**SOURCE CODE**

#include<REGX51.h>

#include<intrins.h> // for using \_nop\_() function

sfr16 DPTR =0x82;

sbit trig=P1^0;

sbit relay=P1^3;

sbit vibrator=P0^0;

sbit water=P1^2;

#define LCDPORT P2

sbit \_RS=P0^5;

sbit \_RW=P0^6;

sbit \_E=P0^7;

#include "lcd.h"

unsigned int target\_range=0x00;

void delay1(int val)

{

int i,j,k;

for(i=0;i<=val;i++)

{

for(j=0;j<=0x55;j++)

{

for(k=0;k<=0x99;k++)

{

}

}

}

}

void send\_pulse(void) //to generate 10 microseconds delay

{

TH0=0x00;TL0=0x00;

trig=1;

\_nop\_();\_nop\_();\_nop\_();\_nop\_();\_nop\_();

\_nop\_();\_nop\_();\_nop\_();\_nop\_();\_nop\_();

\_nop\_();\_nop\_();\_nop\_();\_nop\_();\_nop\_();

\_nop\_();\_nop\_();\_nop\_();\_nop\_();\_nop\_();

trig=0;

}

unsigned char get\_range(void)

{

unsigned char range;

send\_pulse();

while(!INT0); // in sake of these lines you can generate a

delay of 40 Milli seconds=40000 micro

while (INT0); // seconds

DPH=TH0;DPL=TL0;

TH0=0xFF;TL0=0xFF;

if(DPTR<35000) //actually you need to use 38000 but the

sensor may not work at higher levels

range=DPTR/59;

else

range=0; // indicates that there is no obstacle in front

of the sensor

return range;

}

void process(int dat,int add)

{

int i,j,k;

i=dat/100;

j=dat%100;

k=j%10;

j=j/10;

i=i|0x30;

j=j|0x30;

k=k|0x30;

lcd\_com(add);

lcd\_data(i);

lcd\_data(j);

lcd\_data(k);

}

void main()

{

relay=0;

TMOD=0x09; //timer0 in 16 bit mode with gate enable

TR0=1; //timer run enabled

TH0=0x00;

TL0=0x00;

P1=0xff;

P3|=0x04; //setting pin P3.2

target\_range=0;

lcd\_init();

lcd\_com(0x01);

lcd\_com(0x0c);

lcd\_com(0x80);

lcd\_puts("Smart Cane ");

vibrator=0;

delay1(2);

vibrator=1;

while(1)

{

delay1(1);

lcd\_com(0xc0);

lcd\_puts("Range: ");

process(target\_range,0xca);

target\_range=get\_range();

if(target\_range!=0 && target\_range<=30)

{

relay=0;

}

else

relay=1;

if(water==0)

{lcd\_com(0x8F);lcd\_data(' ');vibrator=1;}

if(water==1)

{lcd\_com(0x8F);lcd\_data('W');vibrator=0;}

}

}