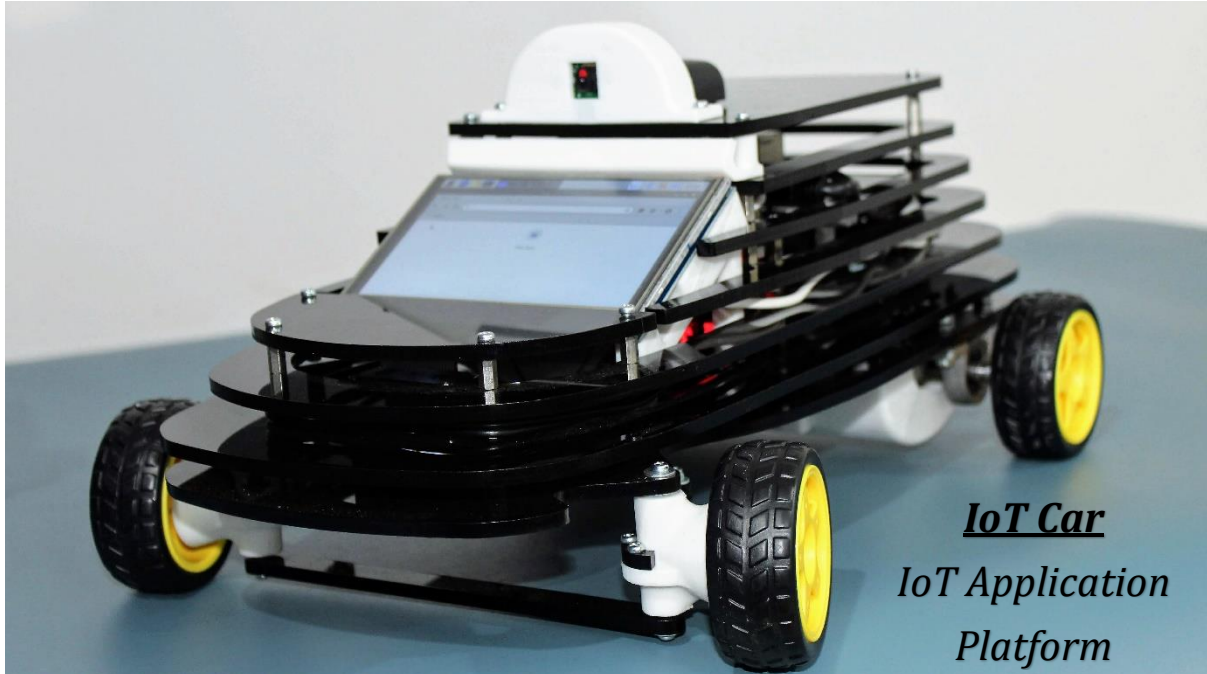


## **IoT Car**

# **IoT Application Platform** with AICTE approved experiments on **Internet of Things** (Hardware + Online Training Content)



## **Introduction**

IoT Car is a product that allows users to learn, visualize and implement Internet of Things in fun and engaging manner. It is a physical product embedded with electronic and mechanical components such as microprocessor, sensors, actuators, touch panel, and network connectivity.

IoT Car uses experiential learning methodology. With the use of IoT Car, students are introduced to Internet of Things concepts and its practical applications using python programming. They also get hands on experience of Electronics, Mechanical and Embedded systems.

IoT Car is based on the Raspberry Pi platform. It is embedded with a variety of sensors like Humidity and Temperature sensor, Accelerometer sensor, GPS and GSM Sensor and Camera sensor. It is driven by a DC motor, and Servo motor-based steering (Ackerman) mechanism. Specially designed graphical user interface (GUI) displays various sensors parameters and can also be used to operate the IoT Car. IoT Car is controlled and programmed using the inbuilt Touch Panel or the wirelessly connected Host Computer.

IoT Car comes with more than 15 well documented experiments right from beginner level to advanced level. The content is entirely online and can be accessed anytime, anyplace as per user's convenience. Specially designed GUI makes it easy to learn and implement the various applications and explore the field of Internet of Things.

