

ABSTRACT

This paper deals with the working, operation and various types of arduino board. It also explains how arduino microcontroller used as a tool for study as well as research work. Main advantages of arduino microcontroller are that it can easily interface with any sensor and very fast responding and processing. Arduino is open source platform which is using software as well as hardware implementation. Arduino provide in low cost, highly reliable. This paper deals with various types of arduino board, working principle of arduino software implementation and their applications.

Keywords: - Arduino microcontroller, Hardware, Software and their applications.

INTRODUCTION

Arduino is basically an open source microcontroller which consists of microcontroller chip. Arduino is design to provide inexpensive and easy way for students to create device which interact with their surrounding environment by using sensor. Arduino is used for constructing and programming electronic devices. Arduino is capable to receiving the information and sending the information. Arduino software develops a code which is known as arduino IDE. IDE stand for Integrated Development Environment). Arduino hardware is known as Arduino development board. Arduino microcontroller can be programmed easy. C or C++ language used programming in arduino software.

TYPES OF ARDUINO MICROCONTROLLER

There are different types of arduino boards are available in market. The list of arduino boards include:

1. Arduino Leonardo Board.
2. Red Board.
3. Lily Pad Arduino Board.
4. Arduino Uno (R3).
5. Arduino Mega 2560(R3)

1. Arduino Leonardo Board: The first developed board of an arduino is Leonardo Board. This board uses one microcontroller. This board is very simple and cheapest board. This board handles USB directly.



Fig.1.Arduino Leonardo Board

2. Red Arduino Board: Red board arduino microcontroller board will work on window 8. This is very easy or simple to utilize in the project designing. this board can be programmed by using USB cable using Arduino IDE ,

Just plug the board, select the menu option to chosen an Arduino Uno and reading to upload the program. Board jack used for control the Red Board over USB cable.



Fig.2.Red Arduino Board

3. Lily Pad Arduino Board: Lily Pad Arduino Board is a textile technology which also comprise of I/O power and also sensor Board. These are even washable.

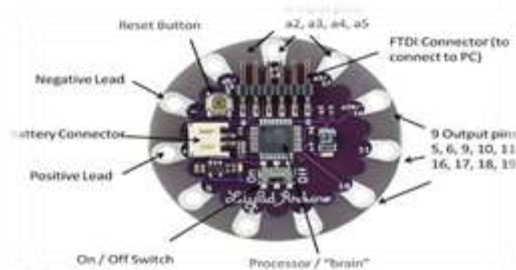


Fig.3. Lily Pad Arduino Board

4. Arduino Uno (R3): The Arduino Uno is consist of 14 digital I/O pins where 6pin can be used for Pulse Width Modulation and 6 analog input pins , a reset button , power jack, USB connection . It require to hold up the micro controller. With the help of USB cable arduino is simply attach to PC and give the supply started with AC to DC battery.

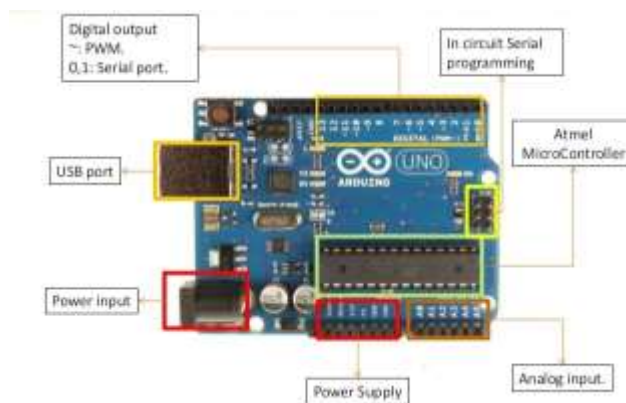


Fig.4.Arduino Uno

5. Arduino Mega (R3): Arduino mega is a modified form of arduino Uno arduino Mega consist of lot of digital I/O pins. Among them 14 pins can be used as PWM outputs signal. 6 pins As analog input pins, a reset button, a power jack, a USB connection. The huge number of pins makes the arduino board very helpful for designing the project. It required holding up the microcontroller simple connected arduino board with PC with the help of USB cable and giving the supply to get started with AC to DC battery.



Fig.5.Arduino Mega

BASIC ELEMENTS OF ARDUINO BOARD

Elements of arduino Board are divided into two different categories. These are:

A. Hardware B. Software

A. HARDWARE: Arduino board consists of many components that make arduino board to work together.

1. Microcontroller: microcontroller is the heart of arduino board. Microcontroller is work as minicomputer which sending and receiving the information or command to device. The device is connector to the arduino board .microcontroller differ from board to board.

2. External Power Supply: This power supply is used to give power to board with voltage range from 9-12 Volts.

3. Analog Pins: Analog pins ranging from A₀ to A₇. These pins are used for analog input / output pins. Board to Board the number of analog pins is differing.

4. Digital Pins: Arduino microcontroller consists of some digital pins also ranging from 2 to 16 pins. Board to board the number of digital pins is differing. These pins are used for the digital input/.output pins.

5. Power and Ground Pin: These pins provide 3.3, 5Volts and ground through them.

6. Reset Button: Reset button present on the board. This button used to reset the arduino microcontroller.

7. Internal Programmer: The software code can be upload to the microcontroller by USB port without any external programmer.

8. USB Plug: USB Plug is most important part in the arduino board .USB plug is used to upload program programming to the microcontroller or using USB cable. When the external power supply is absent then this plug provide regular power of 5 Volts.

B. SOFTWARE:

The program code written for arduino is known as sketch. The software used for program coding is Arduino IDE software. IDE software consists of:

- Text Editor: Simplified code is written in simplified version of C++ programming language.

- Message Area :
 1. Display the error.
 2. Saving and exporting the code.
- Text: Output by area arduino including complete error message and other information.
- Toolbar: verify, upload, new, open, save and serial monitor buttons are include in toolbar.

FEATURES OF ARDUINO IDE

- Provide files saved with the file extension.ino
- Cut, copy or pastes are supported in IDE.

PROGRAMMING BASICS

The two main parts always exist after every sketch .they are:

- Void Setup():
When arduino start, this function is executed .this function is consist of initialization of every pins .we used in our project for input or output. Whenever any program has to be start then it is necessary to define the function “Void Setup”.
- Void Lop():
Second important function of sketch is “void loop”. This “void loop “, consist part of coding that continuously executed the code written in the setup function.

CONCLUSIONS

In this paper, we understanding that the Arduino is the great tool build new devices to create and implement things. We have studies the working and operation of arduino various types of arduino microcontroller. We also understand the hardware and software features of arduino. Arduino microcontroller is used for industrial for controlling the speed of motors. The most suitable for robotic applications

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