Succorsavior lifeguard system to rescue drowning victim

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Abstract—**Drowning is the third leading reason of accidental injury-related death, even with of enhancements in lifeguarding and rescue operation technique.The ultimate goal of this paper is to enhance a lifeguard's ability not only to find drowning victims but also instantly respond and rescue them. This paper explains working, design and description of The Succor savior lifeguard system. The aim of this paper is to describe this concept so it will be used with lifeguard's team to rescue drowning victims in body of water and beneficial for humankind. It will help to find endangered drowning persons and to rescue them safely.**

IndexTerms—**Drowning victims, wristbands, unmanned surface vehicle**

INTRODUCTION

As per records of World Health Organization (WHO) drowning is main public health problem worldwide. Each year in the India average of 3,533 people dies from drowning. Drowning is the third leading reason of accidental injury-related death, accounting for 7% of all injury-related deaths, even with of enhancements in lifeguarding and rescue operation technique. Even though most of drowning victims survived but are living with eternal heart and brain injury caused by long oxygen deprivation. Most of these accidents take place in natural water reservoirs like lakes, rivers and beaches. The ultimate goal of this paper is to enhance a lifeguard's ability not only to find drowning victims but also instantly respond and rescue them.

NEED AND CHALLENGES

This part contains discussion of summary of current drowning statistics and counts in the India. Along with that it will also discuss modern approaches which will be helpful for lifeguards.These approaches include the primary challenges for lifeguards, and the best efforts to address them in practice. As well as it will have a small session to discuss difference and similarities among Succor savior lifeguard system and the Emergency Integrated Lifesaving Lanyard (EMILY). The most common sites for drowning accidents to take place are bathtubs and natural bodies. According to study of drowning incidents between 2005 to 2016 ithas been found that 51% happened in natural environments such as seashore, river and lake (Center for Disease Control and Prevention, 2016).The complexity and risk factor is high in Natural environments as compare to bathtubs. Risk factor increases due to beach topography, intensity of tides and other natural problems which will cause hurdle for rescue operation. Let's take example of controlled open body of water swimming pool which is surrounded by easy means of entry and exit points. In contrast, costal area has complicated topography, unpredictable tides, motion of water and rip current. The direction of rip current is perpendicular from land. Other than the environmental challenges of swimming in natural water bodies, time required for lifeguards to reach drowning victim is depends on how far he is swimming from seashore, so the farther drowning individual is swimming in sea, the longer it will take for a rescuer to reach them. The time required to reach the victim is minimal means of reaching a victim at a swimming pool, compared to means of reaching victim at the swimming pool, this means that the lifeguards will have even less time locate a drowning person, once they require assistance.

LIST OF MAINCOMPONENTS AND DESCRIPTION

1) **Wristband**- Wristband with customized circuitry will monitor heart pulse rate of individual. Along with that it has transmitter to communicate the data, as well as Dialog DA14681 Bluetooth chip and ADI adx1362 acceleration sensor. Wristband has battery capacity of 70mAh approximately 20 days stand by time. The heart pulse rate monitor module is attached to the main chip via flat cable. With the help of LEDlights and photodiodes to illuminate blood vessel for a while and monitoring the heart pulse rate via the change of green light absorbed dose, light absorption changes as blood pressure changes. RB4941 Control transmitter and receiver is used in wristband.
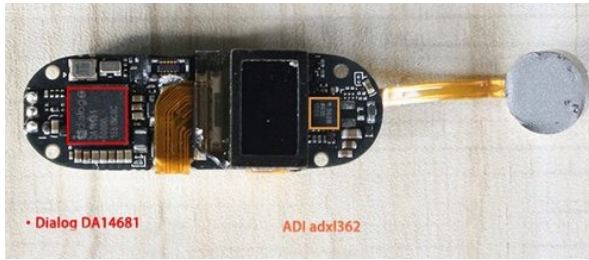
Fig.1. Wristband

2) **USV**-USV is unmanned surface vehicles (USV) or autonomous surface vehicles (ASV) which operateson surface of water without a crew. Usually USV's are operated remotely from land. Vehicles that operate on the surface of the water (watercraft) without a crew.They are used mainly used in an army to scan particular ground area. Surface boat without crew is shown in figure 1.

