

Sanitary Napkin Vending Machine (Hygiene Hub)

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Abstract -

Nowadays, women's are playing lead role in many organizations. They work in many places and are active in various fields. Maintaining good health and hygiene during menstruation is important for working women. The unavailability of sanitary pads during menstruation cause serious health issues among women to avoid such health issues in menstruation they need to change pads every 3-4 hours, so easy availability of sanitary pads becomes very important need. Sanitary napkin vending machines provide a convenient option for women and girls to obtain menstrual hygiene products. Easy access to sanitary napkins helps women and girls to manage their menstrual hygiene confidently and comfortably, which can have a positive impact on their education, work, and overall work culture. Making sanitary napkins readily available in public places is a step towards women security. This paper covers maximum hardware and software requirement for assembling of "Sanitary pad vending machine"

Key Words – AVR_Atmega8 (Microcontroller), IRsensor, LM7805, sanitary napkins, menstrual hygiene, coin acceptor.

INTRODUCTION

This paper analyses the hardware requirement for assembling Sanitary Pad vending machine using microcontroller and IR sensor. As we all know easy availability of napkins become necessary because during menstruation, women's have to change sanitary napkins every 4-5 hours. Due to the insecurity in girls get increased. Thus availability of napkins important for proper awareness. To help women's to get the sanitary napkins when they want, we can install sanitary napkin vending machine in school, colleges, working and public places. A special machine has been made to dispense sanitary napkins to the places where they are needed. We can place this device anywhere or we can hang it to wall. This device is easy to use. All you have to do is insert a 5 rupee coin into it and it will give you a sanitary pad. It is useful for rural areas where

these things are difficult to get. It is also economical and can hold 15-16 pads at a time.

1.1 Aim:

To design and implement an Sanitary napkin vending machine to create awareness about health care and hygiene by providing napkins at reasonable cost and easy availability.

1.2 Objective:

The main objective of the sanitary vending machine is to get the hygiene sanitary napkins with reasonable cost. And it can be easily fit at any place without any acquiring large amount of space. The napkins should be reachable to all ladies in every place where they are working and going. It is to make country hygiene and safe free napkins.

2. Programming:

```
/* * Vending_Machine.c
#include <stdlib.h>
#include <string.h>
#include <stdio.h>
#include "HardwareProfile.h"
#include "LCD.h"
#include "DC_Motor.h"
#include "ExternalInterrupt.h"
U8 DropObject();
U8 GetPinValue(U8 pin);
U8 dispBuff[10];
U8 coinCnt = 0;
const U8 PROGMEM menuDisp[] = "Insert 5 Rs coin";
const U8 PROGMEM menuDisp2[] = "fr Sanitary Pad";
const U8 PROGMEM frstAid[] = "*: First Aid";
int main(void)
{
// Port pin directions
MakePinOutput(LED_DIR, LED);
MakePinOutput(BUZZ_DIR, BUZZ);
// Initialize modules
InitLCD();
```

```

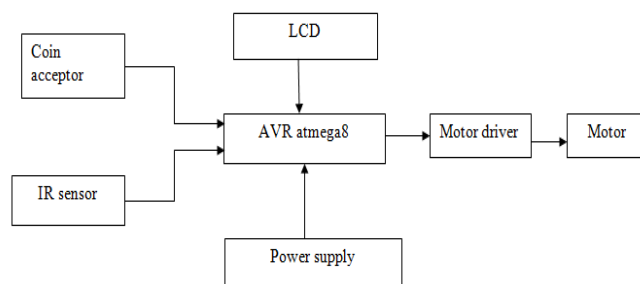
InitMotors();
SetBit(LED_PORT, LED);
SetBit(BUZZ_PORT, BUZZ);
// Display on LCD
PrintString(0x80, (U8*)" Sanitary Pad ");
PrintString(0xC0, (U8*)" Vending Machine");
_delay_ms(300);
// Blink LED & buzzer
ClearBit(LED_PORT, LED);
ClearBit(BUZZ_PORT, BUZZ);
_delay_ms(100);
SetBit(LED_PORT, LED);
SetBit(BUZZ_PORT, BUZZ);
_delay_ms(100);
ClearBit(LED_PORT, LED);
ClearBit(BUZZ_PORT, BUZZ);
_delay_ms(2000);
ClearLCD();
// Interrupt for coin counting
Enable_INT0(INT_FALLING_EDGE);
PrintStringFlash(0x80, menuDisp);
PrintStringFlash(0xC0, menuDisp2);
while(1)
{
if(coinCnt > 0)
{
// Drop object when coin inserted
DropObject();
_delay_ms(2000);
ClearLCD();
PrintStringFlash(0x80, menuDisp);
PrintStringFlash(0xC0, menuDisp2);
coinCnt--;
_delay_ms(1000);
}
_delay_ms(100);
}
ISR(INT0_vect)
{
// Measure pulse width of input pulse from coin
U16 pulseWidth = 0;
INT0_CLEAR_FLAG();
while(!TestBit(COIN_PIN, COIN))
{
pulseWidth++;
_delay_ms(1);
}
// If greater than 50 then incr coin counter
if(pulseWidth > 50)
{
SetBit(BUZZ_PORT, BUZZ);
coinCnt++;
utoa(coinCnt, (char*)dispBuff, 10);
PrintStringFlash(0xC0, (U8*)PSTR("Coins: "));
PrintString(0xC7, dispBuff);
_delay_ms(500);
ClearBit(BUZZ_PORT, BUZZ);
}
}

