

LITERATURE SURVEY

Muhammad Ramdhan MS1, Muhammad Ali2, et al., "An Early Drowning Detection System for the Internet of Things (IoT) Applications ", August 2018, TELKOMNIKA, Vol.16, No.4, pp. 1870~1876 ISSN: 1693-6930

They proposed a headband type wearable IoT device to detect a heartbeat pulsed from pulse oxytomertic sensor. The sensor data is continuously detected by the controlling station outside swimming pool and transmitted to a mobile phone by internet protocols. The event of danger is detected by calculating absence of signal reception after 30 second to the out of pool control unit built by RASBERRY pi system meaning that water is abstracting signal since water does not allow RF signal transmission. It is merely a signal sending wearable device by which an alert to alarm system and mobile alert.

L.Fei, W. Xueli, "Drowning Detection Based on Background Subtraction," 2009 International Conference on Embedded Software and Systems, Zhejiang, 2009, pp. 341-343.

They did experiments in a public swimming pool to take a video sequence using a fixed underwater camera for Drowning Detection Based on the complex Background Subtraction method. They proposed a patented method, where a complex image processing technique used to evaluate a drowning accident. It was presently been used in several sports swimming pools. But always there is a need of a human observer and rescuers is found Soren Bonder up Proposed an automatic surveillance system to trace floating, accidental falling human in harbors and rescue by using thermal cameras and image enhancement techniques like Kalman Filter and virtual trip-wire in combination with an optical flow algorithm which has gained 100 percent accuracy and 0.08 false positive case per hour. Infrared cameras became commonly used in domestic and ocean coast guard to find any living person on top of the water. They can watch a floating object with some heat from 2000 meters distance.

Ahmad Ilham et al., "Au Float (Autonomous Float) Based-on Artificial Intelligent and LORA (Long Range) Using Haar Cascade Method for Rescuing of Water Accident Victims," 2019, International Symposium on Electronics and Smart Devices (ISESD), Badung-Bali, Indonesia, 2019, pp. 1-4.

They have proposed an autonomous underwater float and swim robot to rescue drowning victims in harbors in the event of failure of a large boat with several people struggling to swim for a longer duration. The proposed device is about 5Kgs weight and can carry a person upto 96 kg, with an average speed underwater 0.95m/s. With image processing system with the Haar Cascade Algorithm, the device is proposed to detect human hands, face from 3 to 4 meters distance in low light conditions. The paper reporting a remote-control connectivity table showing successful remote connectivity below 700 meters only and afterwards there is a transmission error. The paper is showing an algorithm of motion of the proposed device autonomously above or underwater.

Wenmiao Lu and Yap-Peng Tan, "Swimmer motion analysis with application to drowning detection," 2002 IEEE International Symposium on Circuits and Systems. Proceedings (Cat. No.02CH37353), Phoenix-Scottsdale, AZ, USA, 2002, pp. II-II.

Wenmiao Lu proposed a complex image processing algorithm to learn and understand the motion behavior of swimmers and detect early detection of drowning incident by video surveillance camera output. It is also an article with a different approach of machine learning. Yap-Peng Tan has proposed a complex image processing technique where underwater cross-section is monitored continuously by a high-resolution camera and every image frame is subtracted by a predefined image to locate anyone staying underwater stationery. The computer system will alert the security personnel immediately after detecting a victim. A rescue person is mandate to do a rescue operation. Watercolor should always transparent to operate this algorithm.

Roy and K. Srinivasan, "A novel drowning detection method for the safety of Swimmers," 2018 20th National Power Systems Conference (NPSC), Tiruchirappalli, India, 2018, pp. 1-6.

They have presented a design article on a drowning detection device that is based on head-wearable comprising swimming goggles housing a wireless transmitter that communicates with a receiver outside the swimming pool and hydrophone backed by an embedded software program. Roy proposed wearable swimming goggles with a hydrophone, a buzzer is in outside water pool. Hydrophones were sending alert to buzzer outside water. Implemented using Proteus software and demonstrated practically. Hydrophones sound may be jammed by noise in public pools, and discomfort to the user to wear a mask type goggle.

S. Sindhuja, "MEMS based-self-regulating airbag drowning aversion system for submerged swimmers," 2015 International Conference on Circuits, Power and Computing Technologies [ICCPCT-2015], Nagercoil, 2015, pp. 1-4.

She has proposed an embedded system of the water pressure sensor and GPS system to send SMS alert to monitoring person and actuation of the airbag, an accelerometer is also used to detect unusual motion of swimmer in the event of suffocation. It's a wearable system where power supply and continuous pressure monitor in water and, gas level checking is needed. Suffocated swimmer will not move so rapidly in all the cases and may fail to detect drowning. It is not useful in a person going sudden unconscious, breathing diseases in the event of failure of airbag failure. Sindhuja (2015) describes a wearable that is operational with a set of accelerometers, pressure sensors, and a microcontroller for automatic drowning victim rescue.

CAI Xiaoyang, W. Chen and F. Lei, "Application of Image Restoration Based on Robust Estimation in Drowning Warning System," Second Workshop on Digital Media and its Application in Museum & Heritages (DMAMH 2007), Chongqing, 2007, pp. 33-35. 11. L. Fei, W. Xueli and C. Dongsheng, "Drowning Detection Based on Background Subtraction,"

2009 International Conference on Embedded Software and Systems, Zhejiang, 2009, pp. 341-343.

CAI Xiaoyang, W. Chen and F. Lei proposed an image processing technique based on image restoration with a robust estimation method. Underwater video CC cameras were assumed in the article. A combination of image processing techniques helped to locate an underwater human body with all noise associated with water surroundings. Comparison table of authors and their choice of technologies to predict and act on drowning accident. Image processing Techniques Wireless SONAR (Acoustics) usage Thermal Imaging IoT Automatic Rescue Wearable Signal to alarm 1

H. Liu, M.B.H. Frej and B. Wen, "A Novel Method for Recognition, Localization, and Alarming to Prevent Swimmers from Drowning," 2019 IEEE Cloud Summit, Washington, DC, USA, 2019, pp. 65-71.

They proposed an arrangement of underwater communication devices like Hydraulic Pressure Sensor, Ultrasonic Sensor to continuously monitor the location of the swimmer and learning the motion behavior of the swimmer is done. Hydraulic pressure is going to sense how deep the swimmer is submerged by 3D positioning of the swimmer. With the technique, the system is going to send a distress alarm signal to an outside system to turn alarm ON.