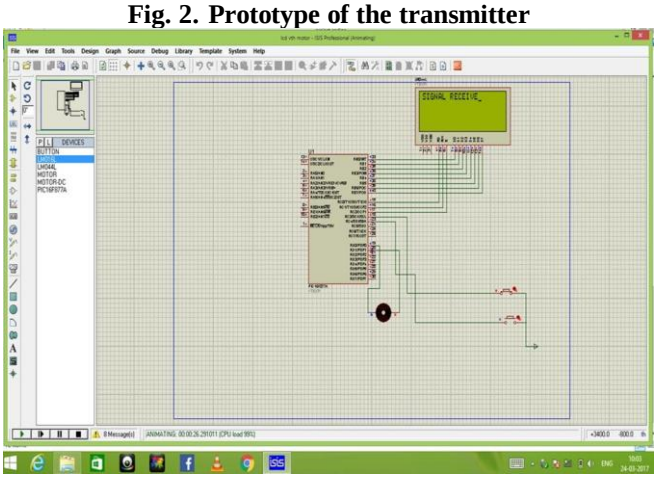

Fig. 3. Simulation Results

And hence by the Received Signal Strength (RSS) the location of the unknown parameter is found and its Geographical position is displayed using GPS in terms of latitude and longitude in the LCD display successfully. Fig 2 & 3 shows the prototype and simulation results.

VI. CONCLUSION

A conclusion Software-defined radios offer significant advantages, features which have attracted the researchers over the last few years. Hence because of their modularity, versatility and discrete, the new radio systems are being developed within software rather than hardware circuit for implementation.

Considering the versatile front and back end hardware module, the signal processing of SDRs often implemented with a general-purpose processor. Likewise, the most accepted SDR units far have been Ethical Research's USRP board and GNU radio software system, because of the open nature, the massive development community, in case of customization. The front and back end hardware are general-purpose CPUs continue with reduced error rate. The developer will implement more advanced software radios and become even more critical in a society with low cost programmable software-defined Radio (SDR).

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