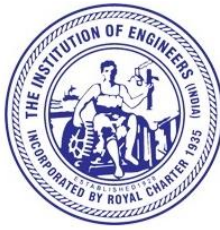**Sarvajanik education society**
Sarvajanik college of Engineering and Technology
Faculty of Electronics and Communication Engineering
Workshop on
"IoT applications using Raspberry PI"
In association with

IETE Surat Sub-Center   **IE-SGLC**   **CSI, Surat Chapter**

Report

Workshop on "IoT applications using Raspberry PI"
15th 16th March 2019

Electronics & Communication Engineering Department, SCET-Surat had organized workshop on **"IoT applications using Raspberry PI"** on 15th – 16th March, 2019. The workshop was organized in association with in association with IE(I) SGLC, IETE Surat sub-center, and CSI Surat Chapter. Workshop was arranged for students of SCET and surrounding college's faculty members and professionals. The event was planned with a zeal to learn trends in IoT applications using Raspberry PI.

There were total 43 participants in the workshop from Electronics and Communication Engineering, Computer Engineering and Information Technology Department. Among them 2 were faculty members from SRKI and 7 were students from Computer Department, of CGPIT, Bardoli (UTU) College.

As per schedule workshop was started at 9.00 AM on 15th March 2019 with Inaugural ceremony, during which Dr. Nehal Shah, Associate Professor, ECE, SCET welcomed all the participants present and narrated objective and schedule of the workshop. Prof. Pritesh Saxena felicitated chief guest of the function Mr. Kirtibhai Shethna, Chairman, IE(I)-SGLC, Surat with flowers. For good commencement, Lighting of the Lamp was performed by Mr. Kirtibhai Shethna. Mr. Kirtibhai Shethna was invited for delivering words of inspiration for workshop participants. Ceremony was completed by vote of thanks and technical session was started.

Dr. Nehal Shah, conducted the opening session of workshop at 9.30AM and delivered the expert talk on "**Single board computers – Meet Raspberry PI for IoT Applications**" which was followed by Tea Break.

Prof. Chintan Panchal, Assistant Professor, ECE, SCET started the session at 11.00 AM with Introduction of Raspberry PI with brief description of the components like processor, power source, SD card, GPIO, USB 2.0 ports etc. He discussed the booting process by installing Raspbian OS on SD card using Etcher software. He continued the session by Quick start up with Raspberry PI followed by internet connectivity setup. This was Hands on Session in which Raspberry PI boards with all accessories were given in group of 5 participants. At the end of this session students were able to do installation, first time configuration and internet connectivity on Raspberry PI.

The next session at 11.45 AM consisted of hands on various Linux and Raspberry PI commands by Prof. Pritesh Saxena, Assistant Professor, ECE, SCET. He demonstrated how Raspberry PI can be used as remote

server using VNC viewer and Putty software where Raspberry PI is configured in LAN network to be accessed by other computer.

Prof. Bhargav Shah, Assistant Professor, ECE, SCET provided the glimpse of the python programming and demonstrated different commands of it at 12.30PM. He also provided in-depth knowledge about the Raspberry PI GPIO interfacing with outer world. Using the knowledge of python programming and GPIO interfacing, students had done various hands on session like LED Switching, Controlling the status of LED using Switch, Brightness control of LED using Pulse Width Modulation (PWM). Due to eagerness of students session was stretched little bit and continued after lunch.

Last session was started at 3.00PM and was conducted by Mr. Shubham Sanghavi, Machine Learning Engineer, Inkocean Pvt. Ltd, Surat on **"Free RTOS and Multi-Tasking on PI".** In the session he discussed about multi-tasking with example and explain how such mechanism can be designed for RTOS. Students were very much enthusiastic to learn usage of Free RTOS till end. Session was lasted till 5.00PM.

