

# Safe and Secure Wildlife Tourism Using Advanced Wi-Com Technology

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## Abstract:

Tourism, Safety and Security: a multi dimensional analysis brings together with advanced Wi-Com Technology is discussed in this paper. India has an amazing spectrum of animals native to the country. The country's rich and diverse wildlife is preserved in 120-plus national parks, 18 bio-reserves and 500-plus wildlife sanctuaries. In recent days, wild life tourism is a very popular place for adventurers and you-tubers. People are expecting more adventures and reality in their tourism, instead of seeing animals in zoo, people now wish to see them in forest areas lively. However, there are only rules and conditions regarding safety for people and forest guards, but no security factors. Therefore, there exists lot of animal attacks and it is increasing year by year as, per the survey. They were only concentrating in forest fire safety and animal tracking in the past years. In this research, we propose an idea to implement a strong safety precaution by using Wi-Com Technology, for the tourists and forest guards in particular. We use Near-field communication (NFC) reader to track the animal's presence, which is fixed with a tag. Once any of the animals is present near the limit, it will store and display the particular animal's details to the tourist's vehicle. The main object of this research work is to provide safety for the tourists. In the proposed system, the emergency switches are used to mention the priority of danger to the forest department server room, using Zig-bee protocol.

## I. INTRODUCTION

Wildlife tourism is an element of many nations' travel industry centered observation and interaction with local animal and plant life in their natural habitats. While it can include eco- and animal-friendly tourism, safari hunting and similar high-intervention activities also fall under the umbrella of wildlife tourism. Wildlife tourism, in its simplest sense, is interacting with wild animals in their natural habitat, either by actively (e.g. hunting/collection) or passively (e.g. watching/photography). Wildlife tourism is an important part of the tourism industries in many countries including many African and South American countries, Australia, India, Canada,

It has experienced a dramatic and rapid growth in recent years worldwide and many elements are closely aligned to eco-tourism and sustainable tourism. A wildlife safari is always as fun as it sounds. What could be more fascinating than capturing the glimpse of exotic species that too in their natural habitat. However, despite being so enthralling, sometimes, a wildlife tour can even lead to insane animal attacks on humans because of sheer negligence and unawareness of visitors. In the recent years, there has been an increase in the number of cases where conflicts between human and wildlife arose that too during an assisted wildlife tour.

## II. LITERATURE SURVEY

### A. Survey on Security in Wireless Sensor networks (Waleed Al Shehri, 2017, IJACS)

The emergence of wireless sensor networks (WSNs) can be considered one of the most important revolutions in the field of information and communications technology (ICT). Recently, there has been dramatic increase in the use of WSN applications such as surveillance systems, battleground applications, object tracking, habitat monitoring, forest fire detection and patient monitoring. Due to limitations of sensor nodes in terms of energy, storage and computational ability, many security issues have arisen in such applications. As a result, many solutions and approaches have been proposed for different attacks and vulnerabilities to achieve security requirements. This paper surveys different security approaches for WSNs, examining various types of attacks and corresponding techniques for tackling these.

### B. Internet of Things technology for fire monitoring system (S.R.Vijayalakshmi, S.Muruganand, 2017, IJRET)

IoT is one of the dominant positions all over the world in technological development. It is another information industry following computer, Internet and mobile communication. In Internet of Things technology the fire-fighting, fire monitoring and safety management system are an important applications. It discusses IoT system framework for fire-fighting, planning, and monitoring. It gives development points for providing research and development of IoT in fire-fighting, monitoring and safety management field. Intelligent fire monitoring systems need a key of accurate and effective firefighting software design. This paper also discusses about the requirements of user and key main issues of wireless sensor network hardware and software for monitoring fire. It discusses in elaborate the function of each module and implementation of that module in a detailed way. It also discusses application features of IoT

technology and Wireless Sensor Network technology for according to fire-fighting requirements.

### C. Wildfire Monitoring and Detection System Using Wireless Sensor Network (Albert S. Lutakamale, Shubi Kaijage, 2017)

Wildfire monitoring and detection system based on wireless sensor network. This system detects fire by monitoring surrounding temperature, humidity and smoke. Once fire is detected, a warning message containing probable location of that fire is immediately sent to the responsible authority over cellular network. In order for the system to be more effective, communities living near forests or national parks can send warning messages through the same system to the responsible authority using their mobile handsets once they witness wildfire or illegal activities. For the system to be fully functional, the only requirement is the availability of cellular network coverage in forests or national parks to enable short message services to take place. The system prototype is developed using Arduino microcontroller, several sensors to detect temperature, relative humidity and smoke as well as wireless network connection modules. At the control center Telerivet messaging platform is used to design the messaging service. The experimental results justify the capability of the proposed system in detecting wildfire in realtime.