```

```

// Drop objects with given count & type; Returns total packets
dropped
U8 DropObject()
{
U8 count;
ClearLCD();
PrintString(0x80, (U8*)"Dropping packet.");
utoa(coinCnt, (char*)dispBuff, 10);
PrintStringFlash(0xC0, (U8*)PSTR("Coins: "));
PrintString(0xC7, dispBuff);
for(; count > 0; count--)
{
while(GetPinValue())
{
Run_DcMotor_Bw(0);
}
else
{
ClearLCD();
PrintString(0x80, (U8*)"Sorry!");
PrintString(0xC0, (U8*)"Stock Empty!!");
Stop_DcMotor(type);
SetBit(BUZZ_PORT, BUZZ);
_delay_ms(500);
ClearBit(BUZZ_PORT, BUZZ);
_delay_ms(500);
SetBit(BUZZ_PORT, BUZZ);
_delay_ms(500);
ClearBit(BUZZ_PORT, BUZZ);
return pillsDropped;
}
}
_delay_ms(200);
}
PrintStringFlash(0x80, (U8*)PSTR("Packet Dropped! "));
PrintStringFlash(0xC0, (U8*)PSTR("Please collect.."));
SetBit(BUZZ_PORT, BUZZ);
_delay_ms(100);
ClearBit(BUZZ_PORT, BUZZ);
_delay_ms(100);
SetBit(BUZZ_PORT, BUZZ);
}

```



```

case 0:
return TestBit(IR1_PIN, IR1);
break;
}
return 0;
    
```

3.1 Components used:

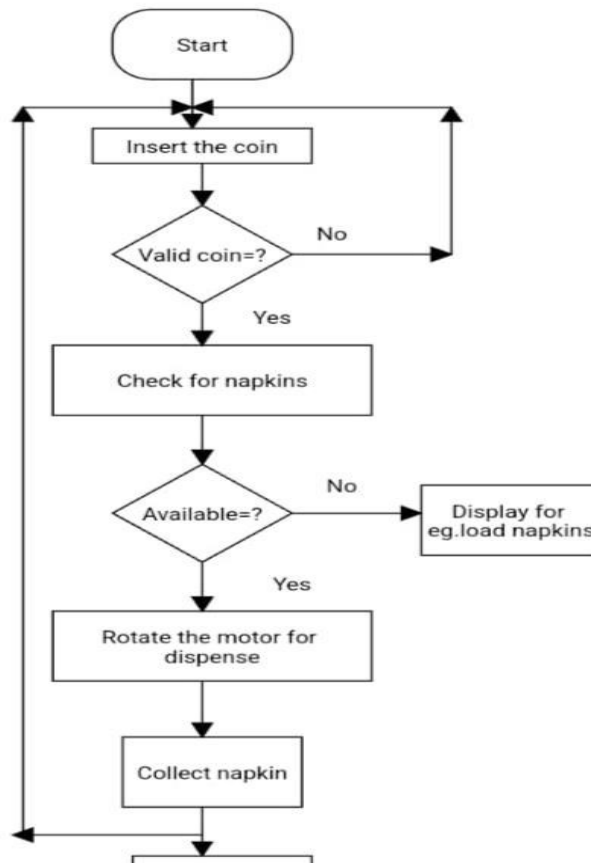
1. Iron Frame
2. MS sheet holding spring and napkins.
3. DC gear Motor (30rpm).
4. Infrared sensors
5. Mechanical spring.
6. AVR atmega8.
7. Coin Acceptor module
8. Power supply

□ WORKING

When the user inserts the coin in the, The coin is detected by an IR sensor. IR sensors are located at two points one at the coin insertion and the other at the pad dispensing point .after the coin is detected the motor rotates clockwise direction and the pad fall so in the dispensing point The IR sensor which is located at the dispensing point will detect the fallen pad and will command the motor to stop rotating The napkin is collected from the dispensing point.

3.2 METHODOLOGY

- Block diagram:
- Flowchart:



3.3 Coin inserting section:

When the power supply is given to the circuit the LCD will display insert coin for sanitary napkin. A slot is provided to insert the coin at the front position. the coin will directly get through the inserting section. The machine will not accept the other comparable coins. the IR sensor will detect and reject the coins. main reason the IR sensor is used is to detect that the coin has dropped. So, when a coin is dropped, the IR sensor will sense and detect, the infrared signal will cut and instant output is going to be generated thus the sensing is going to be done.



Fig 1. Coin inserting section :

3.4 Motor and Spring with napkins set up :

The Motor used is a DC gear motor. the basic work of a motor is to convert the electrical signal into rotational energy. The DC motor is connected to the spring which helps to rotate the spring and dispense the napkins by the IR sensor command



Fig 2. Motor and spring with napkins set up:

3.5 Napkins dispensing unit:

The operation is when the coin inserted is sensed the the motor starts rotating in a clockwise direction, and the napkin is dispensed, as soon as the napkin is dispensed the IR sensor will sense the object and command the motor driver to stop the motor . Thus the napkin is collected from the dispensing point



Fig 3. Napkins dispensing unit:

4. ADVANTAGE AND FUTURE SCOPE

ADVANTAGES

- It is easy to install.
- It requires less space.
- The sanitary napkins cost effective.
- It can be located in schools, shopping malls, offices, etc.
- The napkins are hygiene
- At a time 15-16 napkins can be installed.

FUTURE SCOPE

In the future sanitary napkin vending machines could get really good .They might become smarter ,offer more eco-friendly choices , and reach more places , even faraway areas .This machines could also help teach people about periods and work with groups to make sure everyone can get sanitary products easily Basically , they have a lot of potential to make periods easier for people all around the world. Also as a diploma students we are thinking about the startup depending on the knowledge we get during assembling given machine

5. CONCLUSION

Putting sanitary napkin vending machines in place is the next important thing for women's health and cleanliness. The aim is to make women strong and healthy. That's why it's really important to teach people about using sanitary napkins and make them easy to get from vending machines.

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