



## Speed Control of Induction Motor Using Smart Android Application System

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**ABSTRACT:** Speed Control Of Induction Motor Using Smart Android Application System is the idea of making the technology reliable and efficient. The idea of Controlling an induction motor method became the reason to make a ceiling fan control with a simple android phone. To make the idea abstract, I developed an android application, and design a control panel and further interface the app with the control panel via bluetooth module and control panel is connected with fan. This way I find my abstract came out to the real world.

**Keywords:** Induction Motor, Android Application System, bluetooth module, Microcontroller (AT89S52).

### I. INTRODUCTION

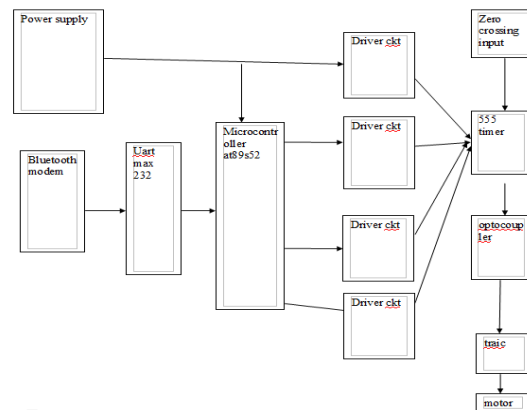
The project is designed to control the speed of an induction motor such as fan by using android application in home automation application convenience remotely controlling the speed of the ceiling fan is achieved

remote controlling operation is achieved by any phone/tablet in which operates on android O.S upon a GUI (graphic user interface) based touch screen operation. android /tablet acts as a transmitter through Bluetooth. which is received by the Bluetooth receiver interfaced with the micro-controller of 8051 family, at the control panel module. Each time data sent by android phone (application), as per the code written is executed by the microcontroller to deliver delayed firing pulses to the thyristor through optical isolation the power to the load connected in series with the thyristor is controlled based on the received signal in the case of absence of a ceiling fan we can use a bulb whose varying intensity will be demonstrated the varying power for the motor to the speed control further the project can be enhanced by adding more output from the micro-controller feeding relay drivers to switch ON/OFF the domestic loads together with the speed control of the fan.

*This device will provide instant controlling of fan without much physical work. This will be useful at home, prominently physically challenged people and patients at the hospitals.*

### II. METHODOLOGY

In this project, embedded system has been used which is a combination of software and hardware. An embedded system is a programmed hardware device. These are the controllers, processors, arrays or other hardware using dedicated (embedded), logic or programming (code) called "firmware" or a "microkernel."

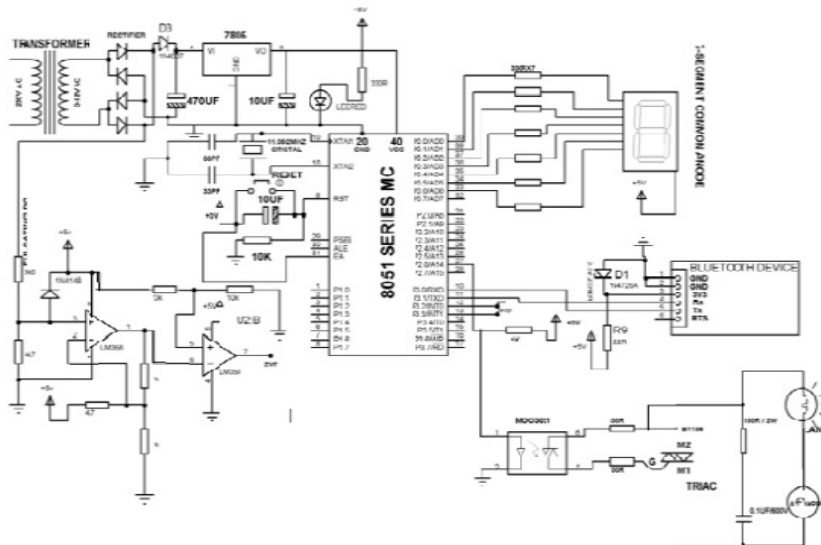


(a) Block diagram

Figure shows the block diagram representation of the systems to be designed and implemented. The Block diagram consists of: Microcontroller, Bluetooth module, Switching assembly, Power supply, Load ac motor, Android application.