### D. Wireless Networked Security System Based on ZigBee Technology (Liting Cao, Yanxia Liu and Shuo Yang, 2016)

The existing security systems show many shortcomings such as difficult to extend and severe time-consuming because it is based on wiring network technology. In this paper, we present a wireless networked security system based on ZigBee technology. The system adopts hybrid topology structure based on cluster, which consists of many micro-sensor nodes, network coordinator nodes, network gateway (router), communication network and monitor centre (computer). For short distance transmission, the micro-sensor nodes

collect data from the monitoring surroundings and transmit to the gateway using Zig-Bee communication. For long distance transmission, from the gateway to the monitor centre, system uses TCP/IP protocol. The gateway in this system is the protocol conversion used to transform a data package in ZigBee protocol to TCP/IP protocol before transmitting. A modified routing protocol based on LEACH is adopted in the system. The simulation result shows that the modified LEACH Protocol has superiority on survival time. The wireless micro-sensor can be scattered to the surroundings that human unable enter. Then the sensor nodes self-organizing networked security system and realize security monitor task. The system also can be used to forest fireproofing and environment pollution inspection after modification.

### III.SYSTEM ANALYSIS

#### A. Proposed System:

In the proposed system, NFC reader is used to track the animal's presence. This is fixed with a tag. It is used to identify the animal type and their nature. This leads them to enjoy the nearby animal and to make aware of the animal nearby. The main subject of this research work is to provide safety for the tourists. Once if any of the animals gets mad, the first prime target is self-defense. Apart from this, the Microcontroller unit (MCU) part of the system will have emergency switches to mention the priority of danger to the server room, using wireless device protocol. Also there is a direction switch to ensure that which part of the forest they are in right now and finally it will shut the power windows of the vehicle and switch on the flash light (to scare the animals) to rescue the tourists and forest guard from that deadly dangerous moment.

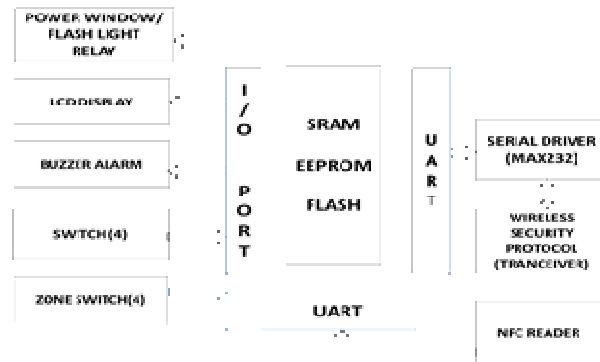


Fig.1 Block Diagram

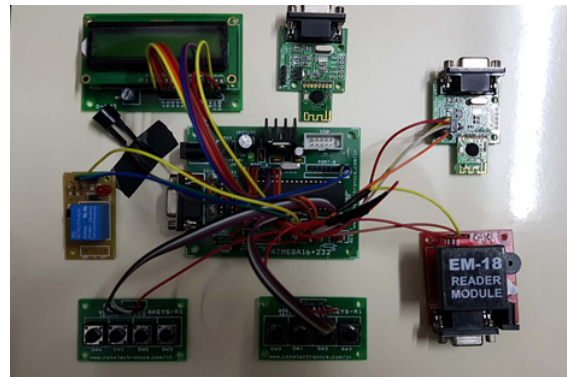


Fig.2 Prototype of the Proposed System

#### B.ATmega Microcontroller:

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. . By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed. The AVR core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one single cycle.

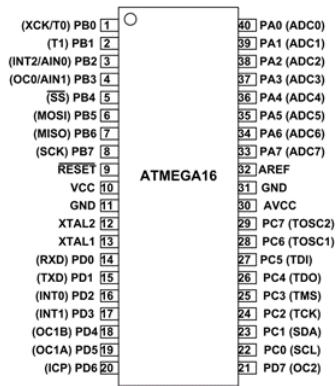


Fig.3 Pin Diagram

The ATmega16 provides the following features: 16 Kbytes of In-System Programmable Flash Program memory with Read-While-Write capabilities, 512 bytes EEPROM, 1 Kbyte SRAM, 32 general purpose I/O lines, 32 general-purpose working registers, a JTAG interface for Boundary scan, On-chip Debugging support and programming, three flexible Timer/Counters with compare modes, Internal and External Interrupts, a serial programmable USART.

**C.Zigbee Module:**

CC2500 RF Modem is a transceiver module, which provides easy to use RF communication at 2.4 GHz. It can be used to transmit and receive data at multiple baud rates from any standard CMOS/TTL source. This module is a direct line in replacement for your serial communication it requires no extra hardware and no extra coding to turn your wired communication into wireless one. It works in Half Duplex mode i.e. it provides communication in both directions, but only one direction at same time.



Fig.4 Zigbee Module

After each transmission, module will be switched to receiver mode automatically. The LED for TX and RX indicates whether IC is currently receiving or transmitting data. The data sent is checked for CRC error if any. The RX LED is directly on TX OUT pin to indicate the actual data is received and it is sent to output pin. No external antenna is required. Supports multiple baud rates (4800/ 9600 /19200 /38400). Works on ISM band (2. 4 GHz) which is reserved internationally so no need to apply for license. Supports multiple frequencies within the same band rate thus avoiding data collision .No complex wireless connection software or intimate knowledge of RF is required to connect your serial devices .Works on +5 V DC supply.