Day 2 i.e. 16th March 2019 started with a great zeal among the students to study more details of Rapsberry PI and its application in IoT. The first session on **IoT Applications** was undertaken by Mr. Urvish Gohil, Software Developer, Picustech, Surat where he cultivated the knowledge into students by taking them into details of IoT and its application in broader view. He added that in nearby future IoT would be able to grasp the major part of technical market. He even made the participant realise that security is an important aspect and cannot be overlooked while working with IoT. He also narrated the thin line difference between Wireless Sensor Network and IoT along with Cloud Computing and IoT. He ended the session with IoT inclination in various upcoming domains of Machine Learning and Artificial Intelligence.
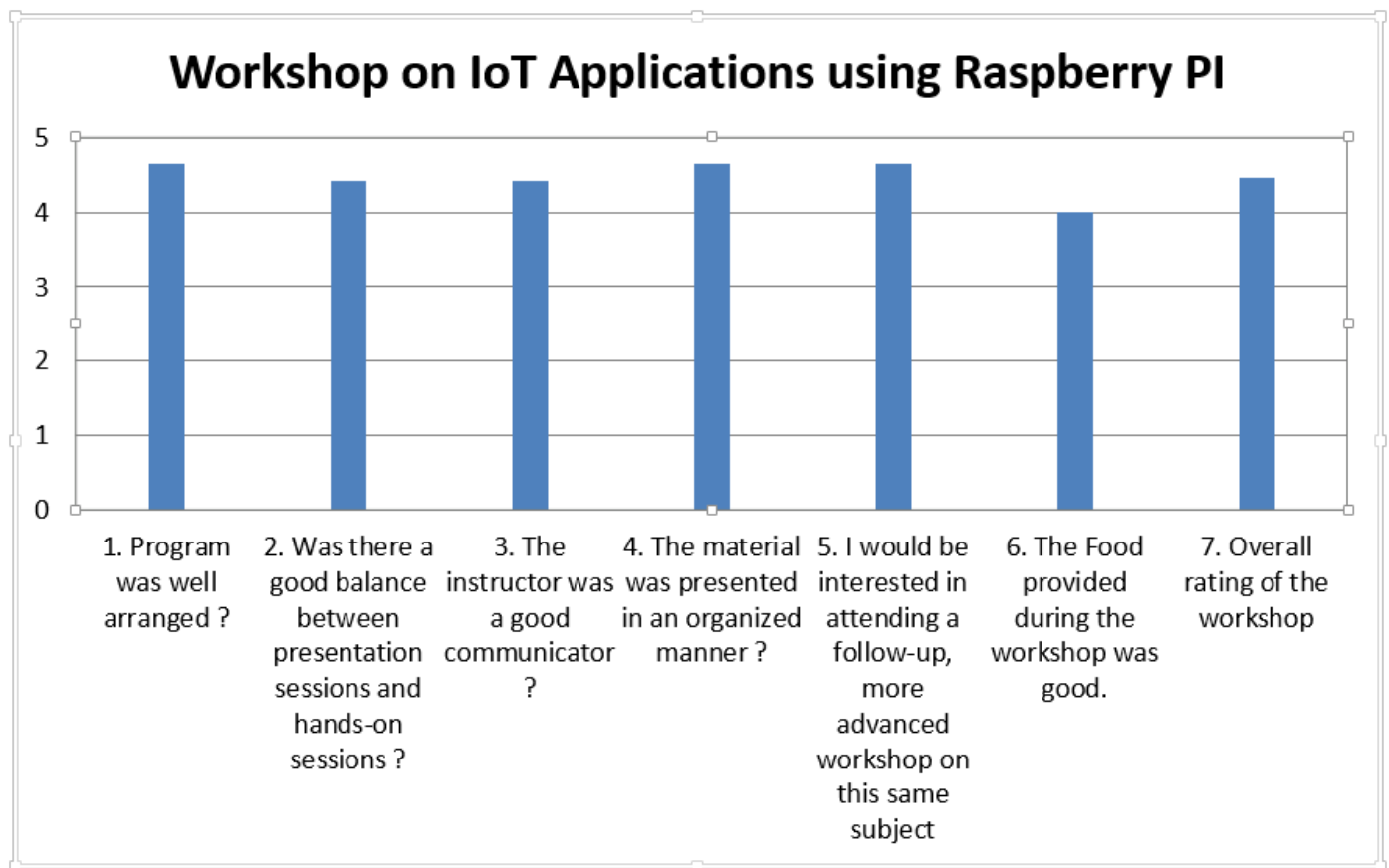
The second session on **Voice Assistant for Raspberry PI** was taken care by Ms. Bhoomika Sheth and Ms. Kripa Ruia, Mentor, Robotticca. In this session the students were very eager to learn interfacing of Raspberry Pi with Alexa. Alexa is the Amazon digital voice assistant. It can be used on smartphones and Amazon's line of Echo products. Students were very happy to learn this concept as it even highlighted the modern application in current scenario. Students had hands on experience of Alexa Voice Assistance with raspberry Pi where they provided command to Alexa through USB microphone interfaced with Raspberry Pi having internet connectivity and were surprised to observe Alexa's response.

