SVCE | Sri Venkateswara College of Engineering

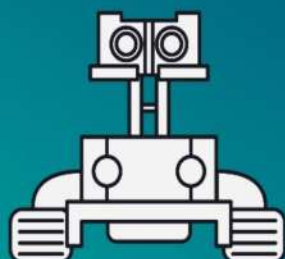ASSOCIATION OF ELECTRICAL AND ELECTRONICS ENGINEERS

&

INSTITUTION OF ENGINEERS (INDIA)

PRESENTS A MAGAZINE ON

SENSOR GUIDED
ROBOTICS
WORKSHOP

3 DAYS HANDS-ON LEARNING

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AI

18,19,21

MARCH 2022

MESSAGE FROM THE PROFESSOR AND HEAD

CONVENER:

Dr. KR. Santha
Vice-Principal
Professor and Head, EEE

In an era driven by technological advancements, it is imperative for educational institutions to equip students with practical skills that not only complement their theoretical knowledge but also foster innovation and critical thinking. The workshop on Sensor-Guided Robotics, organized by the Association of Electrical and Electronics Engineers (AEEE) in collaboration with Institution of Engineers (IEI). The workshop spanned across three days from 18 ,19, 21st march to brought together the enthusiastic students from the department. The program was carefully curated to introduce students to the realm of robotics, with a special focus on sensor technology. The workshop encompassed hands-on practical exercises, ensuring a comprehensive learning experience. It not only imparted practical skills but also ignited a passion for innovation and technology among the participants. As the Head of the Department and the Convener of the program, I am immensely proud of the impact this workshop has on our students. It is imperative that we continue to provide such platforms for holistic education, ensuring that our students are well-equipped to excel in the dynamic and ever-evolving world of technology.

FACULTY CO-ORDINATORS

Dr. Sudhakar K Bharathan,
Professor

Dr. S. G. Bharathidasan,
Associate Professor

Dr. S. Kumaravel,
Associate Professor

Dr. M. Sankar,
Assistant Professor

The main motive to conduct this event is to enhance learning through the peer-to-peer methodology and touch on fields that are seeing tremendous growth across the globe.

Peer-to-peer learning:

Peer-to-peer learning is when one or more students teach other students regardless of whether the individuals are students or co-workers. During this process, the students are supported throughout the learning. Each learner must be treated the same no matter their ability.

It's easier for students to learn new skills in an environment that includes the four key stages of the 'Learning Loop'.

Learning stages are:

●Gaining knowledge

●Applying that knowledge

●Receiving constructive feedback

●Reflecting on skills and lessons learned

Peer-to-peer strategies cover all these stages, making them significantly effective.
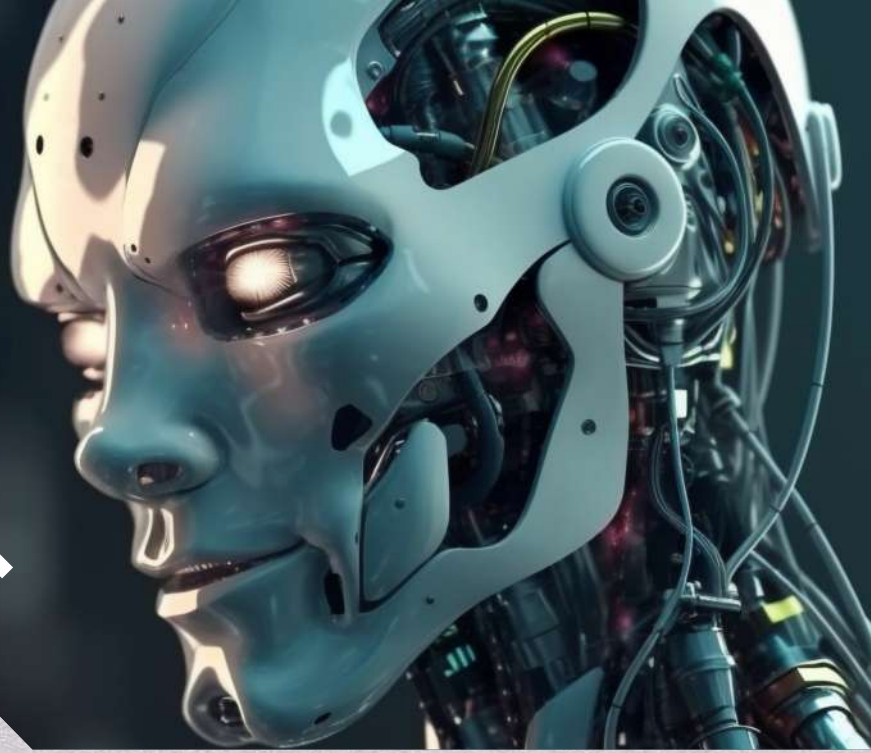
ADVISORS

