ADRS

(AUTOMATIC DROWNING RESCUE SYSTEM FOR HUMAN USING RFID)

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Abstract – *It is very difficult and takes time to detect the person in water by usual ways like with the help of fire force or divers. Human sensor in the proposed system can detect the presence of human under water. RFID is used as the human sensor in the system. GPS and GSM can be used for identifying the location of the person and to send the message of person's location to the receiver on the boat. The RFID consist of two parts RFID tag and reader. The RFID reader is placed at the dangerous locations of the water body and the RFID tag is attached to the person's hand. The RFID reader will produce RF signals at all the time. When the tag is nearer to the reader it will be active using the RF signals from reader and send a unique serial number to the reader using its antenna. By programming the PIC microcontroller the tag will be identified and the GPS will be active at the same time. The GPS signal will be received at the PIC MC and send the location to the receiver on the boat using GSM technique. The boat will reach the location and save the person.*

Key Words: RFID reader, RFID tag, GPS, GSM, PIC.

1.INTRODUCTION

One of the major causes of unnatural death is drowning. In India about 80 people drown every day due to this, calculated from data for five years to 2014. It is very difficult and takes time to detect the person in water by usual ways like with the help of fire force or divers. The common problems are tracking must be robust and overcome occlusion and noise in monitoring. One important environment that the need for monitoring system is crucially sensed is the swimming pool. The lifeguards are not trained enough to handle the drowning problem. Many people are drowned or very close to drowning in the deeps of the swimming pools in each year. This raises the need for having a system that automatically detect the drowning person and alarm the lifeguards. The information of the drowning person can be send to the rescue boat immediately, if we identify drowning using a sensor. RFID tag and reader can be used as the sensor to identify the drowned person. The RFID tag is attached to the persons hand and also RFID reader is placed at the dangerous locations in the water body. The reader will produce RF signal at all the time. So when tag is nearest to the reader, the tag will be active by using this RF

signal from the reader. The tag will send its serial number to the reader. Then it will send a panic signal to the rescue boat.

More than one RFID reader is used, if there is wide dangerous area. To get the location of the person GPS module can be attached to these readers. GSM module is used to send the message containing the location of the victim to the rescue boat. The PIC microcontroller is programmed in such a way that when GPS signal is reached the GSM will be active. When the message reaches the rescue boat a panic alarm will ring.

This rescue system mainly contains RFID readers, RFID tags, GPS and GSM modules, rescue boat with alarm settings. RFID is used because it can be used in the water and also the cost for the implementation is comparably less. It can give a good range of detection. RFID use electromagnetic fields to automatically detect and track the tag attached to the person. This tag contains electrically stored information. There are two types of tags called active and passive. Passive tag can be used here because passive tag collects energy from nearby RFID readers using radio waves. Passive tag need not to be in line of sight to the reader. When a person with tag comes near to the reader, reader will get a signal and GPS become active immediately. It will send the location and time to the rescue boat. It will be received by the GSM module in the boat and the boat will move to the location manually and provide life jackets to the person. The net time consume for the action is just 5 minutes. The most advantage of this project is the rescue of person with less time. Time consumption is very important in the case of drowning, since the person will be in danger when time consumption is more.

2. LITERATURE SURVEY

Automated video-based surveillance for real-time human behavior analysis provides an efficient way of detecting the occurrence of any abnormal events amid our surroundings. The technical challenges faced encompass the need to reliably detect and track moving targets within a possibly dynamic background and an inference module that interprets targets' behavioral patterns as events with semantic meaning [1]. For homeland security, motivates

research into systems that extend beyond indoor and controlled outdoor environments to more realistic hostile environments typically encountered in real applications there is an increase in demand for such technology [1]. Due to rapidly changing environmental lighting, highly dynamic backgrounds and poor visibility of targets major difficulties however continued to be faced by most state-of-the-art systems. An outdoor surveillance problem, which involves human behavior monitoring within hostile aquatic environment, is considered in this paper [1].

For early detection of drowning incidents a camera-based system for early detection of drowning incidents paper presents a novel camera-based system designed to detect potential drowning incidents in a swimming pool [2]. In public places and private houses there are numerous swimming pools located worldwide. One of the leading causes of death from unintentional injury is drowning. In public swimming pools staffed with professional lifeguards many drowning incidents happened. Due to lack of timely rescue even more nearly drowning victims are left with, irreversible injuries, mostly to the brains. To provide useful assistance to lifeguards on duty or to enhance the safety of unattended pools there is a clear need for automated drowning detection systems.

