



A Novel Highway First-Aid Vending Machine

N. Nithya¹, R.S. Janarthnam², A. Narmatha³, P.T. Sree Lakshmi⁴Assistant Professor¹

Department of ECE

Akshaya College of Engineering and Technology, Coimbatore, India

Abstract:

The VLSI based first aid vending machine in highways is used to dispense first aid items and basic monitoring devices for the persons who need immediate attention during accidents in highways. Its main objective is to provide a package of first aid items, one could get to treat a new injury. It contains pulse sensor, respiratory rate sensor and a nerve stimulator. CPLD based design result in high speed and cost-effective solution which is programmed using VHDL language. The heartbeat sensor is used to sense the heartbeat. The signal is then given to a signal conditioning circuit. The sensed output is given to an amplifier unit for amplification. The amplified signal is then given to an A/D converter where the analog signal is converted to digital signal. The digital output is given to CPLD where the coding is written in VHDL language and it outputs the pulse of the person. Similarly, the respiration level is also analyzed using respiratory rate sensor and if it is in a danger level then the electric pulse voltage in the nerve stimulator will be varied which is operated by relay. Based on pulse and respiration level the CPLD sends a signal to relay which makes the circuit to produce minimum voltage for shock treatment.

Keywords: CPLD, Pulse sensor, Respiratory rate sensor, Nerve stimulator, Analog to Digital Converter (ADC)

I. INTRODUCTION

A report released by India's ministry of road transport

says: 146,133 people were killed in road accidents in India in 2015. There were 501,423 road accidents in 2015 - or 1,374 accidents every day - up from 489,400 in 2014 up from 139,671 in 2014. Four hundred road deaths take place every day on India's roads. Thirteen states, including Tamil Nadu, Maharashtra, Madhya Pradesh, Karnataka, Kerala and Uttar Pradesh, accounted for more than 80% of all road accidents and fatalities. Nearly eight in ten accidents were caused by drivers, with 62% of those blamed on speeding and lack of first-aid medicines in highway. Medicine plays an important role in human's life for every situation. An automated medical system is introduced to reduce the man power time and energy. It is similar to an ATM through which we get the required money at any time & any place. The same system is followed for the pharmaceuticals also. First aid medicines like bandage, cotton, ointments etc., can be obtained.

II. PROPOSED SYSTEM

Our main objective is to provide basic monitoring devices along with the first-aid vending machine which dispenses basic first-aid items. Here pulse rate sensor, respiratory rate sensor and nerve stimulator are interfaced with CPLD and PIC controller. The LCD displays the measured sensor values. Based on these two sensors value the electrical pulse voltage will be varied in nerve stimulator which is operated by relay. This relay will be switched on only when the two sensor values reach cut-off values. These sensor values should not be greater than the critical value which is acceptable by human beings.

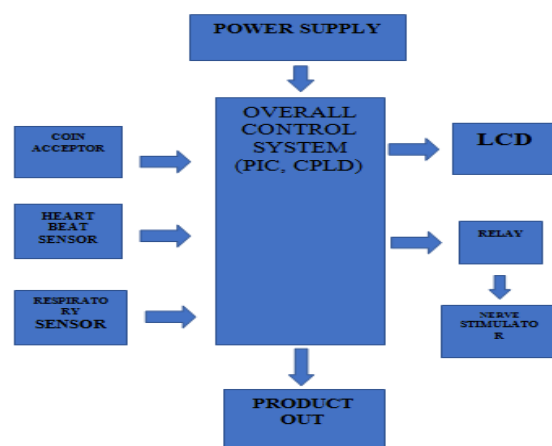
III. RELATED RESEARCH

The medicine vending machine as the name suggests is a vending machine that will dispense the required medicine as per the user's choice. It provides all-encompassing solution to an individual looking for immediate symptomatic relief for trivial health problems [1]. Another vending machine setup

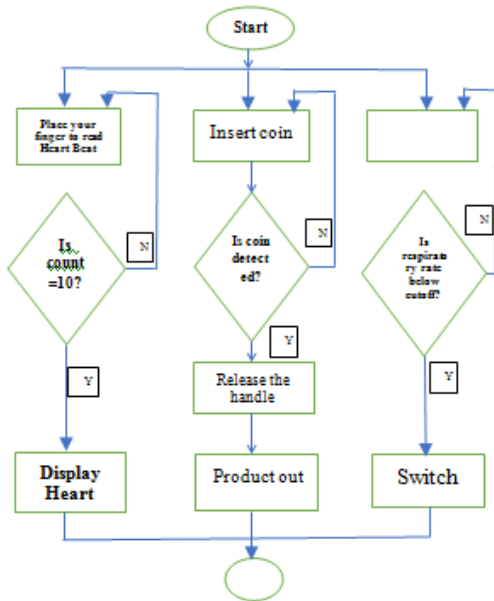
has been made which operates not on coin or note, it operates on RFID system. A small RFID reader is fitted on the machine. The identity card which contains RFID tag is given to each employee [2]. This paper describes about multi select machine using FSM model with Auto-billing features. FSM modeling is the most crucial part in developing proposed model as this reduces the hardware [3]. This system is followed for the pharmaceuticals also. Medicines for BP, diabetes, Cold etc. can be obtained using smart cards as well as coins [4]. This paper presents design and experimental studies of vending machine for office stationary transactions. The advantage of the systems is that the transaction can be done by using SMS, Early warning System etc. and it is also equipped with battery backup when electricity cut-off [5]. This paper attempts to provide solution in coin based vending machine [6].

