ARDUINO BASED SMART VACUUM CLEANER

ECS1001:ENGINEERING CLINIC'S

(ARDUINO USING EMBEDDED C)

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VIT-AP UNIVERSITY

GUDIED BY:

PROF. ESWARAIAH RAYACHOTI

SUBMITTED BY:

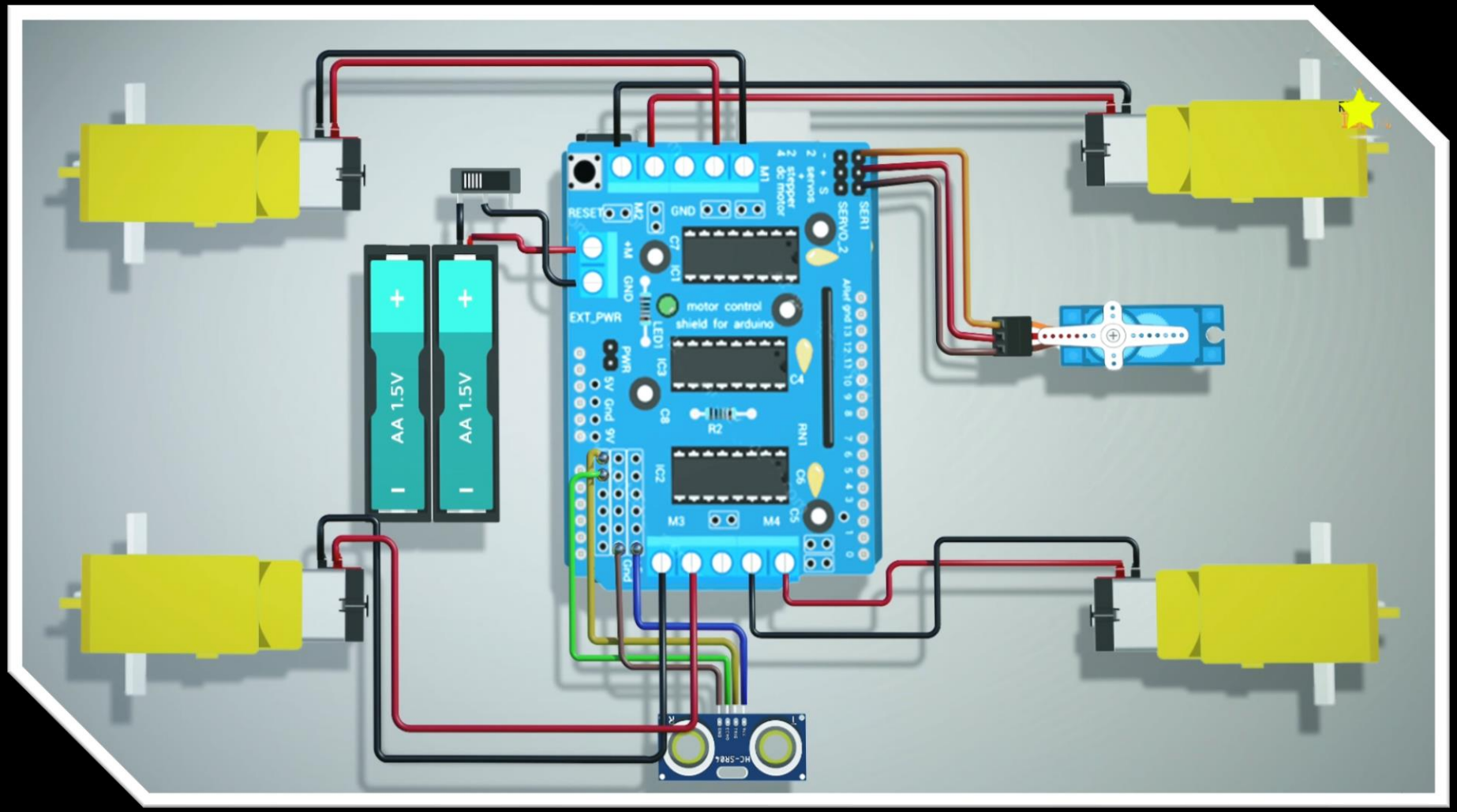
20BCE7369 - YALAMARTHI KOUSHIK SAI – CSE
20BCE7347 - PAVULURI KARUN SAI – CSE
20BCE7331 - VAKA RAJASIMHA REDDY – CSE
20BCE7586 - LOKESH VALLURI – CSE
20BES7056 - KARNATI NAGA PRASANTH REDDY - ECE (SPEC. IN EMBEDDED SYSTEMS)
20BEV7029 - TIRUVEEDHULA CHANDRA MOULI - ECE (SPEC. IN VLSI)

This project is aims at developing Arduino based smart vacuum cleaner to provide a better solution to society.

In this modern digital world, everyone is moving towards automation Robotics allows automation where machines perform a well-defined step safely and productively, in autonomous or partial autonomous manners.

A number of vacuum cleaner bases are available for just such a project. These inexpensive bases are generally made of acrylic and come complete with a set of small DC motors.