ABINAYA B	ANUSHRI M	GOKUL PRASATH G
HEMANTH T	JAYACHANDIRAN R J	KAMALESH P
MCLEAN NITHIN L	IBRAHIM O M S	MONISH KUMAR G S
RANGANATHAN R	SANTOSSH V	ADITHYAN M
NAZIRA NILOFER S	PARTHASARATHY S	VIGNESH P
VIJAY ANANTHAN T	VINODHINI V S	YUVAKISHORE K

SCHEDULE

DAY 1 (18.03.2022)

INTRODCTION TO PROGRAM

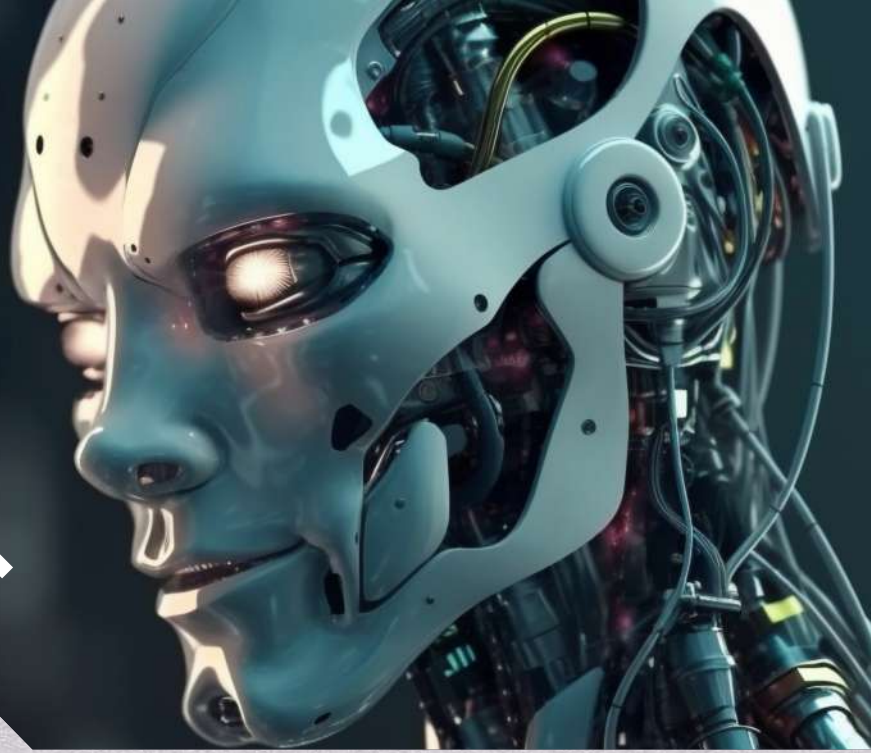|	
08:30 AM – 09:30 AM	Teams and mentor grouping
09:30 AM – 10:30 AM	Inauguration of the training program
10:30 AM – 12:05 PM	(a) Introduction to Arduino, raspberry pi, NodeMCU (b) Introduction to sensors & classification of sensors
12:05 AM – 12:45 PM	Lunch break
12:54 PM – 02:25 PM	Introduction to (a) Gyro sensor (b) Micro gear motor (c) Motor driver
02:25 PM – 03:15 PM	Self Balancing Robot – briefing

DAY 2 (19.03.2022)

INTRODUCTION TO SENSORS AND LINE FOLLOWER ROBOT

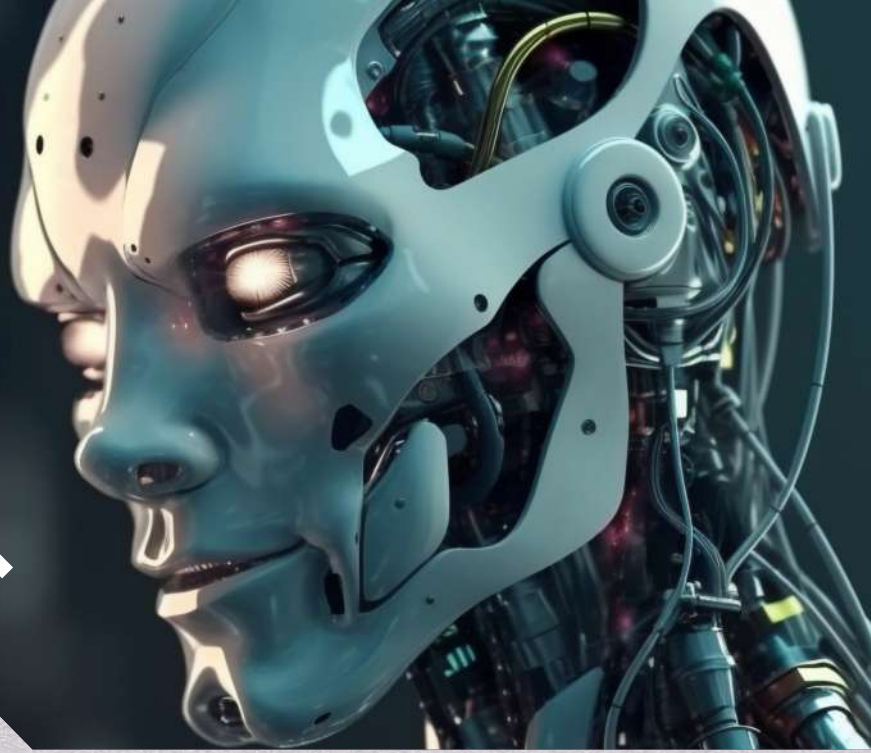|	
08:30 AM – 10:10 AM	Introduction to (a) Infrared sensor & (b) DC motor
10:10 AM – 12:05 PM	Hands-on session
12:05 AM – 12:45 PM	Lunch break
12:54 PM – 02:25 PM	Line Following Robot – briefing & Hands-on session
02:25 PM – 3:15 PM	Introduction to (a) Ultrasonic sensors & (b) Servo motor