Fig.1. Unmanned Surface Vehicle

3) **Control room with high range transmitter receiver**–The 7.2 receiver is a high range audio and video transmitter and receiver. The ".2" indicates the 7.2 receiver's support for two specialized channels that handle only very low frequencies – otherwise known as Low Frequency Effects or LFE – which are output to specialized speakers called subwoofers.

WORKING PRINCIPLES

The Succor saviorlifeguard system is combination of wristbands, unmanned surface vehicle and control room with receivers. Drowning Swimmers in distress approximately have 20 to 60 seconds before drowning, and the major hurdle in rescuing drowning victims is finding the help for assistance from land before it's too late. The Succor Saviorlifeguard System tracks location of victims and monitors heart pulses with the help of convenient waterproof wristbands worn by each individual swimmer. This wristband has customized circuitry to monitor heart pulse rate of individual also its equipped with emergency

panic button which will alert rescue team that an individual needs help. Wrist band is equipped with transmitter which consistently transmits the heart pulse rate data of individual to nearest control room. The system on seashore control house monitor pulse rate of individual and when it falls below threshold system automatically provide an alert and position to locate endangered swimmer. This information is transmitted using specially designed signal relay buoys anchored along the beach at even intervals which used to communicate the data to a processor located in control room on beach. As soon as system receives location it will create a map as shown in figure 3 for lifeguards so that they could easily reach to victims and rescue them. This data helps to on-duty lifeguards to find victims location and to plan rescue operation. In figure 2 data transmission between wristband and control room is shown.
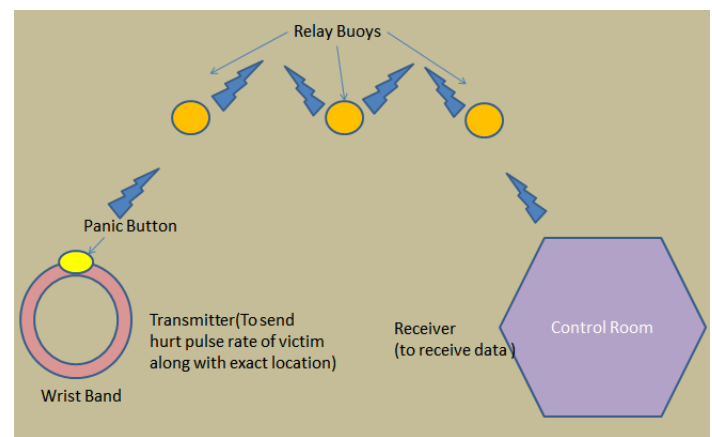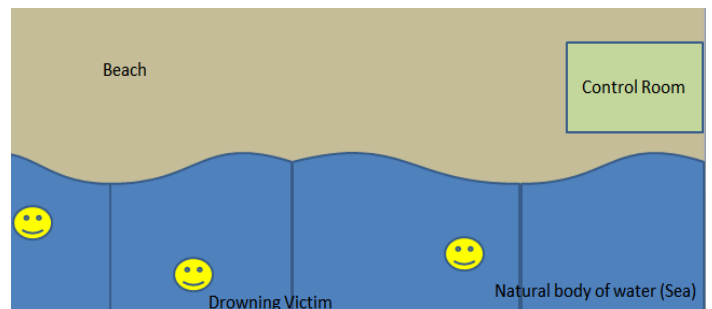

Fig.2. Unmanned Surface Vehicle

Fig.3.Map created by system to locate victims

An unmanned surface vehicle is shipped to victims instantly for rescue with all essential equipment like oxygen cylinder and first aid. USV can transport cautious victims and lifeguards to coast. The main aim of Succor saviorlifeguard system is to prevent unnecessary life loss.

Succor savior lifeguard system helps lifeguards and emergency services with a cost-effective solution and system to locate and rescue drowning victims in Emergency circumstance.So this is how it is beneficial for humankind.

CONCLUSION

This paper gives a detail idea about succor savior lifeguard system which helps to locate and rescue drowning victims in the open natural water reservoirs. Moreover, it also illustrates the different component and benefits of Succor savior lifeguard system. In future, by use ofArtificial Intelligence and Machine learning algorithms this system will recue drowning victims without human interference.

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