The next session was initiated by Prof. Bhargav Shah. He made student work deeply with GPIO pins of Raspberry Pi and interfacing PI **with Ultrasonic Sensor, LEDs** and **switches**. Students had hands on session of such hardware modules with Raspberry Pi. Queries during hands on sessions were calmly handled by student volunteers Ms. Nijal Saspara and Ms. Arnika Bhalani, to obtain optimum result. While handling ultrasonic sensor students had lot of query related to its operation. Mr. Shah handled the queries with specific examples and demonstrated application of ultrasonic sensor for distance measurement. Students were also given hands on for **PWM generation** and thereby know how such signals can be used to control speed of motors.

The day was ended well by taking participants feedback whereby students shared their experience of this two days and were very happy to gain knowledge in this domain. Participants also insisted to organize such kind of workshops. Formally feedback of participants were collected through Google Form. The workshop was ended with the motto of organizing the level up workshop of Raspberry Pi in upcoming semester. The participants were distributed certificates at the end.

Overall it was fruitful experience for all participants, coordinators and volunteers.

Feedback of the Workshop

Workshop on IoT Applications using Raspberry PI

Chart showing feedback ratings (scale 0 to 5) for the following questions:
- 1. Program was well arranged ? — approximately 4.6
- 2. Was there a good balance between presentation sessions and hands-on sessions ? — approximately 4.4
- 3. The instructor was a good communicator ? — approximately 4.4
- 4. The material was presented in an organized manner ? — approximately 4.6
- 5. I would be interested in attending a follow-up, more advanced workshop on this same subject — approximately 4.6
- 6. The Food provided during the workshop was good. — approximately 4.0
- 7. Overall rating of the workshop — approximately 4.5

Faculty Coordinator

Dr. Nehal Shah,
Mr. Pritesh Saxena,
Mr. Bhargav Shah
Mr. Chintan Panchal

Electronics & Communication Department,
Sarvajanik college of Engineering and Technology -Surat.

Memory of the workshop

Group Photo – Workshop IoT Applications using Raspberry PI

Lighting of the Lamp

Inaugural Function

Words of Inspiration by Mr. Kirti Shethna

"Single board computers – Meet Raspberry PI for IoT Applications" by Dr. Nehal N Shah

"Raspbian OS installation and LAN configuration on PI" by Prof. Chintan Panchal

"Getting started with Linux commands" by Prof. Pritesh Saxena

"Free RTOS and Multi-Tasking on PI" by Mr. Shubham Sanghvi

"IoT Applications" by Mr. Urvish Gohil

"Distance measurement with Ultrasonic Sensor" by Prof. Bhargav Shah

"Voice Assistant for Raspberry PI" by Ms. Kripa Ruia, Ms. Bhoomika Sheth, Robotticaa, Surat

Group Photo – Workshop IoT Applications using Raspberry PI