A SMART STRETCHER WITH INTEGRATED MEDICAL INTELLIGENCE SYSTEM

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Abstract

The idea here is to provide an intelligent smart health system using some sensors and microcontrollers which are implemented in stretchers. This can improve the quality of care which makes the process quicker. The purpose of this project is to highlight the main features of an intelligent stretcher and a system of monitoring crucial signs of an unconscious person. Arduino is the selected device for information processing which collectively obtains the heart rate and Temperature, updating directly to the intensive care unit via IOT. This system is developed by using affordable technology and merging different functions to offer an expedient solution. Additionally, the stretcher is provided with an automatic moving mechanism under the guidance of one person which reduces manpower requirements.

Keywords: IoT, Smart stretcher, NodeMCU, Arduino, Patient monitoring system.

Introduction

Covid-19 is still on its current mission of affecting people with it's insperable cause that is the death to expansion of virus ratio. It was in 2019 when it started emerging as a deadly virus and without any discrimination it got spread across the countries worldwide, making people suffer. In November 2020,people being infected by covid was more than 62 million,even today although the count has enormously been reduced people suffer because everyone was although , not infected but affected.

Preserving good health is one of the global challenges for humanity. [4] In the last decade people have offered a considersble amount of attention to the wireless and Internet of things based technology (IOT) ,whereas this technology has also given the beat of it's outcomes to help mankind. It's innovation has helped the each and every field and most importantly ,The medicinal field. Basically in medical field it refers to the establishment of such physical device that can be used to obtain, transfer the information over wireless systems with less support from human[5] . Health care professionals used to go to to each ward and check the patients, thus measuring the basic parameters by themselves,this causes a lot time driven mechanism ,thus a smart streacher is proporsed so that the basic health measuring physical parameters can be measured like temperature , heart rate and oxygen level , helping people as well as the healthcare speacilist by saving their time, by reading and transferring the information through wireless medium to the doctor thus also proving it medically intelligent.

Previously, Arduino, Android, and microcontroller-based heart rate monitoring

systems have been proposed in system based on the Arduino Uno and cloud computing, in which only a hardware prototype was produced.

[3] Implementation of vehicle ventilation system using NodeMCU ESP8266 for remote monitoring.

The prime goal is to develop a healthy setup which in fact follows the covid guidelines ,that is maintaining social distance,developinga patient monitering system so that doctors can monitor patients,who are either hospitalizedor executing their normal daily life activities,thus improving the technological growth.Hence, a Patient monitoring system (PMS) is required.

Different sensors like: Temperature sensor, SPO_2 sensor, Heart sensor, PIR sensor, Ultra Sonic Sensor, IR sensor are used to measure the different physical parameters.

Methodology used:

Fig1: Flowchart of methodology

The methodology consists of six main steps:

1) The assessment means that proper analysis is done at the basics sted to form an ideology.

2) The literature review: Taking idea from different sources the literary review serves the base of the idea formation of the project that is the review from [1] demonstrated in the use of wireless system. Hence the reviews serves of great values.

3) Material collection : The sensors and the different hardware particles need for successful completion for the project is assembled.

4) Fabrication: The complete steps involved in the process of successful layout of the project.

5)Testing:In testing part of the methodology the fabricated project is tested against all the circumstances.

6) Demonstration: The project is demonstrated and successfully completed.
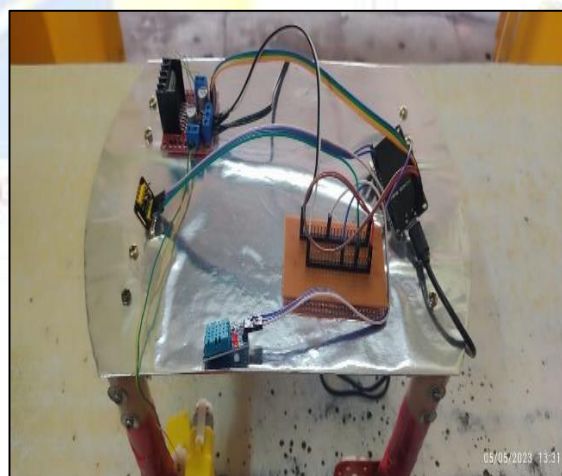
Developed model of stretcher

Fig2: Model of the developed stretcher

The above model represents the system of
A smart stretcher with medical intelligence system, possessing all the required sensors and thus resulting the desired prototype.
The health monitoring task is achieved by

telemedicine (enabling medical information exchange as the support to distant decision making) and tele-monitoring (enabling simultaneous distant monitoring of patient and his vital function) that monitor changes in ECG signals and provide feedback to

help maintain an optimal heart status. Wireless ECG sensor module is realized by using an eZ430-RF2500 which is a complete MSP430 wireless development tool providing all the hardware and software for the MSP430F2274 microcontroller and CC2500 2.4GHz wireless transceiver. On the personal server module, visualization and analysis software are implemented. This software has the following facilities: GUI (Graphic Interface) for ECG waveforms; displays the patient's parameters received from the sensors; sends the commands and medical decisions.

Working of the Model

The system consists of two parts: the hardware and the mobile application. Both parts are essential for the system, and users can obtain results from both. The given diagram shows the system prototype. Devices like the Arduino Uno, LCD display, buzzer, pulse sensor, temperature sensor, node MCU, and Bluetooth module are added to implement the system. In the display of the system, the measured pulse rate, SpO2 level, and body temperature are shown; if the measured data goes out of range the buzzer rings.

In [2], the system prototype is simple, easily implemented and easy to use. It may be easily moved from one location to another because it is a lightweight prototype.

Sensors monitoring health parameters:

Pir Sensor: It utilizes the detection of infrared that is radiated from all objects that emit heat.

Piezo Sensor: For beep purpose

IR Sensor: For radiation purpose

Temperature Sensor: For Temperature measurement

Spo2 Sensor: To measure oxygen level

Heart Beat Sensor: To measure heart rate

Result & Discussion

All the components are precisely positioned, the overall result is good to prove the medical intelligence of the smart streacher.After examining the system separately, it was observed that the system worked adequately. This means that the system designs and implementation process for the project were correct; thus, the user's data were satisfactorily measured. The full system has two combined main parts. Through this system, users can obtain measured values of their vital signs through the mobile application as well as the LCD of the system.

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