**2. LITERATURE SURVEY**

[1] The main goal of this work is to use low cost hardware, to connect Simulink with a real system for lab practices in Control Engineering bachelors at Carlos III University of Madrid. Nowadays, the practical prototypes are connected to a computer through expensive DAQs. When computers or DAQs are updated, it implies a very high cost. In the case of internal DAQs, connected on an internal bus of the computer, the difficulties are bigger. New Arduino based DAQ must be adapted to the lab prototypes in order to avoid hardware changes or modifications on it.

[2] For general lighting purpose in shops, offices, houses, schools etc. single phase supply is commonly used. Based on this supply the motors which work on single phase A.C supply (A.C motors) are very popularly used instead of D.C. motors. Among These A.C motors single phase induction motors are widely used for numerous domestic and industrial applications like home appliances, industrial control, and automation as they are robust, reliable, and durable. These motors are the most widely used since their power ratings are very small. Hence, they are often called the workhouse of the motion industry. It is very important to control the speed of induction motors for efficient control strategies and for reducing operation cost too. Before going for the various controlling methods we need to know the speed - torque characteristics.

[3] Speed controllers of DC motor are very useful for controlling the robotic motion and automation systems in industry. In this paper controller presented uses the pulse-width modulation (PWM) technique for speed control of DC motor. Using Atmel AT89S52 microcontroller generate the PWM wave for speed control of DC motor, we need a variable-voltage DC power source to control the speed of the DC motor. When the DC motor is on, it takes certain time to reach at full speed. As soon as the power source is on, the DC motor starts gaining speed and if we switch off the power source before it reaches at rated speed, it starts to goes down. In quick succession of switching on and switching off are done, the motor rotate at a lower speed between zero and rated speed. In this paper we used PWM method so it switches the motor “on” and “off” with a pulse wave. The main objective of this paper is to become easy with the implementation of hardware of Amtel AT89S52 microcontroller based speed control of DC motor, L293D IC is used to provide to motor and infrared sensor is used to count the speed which are interface with 555 IC, it give senses of occurring overload to the operator at overload condition and speed display on LCD screen. For the required speed the speed controller takes signal represent and to drive a motor at required speed.

[4]Direct current (DC) motors are very important integral parts of drive mechanisms both for domestic, entertainment, and industrial uses. The wide applications of dc motors are largely dependent on the variability of their capacities of power and running speeds. The possibility of variation and the ease of control of the drive speed and direction of dc motors have helped to increase the range of areas in which they are being applied, which include such areas as rolling mills, electric vehicle tractions, electric trains, electric bicycles, guided vehicles, home electric appliances, toys and robotic manipulators, etc. Characteristics of the DC motor that are required to be controlled or changed at anytime usually include speed, torque and direction of rotation. Important speed–related requirements for efficient and intelligent dc motor speed control include maintaining constant speed with variation of load, varying the running speed to suit particular needs, for energy saving, soft starting and stopping to increase motor reliability and availability. Normally, in the conventional DC motors which is known to have high starting torque and a high no-load speed, the speed is poorly regulated in the sense that the speed changes when the amount of load it drives changes and would require additional supply potentials to maintain a steady running speed. But in the permanent magnet DC motors, the torque-speed characteristic is usually linear because the flux is generated by the permanent magnet rather than the wire wound poles in conventional dc motors.

[5] Advances in technology led to the role of humans being replaced by machines or automatic control devices to do some job. One of such device in automatic control is motor. Motor is device that converts electrical energy into mechanical energy. The motor that utilizes a DC supply to produce mechanical output is direct current (DC ) motor. Direct current (DC) motors have been widely used in many industrial applications such as electric vehicles, steel rolling mills, electric cranes, and robotic manipulators due to precise, wide, simple, and continuous control characteristics . The motor speed can be controlled by controlling armature voltage and armature current. These method have some demerit because some power is wasted in control resistance. PWM method also can be used to control dc motor speed. PWM circuit work by making a square wave with a variable on to off ratio. The ratio can vary between 0 % - 100%. In this manner variable power is transferred to load. Main advantage PWM circuit over a resistive power control is the efficiency. On PWM 50% amount off pulse and on pulse is equal. Remote control can be used to control devices in long distance through infrared (IR) medium. Each keys on remote control have different code. The different code can be convert to hexa digital data with IR receiver (TSOP1736) and processed in microcontroller. The output of the microcontroller is on off pulsed which used to rotate DC motor.

[6] In many control applications, such as motors, DC/DC converters, or class D amplifiers, H-bridge is an often-used power device to drive the inductive load. Especially for DC motors, the H-bridge driver can be used to control the direction and speed of DC motors; therefore, it has become an important driving component for motor control. The basic structure of H bridge is constructed by 4 power transistors such as BJT, MOSFET, or IGBT, which they work as electronic switches. When both upper and lower power transistors at the same side turn on concurrently, the shoot-through phenomenon may occur due to the transition delay of power transistors. Consequently, the generation of dead time is necessary and important for the H-bridge driver. However, this will cause a nonlinear output corresponding to the PWM control input. Based on complementary MOSFET structure, a new H-bridge design using gate bias technology is proposed in this paper. Without dead time generation exiting in the conventional H-bridge drivers, therefore, the proposed H-bridge driver can benefit low hardware cost and achieve better linear control.

[7] Control system designed and analysis technology are widely spread and very useful in real time applications. Some can be solved by hardware technology and by the advance use of software, control systems are analyzed easily and in detail. As an application of Wheeled Mobile Robots (WMR), DC motors can be used as wheel drive machines and by using a simple microcontroller PIC 16F877A or 8051/8052 series, the rotation of motors or motion of the robots can be controlled easily. The motion of WMR is based on the concept of differential mechanism. Taking into consideration two wheel drives, left and the right wheels are driven with a DC geared motor, such that each motor movement controls the motion of Robot.