**Block Diagram Description:** Microcontroller is the heart of the system. The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density non volatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non volatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and

cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52[2] is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The optoisolator is used to drive the triac which provides complete pulse to the motor in order to rotate and to control the speed of inductor motor via android application.



(b) Basic circuit diagram

**Basic circuit diagram Description:** As shown in above figure transformer T1 step downs 230 V AC into 9 V AC and this is given to bridge rectifier. This rectified output is directly fed to base of Q1 through resistors R1 & R2. Same rectified output is filtered through C1 and given to voltage regulator IC 7805. Output of 7805 is regulated 5 VDC that is given as biasing voltage for both transistors Q1 & Q2 (same regulated 5 V supply is given to main control section also). Both transistors are connected in switch configuration. The final output „C is given to main control section. As shown in below figure micro controller ATmega16 along with opto-coupler MOC3011 (for triggering TRIAC) and common Anode type bar graph display (for indicating angle) are used for changing firing angle of TRIAC. Signal 'C' from zero crossing detector circuit is directly given to pin no 13 (INT1) that is external interrupt 1 (PD.3) pin. All port PA pins are connected with cathode of bar graph

*Goswami*

display It is used to show the status of the motor power and zero cross circuit As shown in above figure transformer T1 step downs 230 V AC into 9 V AC and this is given to bridge rectifier. This rectified output is directly fed to base of Q1 through resistors R1 & R2. Same rectified output is filtered through C1 and given to voltage regulator IC 7805. Output of 7805 is regulated 5 VDC that is given as biasing voltage for both transistors Q1 & Q2 (same regulated 5 V supply is given to main control section also). Both transistors are connected in switch configuration. The final output „C is given to main control section. As shown in below figure micro controller ATmega16 along with opto-coupler MOC3011 (for triggering TRIAC) and common Anode type bar graph display (for indicating angle) are used for changing firing angle of TRIAC. Signal 'C' from zero crossing detector circuit is directly given to pin no 13 (INT1) that is external interrupt 1 (PD.3) pin. All port PA pins are connected with cathode of bar

graph display It is used to show the status of the motor power and zero cross circuit PD7 is connected with input of opto-coupler[12] MOC3011[3]. Output of MOC3011 is connected with gate of TRIAC. TRIAC is connected in loop with AC motor and 230 VAC supply

as shown. RC snubber circuit is connected is connected in parallel with TRIAC.A 16MHz crystal along with two 22pf capacitor is connected with crystal input pins. Capacitor C2 with Resistor R6 performs power on reset.

### III. COMPONENTS LIST

S No.	NAME OF COMPONENTS	N O s	S P E C I F I C A T I O N S
1	t r a n s f o r m e r	1	S t e p - d o w n . ( 1 2 0 v t o 9 v )
2	C a p a c i t o r	5	1 0 0 0 u f , 1 0 u f , 2 7 p f , 1 0 0 u f , 5 5 u f
3	R e s i s t o r	5	1 k , 1 0 k , 4 7 0 o h m , 2 2 k , 5 6 k
4	T r a n s i s t o r	4	n p n a n d p n p
5	D i o d e	8	I n 4 0 0 7
6	B l u e t o o t h m o d e m	1	H c 2 0 5
7	D r i v e r d a r l i n g t o n	1	-
8	S w i t c h .	1	-
9	S o c k e t .	1	-
10	p c b	1	Manual component installing type
11	C r y s t a l o s c i l l a t o r .	2	1 0 0 m h z
12	B r i d g e r e c t i f i e r	2	-
13	t i m e r	1	5 5 5 t i m e r
14	o p t o c o u p l e r	1	M o c 3 0 2 1
15	t r i a c	1	B t - 1 3 6
16	m i c r o c o n t r o l l e r	1	a t 8 9 s 5 2

### IV. CONCLUSION

The objective of a project has been achieved which has been developing the hardware and software for controlling speed of induction motor using android application. The demand for wireless operating device increases, it is more preferable over wired devices. Here we are controlling speed of induction motor using Bluetooth and android application wirelessly.

So this device is very simple to use and because it contains only a control panel and a Bluetooth receiver ,android app and simple driver circuit and the few supporting elements in it which makes the device economic and user friendly .Therefore the device is practical and successful.

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