DAY 3 (21.03.2022)

INTRODCTION TO OBSTACLE AVOIDING ROBOT

08:30 AM – 09:30 AM	Introduction to Obstacle Avoiding Robot
09.45 AM – 11.30 AM	Guest Lecture
11.30 AM – 12.05 PM	Introduction to Firebird-V Robot - Mr.V.Mohanraj AP.EEE
12.05 PM – 12.45 PM	Lunch
12.45 PM – 3.45 PM	Obstacle Avoiding Robot - Hands-on session

DAY 1

The inauguration of the training program was held on 18.3.2022 in the Function Hall of the college premises from 9.30 AM to 10.00 AM. Dr.KR.Santha, Vice-Principal, Professor and HOD, EEE lighted the Kuthuvilakku and presented the inaugural address with more emphasis on robotic sensors, signal conditioning circuits, controllers, actuators and applications of robotics in the medical field. Dr.Sudhakar K B, Professor, EEE motivated the students to apply the learnt concepts in the robotics training program for real-time problem solutions.

The day started with the formation of groups, the finalization of the mentor and a brief explanation of the upcoming events for all 3 days. Well understandable and a basic explanation of the Arduino, raspberry pi and NodeMCU was delivered to the students by the mentors allotted. Followed by, a brief introduction to sensors and classification of the sensors were presented. Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and motors as an output. This small computer is used as the brain of the robot. It can be programmed to control the way buttons, motors, switches, lights, and other electronic parts work together.

Arduino UNO board

Chassis

Sensors

Castor Wheel

Motors

Solder and lead

Motor Driver

Jumper wires

SENSORS

A sensor is a device that detects and responds to some type of input from the physical environment. The input can be light, heat, motion, moisture, pressure or any number of other environmental phenomena. The output is generally a signal that is converted to a human-readable display at the sensor location or transmitted electronically over a network for reading or further processing.

Ultrasonic Sensor

An ultrasonic sensor has two parts, transmitter and receiver. Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Our ultrasonic sensor, like many others, use a single transducer to send a pulse and receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.
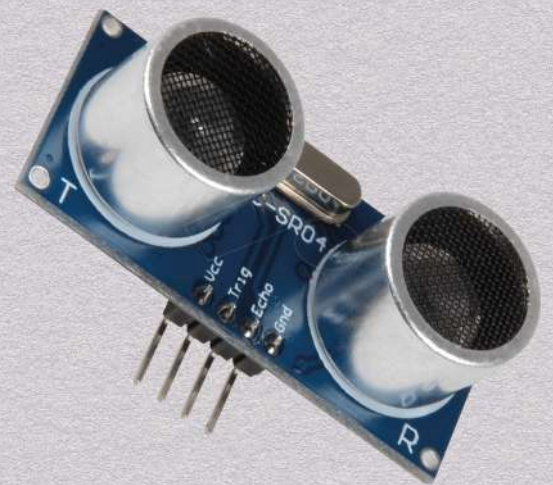
IR Sensor