**1)SPECIFICATION:**

TABLE I  
ZIGBEE SPECIFICATION

NAME	MIN	TYPICAL	MAX	UNITS
WORKING VOLTAGE	4.5	5	10	VOLTS
FREQUENCY		2.4		GHZ
RANGE	15	25	30	METERS

**D.5EM-18 RFID Reader:**

The EM-18 RFID Reader module operating at 125kHz is an inexpensive solution for your RFID based application. The Reader module comes with an on-chip antenna and can be powered up with a 5V power supply. Power-up the module and connect the transmit pin of the module to receive pin of your microcontroller. Show your card within the reading distance and the card number is thrown at the output. Optionally the module can be configured for also a output.

**E.LCD 16\*2 Displays:**

A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCDs do not emit light directly. Liquid crystal displays (LCDs) are a passive display technology. This means they do not emit light; instead, they use the ambient light in the environment. By manipulating this light, they display images using very little power. This has made LCDs the preferred technology whenever low power consumption and compact size are critical. They are used in a wide range of applications, including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have displaced cathode ray tube (CRT) displays in most application.

TABLE II  
LCD Display Pin Configuration

PIN NO	SYMBOL	DETAILS
1	GND	Ground
2	Vcc	Supply voltage +5v
3	Vo	Contrast adjustment
4	Rs	0 >Control Input
5	R/W	1 >Data Input
6	E	Read/Write
7to14	D0toD7	Enable
15	VB1	Data
16	VB0	Backlight +5V

**F.Buzzers:**

A buzzer or beeper is an audio signal device, which may be mechanical, electromechanical, or electronic. Typical uses of buzzers and beepers include alarms, timers and confirmation of user input such as a mouse click or keystroke. Early devices were based on an electromechanical system identical to an electric bell without the metal gong. Similarly, a relay may be connected to interrupt its own actuating current, causing the contacts to buzz. Often these units were anchored to a wall or ceiling to use it as a sounding board. The word "buzzer" comes from the rasping noise that

electromechanical buzzers made. An oscillating electronic circuit or other audio signal source may drive a piezoelectric element. Sounds commonly used to indicate that a button has been pressed are a click, a ring or a beep. Electronic buzzers find many applications in modern days.



Fig.5 Buzzer

**G.TACT Switches:**

Switches can be seen everywhere. For electronic and electrical system, they act as a physical interface to the real world. Be it a key of a keyboard or mobile, be it a knob on an electrical appliance, be it a miniature button used on the PCBs of embedded systems, or be it a circuit breaker used on the power lines- all these are switches. Switches are of different types, of different specifications and are selected and used in a particular application according to specific requirements.

**H. Power Supply:**

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others.

Power supplies for electronic devices can be broadly divided into linear and switching power supplies. The linear supply is a relatively simple design that becomes increasingly bulky and heavy for high current devices; voltage regulation in a linear supply can result in low efficiency.

Transformer-steps down high voltage AC mains to low voltage AC.

Rectifier - converts AC to DC, but the DC output is varying.

Smoothing- smooths the DC from varying greatly to a small ripple.

Regulator- eliminates ripple by setting DC output to a fixed voltage.

### III. SOFTWARE COMPONENTS

#### A.AVR studio:

Atmel Studio 7 is the integrated development platform (IDP) for developing and debugging Atmel® SMART ARM®-based and Atmel AVR® microcontroller (MCU) applications. Studio 7 supports all AVR and Atmel SMART MCUs. Atmel Studio 7 IDP gives you a seamless and easy-to-use environment to write, build and debug your applications written in C/C++ or assembly code. It also connects seamlessly to Atmel debuggers and development kits. Additionally, Atmel Studio includes Atmel Gallery, an online apps store that allows you to extend your development environment with plug-ins developed by Atmel as well as by third-party tool and embedded software vendors. Atmel Studio 7 can also able seamlessly import your AVR sketches as C++ projects, providing a simple transition path from Maker space to Marketplace.

#### IV.CONCLUSION

The topic of safety and security in the tourism industry is of vital importance globally. In recent years, and mainly after the 9/11 event, both academics and practitioners have started to look into crisis management issues seeking workable solutions in order to mitigate the negative impacts of safety and security incidences on the tourism industry and affected destinations. In the proposed work, we addressed a multi dimensional perspective incorporating Tourism, Safety and Security: covering the major issues that are all about how to stay safe around wildlife and not be a victim of a wild animal attack on a wildlife safari tour.

#### ACKNOWLEDGMENT

We would like to express our deep gratitude to our beloved Project Supervisor, Dr.A.KISHORE KUMAR, Associate Professor-ECE, for giving us opportunity to do this project and for his inspiring

guidance, generous help and support. We would like to extend our sincere thanks to all our department staff members and our parents for their advice and encouragement to do the project work with full interest and enthusiasm.

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