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An Intelligent model of FAN automation for smart house

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ABSTRACT

Embedded system use in smart house is very common now-a-days. Electrical device like TV, Computer, Mobile, Fan etc. are very common for day to day life of everyone. These sorts of device are controlled manually by man or by remote control with different controller or different switch. As we are being more digitalized day by day and getting rid of any sorts of manual devices then we are more inclined to the digital controlling system. Developing countries are radically using this type of systems in a very large scale. We develop a system model that will help the developing smart house smarter. Our developed system works with the current electrical system. We developed the system that works automatically with the increase or decrease of temperature. If the temperature goes to 37° or more the fan runs with full speed the fan also run slower/faster when the temperature goes down/increase in every 2° and vice-versa. When the temperature is ≤ 20° it's automatically stops. It can also operate manually though it has a switch connected to motor.

Keywords

ADC – Analog to Digital converter, DAC- Digital to Analog converter, IC- Integrated Circuit, ULN2003-Driver for stepper motor, LM 35 – Linear Mode Temperature Sensor.

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INTRODUCTION:

Starting from scratch we develop our system by studying LM 35 [1][2]temperature sensor. The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the centigrade temperature. It gives 10 mV analog values[5] in every centigradeincrease or decrease of temperature. To calibrate analog to digital value conversion we use ADC [3]. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical and various application of smart home model. After getting the value from ADC it is being calculated to fan rotation. Then we started developing our model by using microcontroller and its peripherals [4]. We use ULN2003 for stepper motor rotation. We also use 7-segment display to display the current temperature.

SYSTEM DESIGN:

In design phase First of all we make a prototype [Figure: 1] for our design. The prototype works for the black box of various electrical devices that we used to build our system.