CIRCUIT DIAGRAM



DC MOTORS WITH WHEELS

- These types of motors are the easiest to control on a macro level, however, precision control can be very difficult to achieve. In most cases, DC motors are considered analog not digital.
- Generally the way to control a DC motor is by supplying a voltage to the motor. The speed of the motor can be changed by varying the voltage supplied. There are several ways to vary the voltage to the motor.
- The easiest, but worst way to do so is using a potentiometer. They are available at any electronics store and are cheap. The problem with using a potentiometer is the huge amount of energy that is wasted as heat through this type of transistor.

ARDUNIO UNO

❖ **Arduino Uno Board Description:**

- The Arduino Uno board is the most popular board and mostly referred for the beginners as they are super easy to begin with, it does not requires any specific arduino uno software instead of that all you need is to select the arduino uno in the device option before uploading your program.

❖ **Reset Button :**

- There is a reset button given which is used to restart the program running in the Arduino uno. There are two ways to restart the whole program.
- You can use the default reset button.
- You can connect your own reset button at the pin labeled as Reset.

L293D SHIELD DRIVER BOARD

- L293D shield is a driver board based on L293 IC, which can drive 4 DC motors and 2 stepper or Servo motors at the same time.
- Each channel of this module has the maximum current of 1.2A and doesn't work if the voltage is more than 25v or less than 4.5v. So be careful with choosing the proper motor according to its nominal voltage and current.

SERVO MOTOR

- Servo motor is a simple DC motor with a position control service. By using a servo you will be able to control the amount of shafts rotation and move it to a specific position. They usually have a small dimension and are the best choice for robotic arms.
- But we can't connect these motors to microcontrollers or controller board such as Arduino directly in order to control them since they possibly need more current than a microcontroller can drive so we need drivers.
- The driver is an interface circuit between the motor and controlling unit to facilitate driving. Drives come in many different types. In this instruction, you learn to work on the L293D motor shield.

ULTRASONIC SENSOR

- Ultrasonic sensors are electronic devices that calculate the target's distance by emission of ultrasonic sound waves and convert those waves into electrical signals. The speed of emitted ultrasonic waves traveling speed is faster than the audible sound.
- There are mainly two essential elements which are the transmitter and receiver. Using the piezoelectric crystals, the transmitter generates sound, and from there it travels to the target and gets back to the receiver component.
- To know the distance between the target and the sensor, the sensor calculates the amount of time required for sound emission to travel from transmitter to receiver

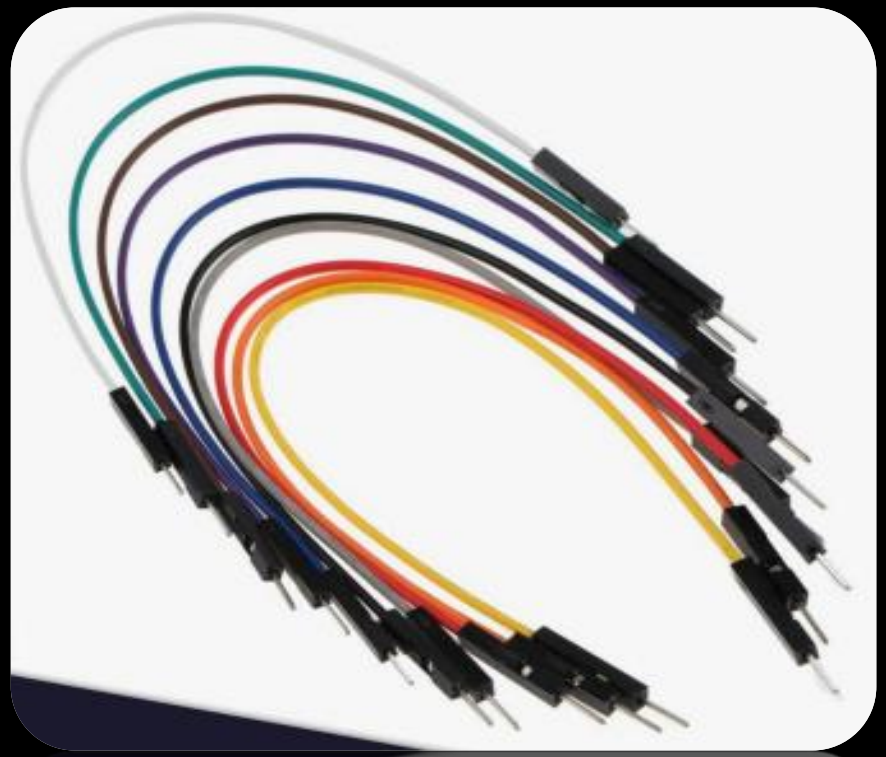
LITHIUM-ION BATTERY

- First 4 digits of the designation “18650” indicate the physical dimensions while the 5 th digit indicates it is a cylinder cell. The standard 18650 battery is 18mm around by 65mm long.

- This type of battery is very common in applications such as laptop battery packs, flashlights, electric vehicles, cordless tools and various other devices that require portable power.

- Some types of 18650 have been modified adding either a button top and/or internal protection circuit. This can increase the physical length of an “18650” battery from 65mm to 70mm or in certain cases even longer.

CONNECTING WIRES



- Connecting wires allows an electrical current to travel from one point on a circuit to another because electricity needs a medium through which it can move. Most of the connecting wires are made up of copper or aluminum.

THANK YOU