An IR proximity sensor works by applying a voltage to a pair of IR light-emitting diodes (LEDs) which in turn, emit infrared light. This light propagates through the air and once it hits an object it is reflected towards the sensor. When there is a black body, the receiver does not sense any obstacle, it can be used to identify to follow specified paths.
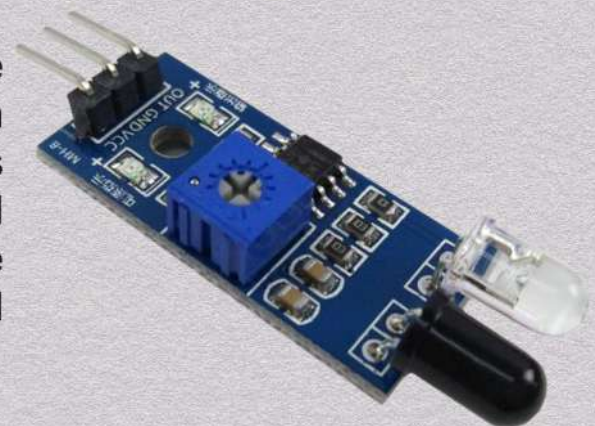
MOTORS

An electric motor is a device that converts electrical energ into mechanical energy generating motion or rotation. It operates on the principle of electromagnetic induction, where a current-carrying conductor placed within a magnetic field experiences a force that causes it to move. Electric motors are integral components in a wide array of applications, ranging from industrial machinery and appliances to transportation systems and robotics.

Servo Motor

A servo motor is a compact and precise electric motor used in applications requiring accurate control over movement and position. It operates based on feedback mechanisms that constantly adjust the motor's position to match a desired target. This level of precision makes servo motors indispensable in robotics, CNC machinery, and other tasks where consistent and controlled motion is essential for optimal performance.

Gear Motor

A gear motor combines an electric motor with a gearbox to deliver controlled and efficient motion. The gearbox helps regulate speed, torque, and direction, making gear motors ideal for applications requiring specific power and motion requirements. They find extensive use in various industries, such as automotive, industrial automation, and appliances, where tailored and reliable movement is necessary.

D A Y 2

The students were taught in brief about the sensors and motors. An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment. DC motors have a significant application in robots. A DC motor converts mechanical energy and the magnetic field into torque that can be used for various applications in robotics.

It was followed by a hands-on session on building a line follower robot. This session made the learning inquisitive and fun. The learning, testing, and trial run processes continued post-lunch. Subsequently, this transcended their learning.

Later, practical knowledge of the ultrasonic sensors and servo motors was delivered to the students. Ultrasonic sensors allow us to equip robots with a means of perceiving surrounding objects, an alternative to technical vision. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception.

DAY 3

After the introduction, participants moved to the function hall for a guest lecture. Mr B.Saravanan, Founder Director, Brixen Hitech Pvt Ltd, Chennai, presented a guest lecture on the topic "Industrial applications of Robots and Autonomous Mobile Robots (AMRs)". After the informative guest lecture, the inquisitive crowd raised questions and the speaker was very happy to answer all of them.

Students had a great opportunity to learn about Firebird-v-Robot from Mr V.Mohanraj, Assistant professor of the EEE department. Fire-V-robot is a significant robot at present due to transcending automation. It is based on embedded C and python, containing both a microcontroller and microprocessor.

Post lunch, participants had a hand on session where they were expected to build an obstacle-avoiding robot. Participants enthusiastically took part in the learning process. The participants showcased amazing teamwork and an unquenchable thirst for knowledge.

There was never a scarcity of information, and the learning was taken to the next level. The entire workshop was overflowing with titbits of facts and information. The workshop not only helped the participants to learn new things, but it also aided the trainers in transforming themselves into better leaders as well as showcasing coordination and deepening knowledge.

" Knowledge doubles when shared"

CERTIFICATION

Sri Venkateswara College of Engineering

EEE The Department of Electrical and Electronics Engineering

SVCE | Sri Venkateswara College of Engineering
Autonomous - Affiliated to Anna University
Pennalur, Sriperumbudur, Tamil Nadu | www.svce.ac.in

35 Years of Excellence

Department of Electrical and Electronics Engineering
Association of Electrical and Electronics Engineers
in association with
The Institution of Engineers (IEI)

Certificate of Participation

This is to certify that **Mr. / Ms.**_____
has participated in the 3-days **"SENSOR GUIDED ROBOTICS – Hands-on Training"**
organized by the Department of Electrical and Electronics Engineering,
Sri Venkateswara College of Engineering from 18th to 21st March 2022.

Dr. Sudhakar K B, Prof/EEE
IEI SVCE Coordinator

Dr. KR. Santha
Vice Principal, Prof & Head / EEE

Top Ranked Affiliated Institution in Tamil Nadu

5/5 Star Rated Innovation Cell

SMART INDIA HACKATHON 2020 Top Performer

Recognized Incubation Center

Certified Organization

Accreditations

Participants got a good level of exposure to microprocessors, microcontrollers, embedded C programming, and sensors, and built 2 projects using all of these concepts.

The projects were obstacle detector and line follower robot.

Mr.Akash A   IVth year

Mr.Adithyan M   IIIrd year

Mr.Sabari S   IInd year

Ms.Harini N   IInd year