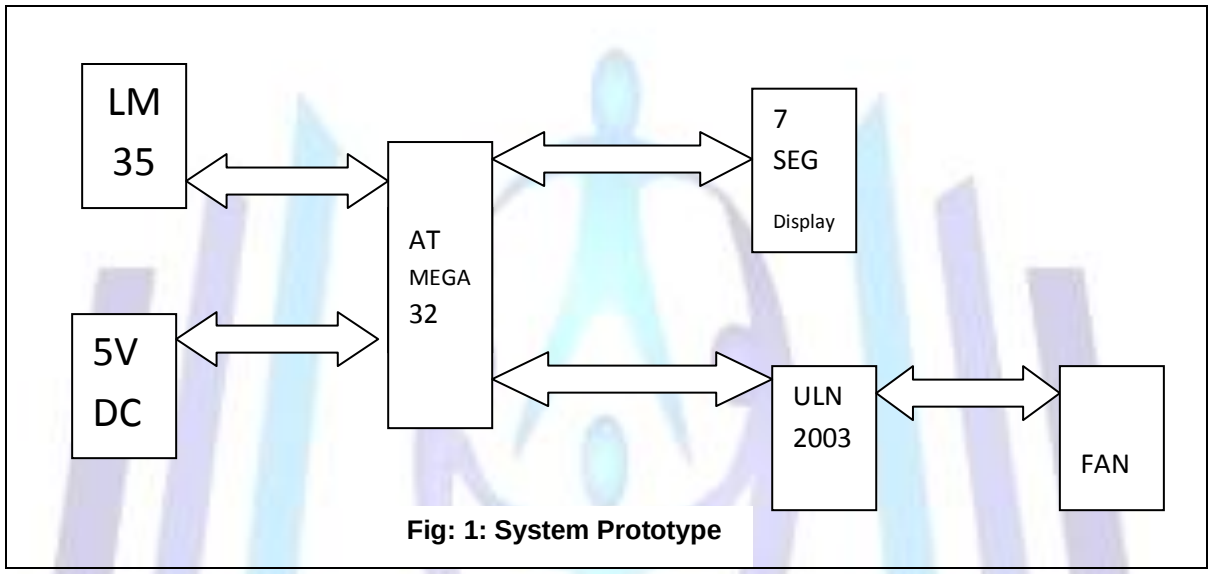

Fig: 1: System Prototype

Our system model is to control the temperature of a room and a automation of the speed of a fan. For this purpose we make sure to know the real temperature of the room. It must be very precise because by using temperature we are going to control the speed of fan. For this we use temperature controller sensor LM 35 which gives 10 mV of analog DC voltage value for each increase and decrease. It means if the room temperature 25° centigrade then LM 35 will give us 25 X 10 = 250 mV . The value got from LM 35 was digitalized by microcontroller ADC. We are using two 7-segment displays thus we can show 0-99° temperature. Our second steps are to control the speed of fan. For this we use stepper motor and its driver ULN 2003 to interface with microcontroller. As we are in moderated temperature zone so we suppose at 20° there will no need of fans. At temperature (T) will $20^{\circ} < T \leq 25^{\circ}$ fan's speed will as slow as the stepper motor allow. Then when $25^{\circ} < T \leq 27^{\circ}$ it's speed goes one step higher than previous. By this we can speed up the speed of fan by every 2° . When the temperature in 37° or more the speed of fan is it's full operating and the speed depends on its manufacturing speed. Meanwhile we have also an extra switch by which we can stop the fan manually.

PIN DIAGRAM and CONFIGURATION:

To implement the system prototype we simulate our design in Protues simulator. Implemented in the code for microcontroller using AVR studio and to convert the code to the hexadecimal value we use ponyprog simulator. Our simulated design is in figure 2.

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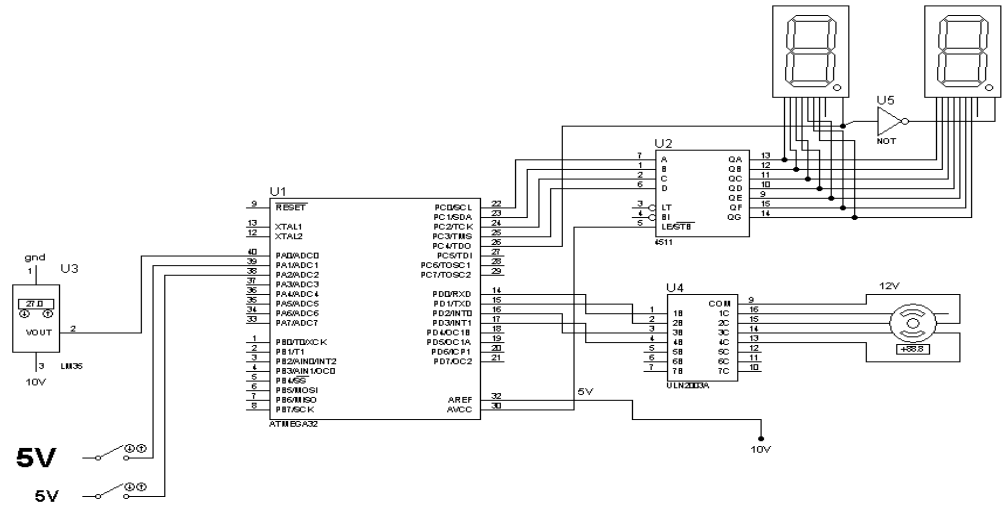

Fig 2 : Pin Diagramof an intelligent model of FAN automation for smart house

OPERATING METHODS:

To operate our model for smart house or any other application user must have to take some measures that for microcontroller the power supply must be 5 V DC. If there is some problem user has to use voltage regulator IC-7805 for un-interrupted voltage regulation services.

ADVANTAGE OVER PRESENT:

Though it is an automated system model the fan in a room is controlled automatically. In the moderated temperature country likes ours it is very often seen that at the first night the temperature is very high and last night it was low and vice-versa. If the speed of fan is same for all time then it will cause interruption for sleep and also cause cold and fever for the user. Our system works as a regulator as well as a controller. This model will cost less than market value of fan regulator.

CONCLUSION and FUTURE SCOPE:

We start our model from scratch and finally we got a run able model which works to improve the smartness of house and helps to make it automated. The model that we designed there will not any relation with person now we are trying to automated by the movement of person to room both in and out going case. We also work for the room where we use table fan then the table fan moves by the presence of person in the room with direction.

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