CheerBoxite

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***Abstract*-- Dance as a form of performing arts includes a wide range of social behaviour, is an important means of communication , is a useful tool for psychological and physical therapy , and is a natural means of emotional expression . Robotic dance has attracted interest in the field of social robotics, and dancing robots can perform many kinds of robotic dances. In general, robotic dance has many social effects in society: 1) It is a kind of interactive social behaviour, in particular human–robot interaction and animal activity , 2) it is a way to express the emotions or intentions of robots through nonverbal communication , 3) it is a treatment and therapy for a wide range of illnesses, including autism , developmental disorders , and attention deficit and cognitive disabilities , 4) it is a tool to enrich the need of growing spiritual cultures of society.**

Keywords— Robot, Robotic Dance, Synchronization

I. INTRODUCTION

In beginning, robots were only used for a singular function or purpose that is as an aid to human in industrial applications. Nowadays, the robot is not only assigned to do work but also for entertainment purpose. As a part of it, dancing robots can be created. Dancing robots grab the attention of people with their ability to dance on the floor especially on their own feet. Their smooth movement while dancing, captures everyone's heart. This may increase the interest of people in robotic world.

The main objective of this project is to create dancing robot. This dancing robot can be characterized as mobile robot where wheels will be used for its leg's movement. This dancing robot will dance according to the programmed movement along with the chosen music within a specific time frame. This robot will design in hardware and going to operate by interfacing the software to control all robot's movements due to the dancing steps that have been programmed. To fulfill this need, ATMEGA328P microcontroller is to be used to apply the software programming on the circuit.

II. METHODOLOGY

In this system we are using ATMEGA328P microcontroller interfaced with sound sensor, servo motor and dc motor to demonstrate the concept. So here the sound sensor is employed to determine sound from surrounding and constantly sends signals to the microcontroller. The microcontroller will get particular sound level as a input and according to that level cheerleader will dance.

Because we have assigned different moves to the different sound levels.

III. HARDWARE REQUIREMENTS

1. ATMEGA328P

The high-performance Microchip picoPower® 8-bit AVR® RISC-based microcontroller combines 32 KB ISP Flash memory with read-while-write capabilities, 1024B EEPROM, 2 KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented Two-Wire serial interface, SPI serial port, a 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. It is called the heart of the system because is used to control all the inputs and the controlling action to be taken at the output. Microcontroller used in our project is the ATMEGA329P.[1]

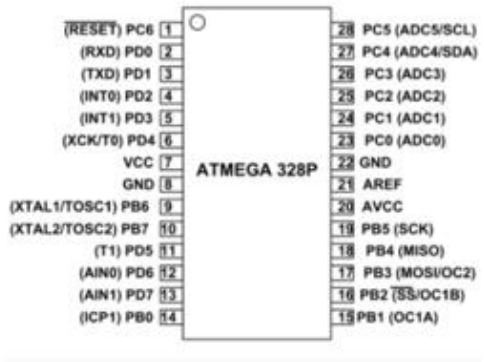

Fig-No 1: Atmega328P

2. Sound Sensor (VMA309 Microphone Sound Sensor Module)

This high sensitivity sound detection module detects sounds between 48 and 66 dB and has an analog as well as a digital output. The AO or analog output creates a real-time output voltage signal of the microphone, whereas the DO or digital output depends on the sound intensity and the threshold that has been set.

Pin Out

VCC – Input Power Supply

DO – Digital Output

AO – Analog Output

GND-Ground.[2]

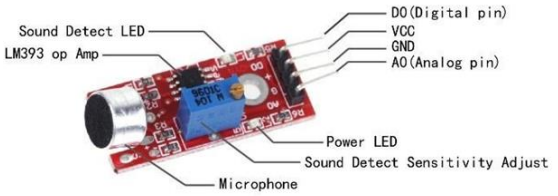

Fig-No 2: Sound Sensor

3. Servomotor

A servomotor is a linear actuator or rotary actuator that allows for precise control of linear or angular position, acceleration, and velocity. It consists of a motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.[3]

Fig-No 3: Servomotor

4. Motor Driver [L293D]

L293D IC generally comes in standard form as 16pin DIP (dual-in line package). This motor driver IC can control two small motors in either direction; forward and reverse with just 4 microcontroller pins simultaneously. (If you do not use enable pins) [4].