To detect human fall incidents for enhanced safety indoor environments an intelligent video surveillance system is used [3].The main two parts of this system are a vision component to detect and track moving people in the view of a camera and to parses observation sequence of people features for possible falling behavioral sign an event inference module is used . The proposed system can robustly detect human falls in real time [3].

Surprisingly existing camera-based drowning detection systems are rare except few reported in patents. To detect motionless bodies at the bottom of a swimming pool in general, these systems make use of underwater cameras none of them involves analyzing early drowning behavioral signs, such as struggles on the water surface, which are important for timely rescue and reliable drowning detection. The use of underwater cameras not only incurs high installation and maintenance cost but also faces the problem of cameras being easily occluded by nearby swimmers. So the objective is to build a camera-based system that is capable of detecting potential drowning incidents at the earliest possible stage using only off-the-shelf overhead cameras.

In this project a robotic arm can be used to rescue the person automatically from the water. In the world of robotics, robotic arm has become popular. A programmable microcontroller based brick capable of driving basically three stepper motors design to form an anthropomorphic structure is the essential part of the robotic arm. This also explains the way of interfacing the

robotic arm with the programmed 8051-based micro-controller that is used to control the robot operations. An assembly language in programming microcontroller is created [4].

To find the correct location of the drowned person sonar can be used. This is also a technique to detect the presence of computer users [5]. This technique already exists on commodity laptop computers and other electronic devices. It uses the fact that human bodies have a different effect on sound waves than air and other objects [5]. A user study is conducted in which 20 volunteers used a computer equipped with our ultrasonic sonar software, our results show that after only ten seconds of measurement it is possible to detect the presence or absence of users with perfect accuracy [5].

GPS – GSM based tracking system work is an attempt to design a tracking unit. This system uses the global positioning system to determine the precise location of an object, person or other asset to which it is attached and using GSM modem this information can be transmit to remote user[6].

It is autonomous and easier to use with Unmanned Aerial Vehicles (UAVs) are more reliable, great potential for commercial use in common airspace. Though autonomous UAVs often do not rely on communication links with the ground during flight, it is necessary and essential to communicate for accomplishing complex mission tasks [7]. In cooperative missions where tasks are solved using many vehicles of different sizes and characteristics communication links become especially important. Wireless Ethernet or radio modems that use open frequency bands are often unreliable in urban areas due to interference from other[7].

A survey paper on radio frequency identification work provides a survey on radio frequency identification (RFID) technology. RFID tags will replace barcodes in supply chains. They can be read wirelessly and without line of sight, contain more information than barcodes. The current technology, including the frequency ranges used and standards described by this work [8].

3. PROPOSED MODEL

The block diagram of the proposed system consists of the PIC microcontroller. It also includes the GPS, GSM, RFID. These different modules are controlled by PIC. Transmitting section consist of RFID, GPS and GSM transmitter. Receiver section consist of GSM receiver.
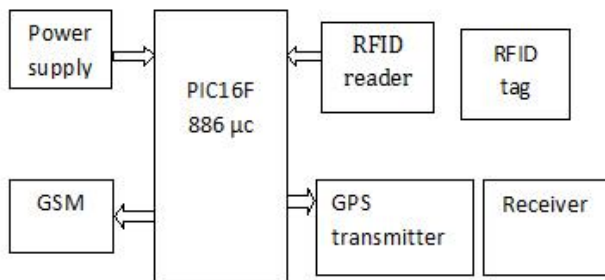
Fig -1: Block diagram of ADRS

3.1. WORK DESCRIPTION

The Radio Frequency Identification system containing reader and tag performs the detection of the person who was drowning in the water bodies. The tag is attached to the body of person. Global Position System is used to determine the location of person and all the details regarding drowning person with his name, location is transferred to the rescuer in the boat by the means of Global System for Mobile Communication. Here using passive RFID tag which is boosted by electromagnetic fields emitted by RFID reader. The carrier signal always emitted by reader captures by tag and the modulated signal is reverted to the reader by tag and thereby making a communication between reader and tag. Once the RFID becomes active GPS gets on soon by the switching of PIC controller through relay and transfers the location through GSM to GSM receiver for the rescuing operation. GSM receiver also alerts the rescuer in the boat for the immediate operation.