## Recommended for:

The IoT Car is primarily for the following users:

- **Students** learning about Engineering at a technological University e.g., courses and disciplines like Mechatronics, Electronics, Computer, Instrumentation, Control & Automation can learn about the Internet of Things (IoT) and implement that learning in further research and project development.
- **Professors** teaching graduate and postgraduate engineering courses who want practical resources to explain and demonstrate Internet of Things (IoT) concepts in both lab and classroom environment can utilize IoT Car and assist the students understand the concepts well.
- **Makers** with an interest or background in engineering, either professionally or as a hobbyist can interface multiple sensors to collect data and perform efficient processes using IoT Car.
- **Users** who are interested in LINUX systems and IoT (Internet of Things).

## Features:

- In-depth practical learning on IoT
- Based on Linux Debian Operating System
- Python Programming
- Study interfacing of various Sensors and Actuators
- Learn and implement various Communication Protocols for IoT
- Built in Eclipse MQTT Server
- GSM and GPS included
- GUI based IoT experiments demonstration.
- IoT Gateway using WiFi and Ethernet.
- Bluetooth interface
- Vision-based experimentation

## Technical Specifications:

- Processor: 64bit cortex A53 ARMv8 Quad-Core Processor 1.4GHz
- Connectivity: 802.11 b/g/n Wireless LAN
- Bluetooth 4.2, USB & Ethernet
- RAM: 1GB LPDDR2 SDRAM
- OS: Linux Debian
- Camera: 5MP Camera
- Memory: 16GB
- Display: 5inch resistive touch display
- Actuators: Servo and DC Motor
- Power: 5V, 2A
- Charging: USB
- Battery: 5V, 10000mAh
- Included Sensor:
  - Humidity & Temperature Sensor
  - GSM Sensor
  - GPS Sensor
  - Accelerometer Sensor

## **Learning Objectives include, but are not limited to the following:**

- Connect host PC or mobile to the Raspberry Pi, for reading data from connected sensors and actuating peripheral devices.
- Learn IoT networking Protocol.
- Study behaviour and dynamics of wireless sensor networking (WSN).
- Learn concepts and implementation of the Internet of Things (IoT) architecture
- Learn UART (Universal Asynchronous Receiver Transmitter) and I2C communication Protocol used for interfacing sensors.
- Learn Shell Scripting Programming.
- Learn GSM, GPS module interfacing.
- Learn MySQL database configuration, management, and query handling.

## **AICTE Experiments:**

- Familiarization with Raspberry Pi and perform necessary software installation.
- To interface DHT11 sensor with Raspberry Pi and write a program to print temperature and humidity readings.
- To interface motor using relay with Raspberry Pi and write a program to turn ON motor when push button is pressed.
- To install MySQL database on Raspberry Pi and perform basic SQL queries.
- Write a program to create TCP server on Arduino/Raspberry Pi and respond with humidity data to TCP client when requested.
- Write a program to create UDP server on Arduino/Raspberry Pi and respond with humidity data to UDP client when requested.

## **Exclusive Experiments:**

- To introduce Raspberry Pi GPIO and control a DC motor.
- To introduce Raspberry Pi GPIO and control motor.
- To control Servo motor using Raspberry Pi using Python.
- To interface temperature and humidity sensor DHT11 with Raspberry Pi.
- To interface accelerometer sensor with Raspberry Pi.
- To interface GSM module with Raspberry Pi.
- To interface GPS module with Raspberry Pi.
- To interface RPi Camera with Raspberry Pi.
- To introduce mySQL and experiment with Raspberry Pi.
- To create a TCP (Transmission Control Protocol) server on Raspberry Pi to send Temperature and Humidity data as per TCP client request.
- To create a UDP (User Datagram Protocol) server on Raspberry Pi to send Temperature and Humidity data as per UDP client request.



*Image of IoT Car for reference*

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