IV. SYSTEM DESIGN

The whole setup is powered up using single rechargeable battery. It uses two controllers (PIC and CPLD) for overall system control and it includes two sensors such as pulse rate sensor and respiratory sensor. The LCD display is interfaced with PIC controller and the nerve stimulator is activated based on the two sensor values.



Process Flow

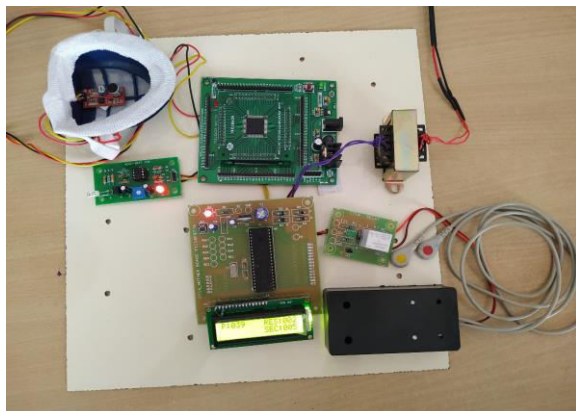
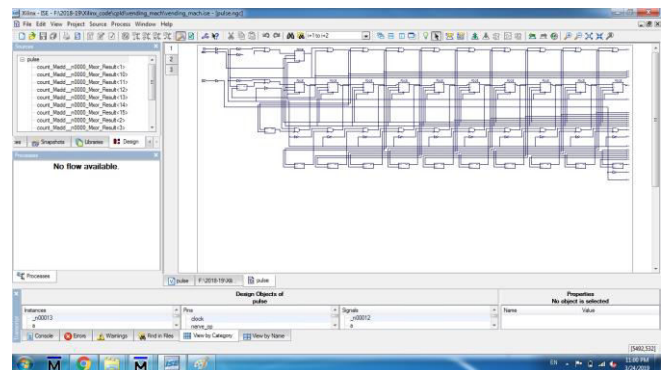
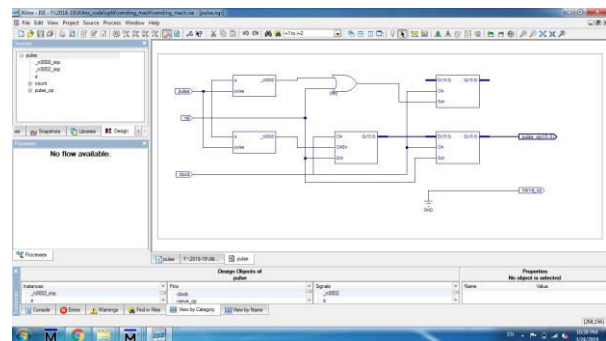
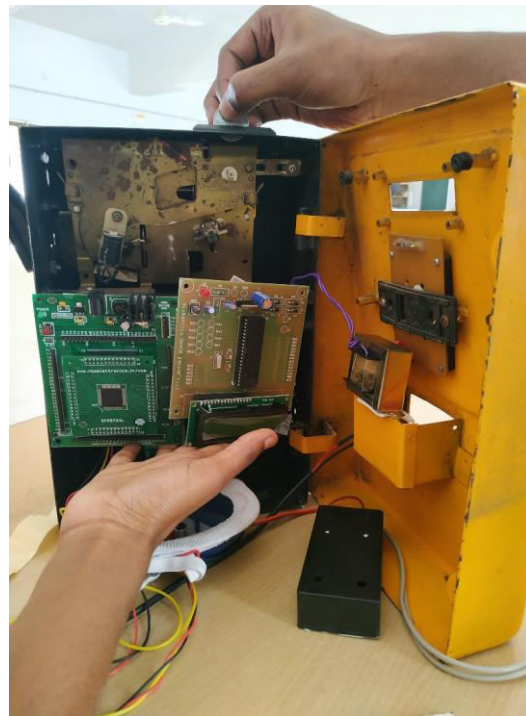


Algorithm:

1. Insert coin to the coin acceptor slot and release the handle.
2. Measure the heart rate and respiratory rate of the person simultaneously.
3. After releasing the handle, get the required product output.
4. After measuring the heart beat and respiratory rate value, switch on the nerve stimulator
5. display the heart rate and respiratory rate in LCD.

V.RESULTS AND OUTPUT

Thus, the measure of heart beat and respiratory rate are obtained along with proper working of vending machine that contains first- aid products like band aid, cotton, Dettol etc., This vending machine's product delivery is accurate, and the overall power management is ensured by battery.



VI.CONCLUSION

In smart cities, due to traffic, sometimes ambulance will not reach the emergency spot on time, it may causes death. To overcome these problems, vending machine is used. Hence this major problem is solved by our project and few additional features like heart beat sensor, respiratory sensor, nerve stimulator are also included in order to avoid delayed checkup after the ambulance reaches the spot. Also we can add the Global Positioning system (GPS) to locate the nearby First-aid vending machine in case of emergency.

VII. REFERENCES

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