3.2. Hardware Description

a) PIC: Peripheral Interface Controller 16F 886 with 28 DIP is used for controlling operations in ADRS. It has enhanced Flash-Based 8-Bit and is CMOS Microcontroller with nano Watt Technology. It operates in 5 V supply and having Precision Internal Oscillator with 4 M Hz. PIC 16 operates with only of 35 instructions and having USART pin for serial communication. This small packet computer controls the RFID, GSM and GPS. It is factory calibrated to ±1% and the Software selectable frequency range of 8 MHz to 31 kHz.

b) RFID: It is a wireless non-contact system that transfer data from a tag attached to a person using radio-frequency electromagnetic fields, for the purposes of automatic identification and tracking. RFID operates with 5 V supply and having an application software, the memory together with the antenna. The output of this deals with 8 bit data corresponding to the tag.

c) GPS: A location determiner operates with 12 V supply with the help of 3 satellites orbiting the earth. The output oft of global positioning system provides the location by means of North- East data. The proposed frequencies are L1 (1575.42 MHz), L2 (1227.60 MHz) , L3 (1381.05 MHz) , L4 (1379.913 MHz) L5 (1176.45 MHz) . The analogue intermediate frequency is converted into a digital signal by means of a 2-bit ADC.

d) GSM: A global system for mobile communication provides output regarding the location with 12 V supply. GSM is a TDMA based wireless network technology operates on the 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands. It Provides the industry standard serial RS232 interface for easy connection to computers and other devices. It requires only of low power of 0.25 A during normal operations and around 1 A during transmission. It can be controlled through standard AT commands.
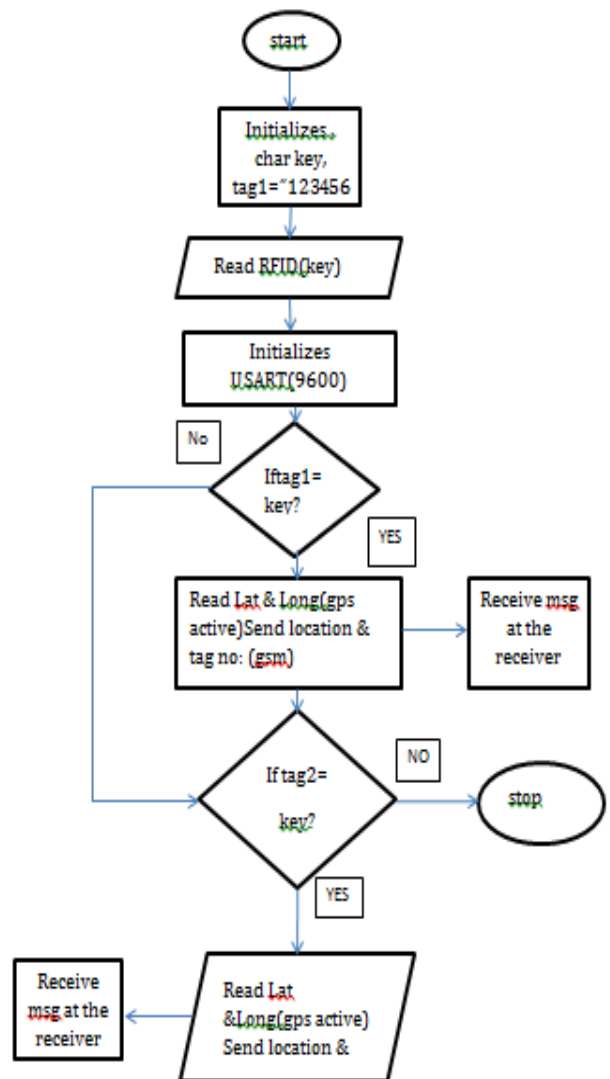

Fig-2: Flow Chart of ADRS

4. FUTURE SCOPE

The proposed system can improve by using video surveillance system for detecting human presence under water. But there must be always a person needed for monitoring the camera then only we can identify the person. This can be implemented for a large area. So within one camera, can identify drowning for a large area. Also many RFID readers can be used in different dangerous location for detecting drowned person in a wide area. The proposed system can also be implement by an automatic rescue boat to reach the drowning location. Thus the total time consumption for the rescue can be reduced to a very small value. In future a robotic arm can be also implemented to rescue the person automatically from water.

6. CONCLUSION

Implemented an automatic drowning rescue system to rescue the drowning person from water. Time consumption for rescue is very important in the case of drowning. Since when much time require for the identification of person, then the person's life will be in danger. The most advantage of our project is the automatic identification of drowned person and his rescue with a less time. The normal 125KHZ frequency RFID reader has only a 10cm range so instead of that we use 3m range RFID module. The GPS module is used for identifying the location of the victim. Also GSM technique is used for sending message that consist of the location of the person and also the serial number of tag to the rescue boat.

8. REFERENCE

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