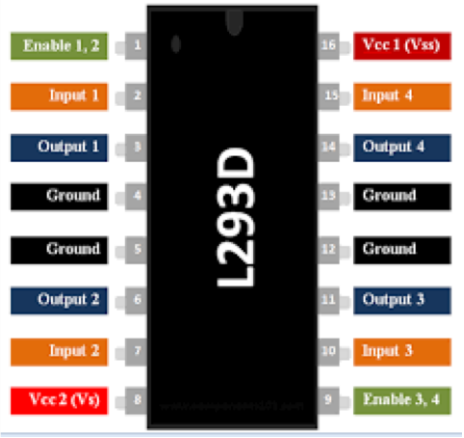

Fig-No 4: Motor Driver [L293D] **5.**

DC Motor

A DC motor is a mechanically commutated electric motor operated from direct current. In DC motor, operation is based on the principle of simple electromagnetism. The principle of electromagnetism states that a current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current flowing through the conductor, and to the strength of the external magnetic field. Opposite (North and South) polarities of magnet attract, while like polarities (North and North, South and South) repel. The internal organization of a dc motor is designed to tackle the magnetic interaction between a current carrying conductor and an external magnetic field so as to produce the rotational motion. The speed of a DC motor is directly proportional to the voltage supplied. If we reduce the supply voltage from 12 Volts to 6 Volts, the motor will run at half the speed [5].

Fig-No 5: DC Motor

IV. SOFTWARE REQUIREMENTS

1. Arduino IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards. The Software (**IDE**) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the **Arduino** and Genuino hardware to upload programs and communicate with.

2. Proteus 8 Professional

Proteus is used to simulate, design and drawing of electronic circuits. It was invented by the Labcenter electronic. By using proteus you can make two dimensional circuits designs as well. With the use of this engineering software, you can construct and simulate different electrical and electronic circuits on your personal computers or laptops. There are numerous benefits to simulate circuits on proteus before make them practically. Designing of circuits on the proteus takes less time than practical construction of the circuit.

It is a software suite containing schematic, simulation as well as PCB designing.

- ISIS is the software used to draw schematics and simulate the circuits in real time. The simulation allows human access during run time thus providing real time simulation.
- ARES is used for PCB designing. It has the feature of viewing output in 3D view of the designed PCB along with components.
- The designer can also develop 2D drawings for the product.

V. PROJECT DESCRIPTION

Working:

Sound sensor VMA309 is used as the input to the controller which detect the sound level from the environment and constantly sends signals to the microcontroller. The microcontroller will get particular sound level as input and according to that level cheerleader will dance. Because we have assigned different moves to the different sound levels and last output is connected to L293D motor driver to drive the DC motor.

ADVANTAGES:

- Autonomous system – Using ATMEGA328P microcontroller autonomous system is designed which controls the DC motors and servo motors through L293D module.
- Aesthetics – Perfection due to dance choreography and music synchronization.

APPLICATIONS:

- Entertainment: The main application of our project is for entertainment as our cheerleaders are dancing. Their smooth movement while dancing, captures everyone's heart.

VI. RESULTS

CASE 1:

When logic 0 is applied to the sound sensor no input is provided to the microcontroller and there is input provided to the DC and servomotor hence no movement of the cheerleader.

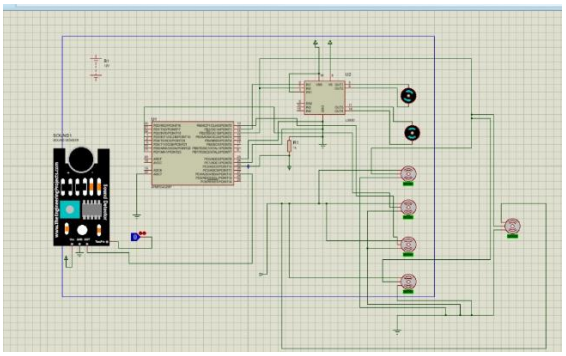

Fig-No 6: CASE 1

CASE 2:

When logic 1 is applied to the sound sensor input provided to microcontroller and motors and motor started moving. But in practical implementation we

have divided sound sensor input in different 7 levels and according to level cheerleader will do different dance steps.

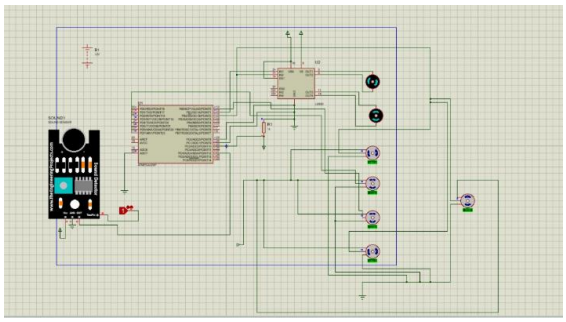

Fig-No 7: CASE 2

VII. CONCLUSION

In this project we have developed a true time model which will entertain people by dancing moves. Cheerleaders are synchronously dancing, moving freely and performing dance on the music. Dancing robots are grabbing the attention of people with their ability to dance and aesthetics. These are completely autonomous system.

FUTURE SCOPE

Traffic control: Whenever there is huge traffic at signal by proving sensors to system, they could sense the density of the traffic and the lane where traffic is more the robot will turn to that lane and the traffic of that lane will be released first.

Gaming: As we are providing hand, leg, neck movements to robot thus by sensing opponent robot's movement we can we system for gaming application.

Household purpose: By little modification in the system robots can be used for serving, cleaning etc. There is hotel in china wherein waiters are not human beings but the robots.

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