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Report On 3-Days Hands-on Workshop On Intel Galileo Board Organized By Design Innovation Centre (DIC)

Date: 22nd – 24th April 2022 Mode: Offline Mode Venue: Chanakya Hall, Academic Block-4, GTU Campus, Chandkheda Total registrations: 18 Time: 10:30 AM to 5:30 PM (6 Hrs.) Subject Expert(s): 1. Level-up Team 2. Prof. Raj Hakani, Asst. Professor, GSET, DIC Coordinator

3. Ms. Priya Mishra, DIC-GTU

4. Ms. Urvashi Mesariya, DIC-GTU

In this fast-growing world, AI, the Internet of Things, and Embedded Systems have always played an immense role. The IoT techniques have been an asset for us, humans. They are used in almost every aspect of today's world, from healthcare to household chores and industries. Economically, this field has created a wide range of new business opportunities and revenue streams.

With an aim of imbibing these Physical Computing techniques in young minds, Design Innovation Centre (DIC), supported and funded by the Ministry of Education (MoE), Gujarat Technological University (GTU) initiated a 3-Days Hands-On Workshop on Intel Galileo Board. The workshop covered some of the basic aspects of Embedded Systems and Physical Computing. This workshop was formulated in various phases including a brief overview of Intel Galileo Boards, hands-on practical for LED and LCD interfacing, various sensors and actuators - their interfacing and calibration, and prototype building.

Objective: The objective of this workshop was to inculcate knowledge about Embedded System Design and Physical Computing techniques in the participants of the workshop. This workshop was mainly designed for the students who wanted to start from the basics of these techniques, with a minimal prior understanding. The workshop was aimed at making the students able to develop a prototype of their own at the end of the session.



Workshop Content

Day 1 22/04/22	Introduction and Basic LED Interfacing, LED Patterns and combinations
Day 2 23/04/22	Sensors and Actuators and their interfacing
Day 3 24/04/22	Introduction to IoT Networks and Make Your Own Prototype segment

Day 1: Introduction and Basic LED Interfacing

Day 1 was aimed at inculcating the basic knowledge of everything in the participants. The day started with a formal introduction of the participants and the expert. It then proceeded to the main aim of the event. A boost-start was given to the attendees with the introduction to physical computing and embedded systems. A basic look-up was given to the Arduino IDE and the Intel Galileo Board. A schematic of the Pin Diagram for the Intel Galileo Board was also explained. In the second phase of Day 1, LED Interfacing was discussed. Various LED patterns were also covered. Taking a step higher, LED interfacing with a push-button and LCD interfacing were discussed. Hands-on practical were given for all the aspects. Lately, some basics of programming were covered in order to clear the doubts of the participants. The day ended with a one-on-one problem discussion with the participants.

Day 2: Sensors and their Interfacing and Calibration

Giving a blissful start to the day, where the workshop started with the topic of Sensors and Actuators. A basic understanding was cultivated of the usage, specifications, and criteria involved while building real-time applications. Further jumping on the hands-on applications of basic prototyping, where the system Senses, Thinks, and Acts.

The sensors that were briefed to the participants include HC-SR04 Ultrasonic Sensor, soil moisture sensor, gas sensor, PIR motion sensor, and Infrared sensor. The participants gained knowledge about the schematics, circuit diagrams, interfacing, difficulties faced while interfacing these sensors, and calibration. Hands-on practical were given for all the sensors.

Actuators that were discussed include LED, LCD, 7-segment display LCD, servo-motor, and DC motor. The individual usage of these actuators in real life was also explained. The difficulties of each and every participant were addressed thoroughly.



Day 3: Introduction to IoT Network and Making your own Prototype

The day initiated with a brief introduction to the Internet of Things (IoT) and Computer Networking. A brief knowledge of these topics was given. In the second phase, the participants were told to make their own prototype using any of the sensors, actuators, LED, LCD, pushbuttons, motors, etc. The prototypes built by the participants include an Automatic Solar Panels Adjuster, Vehicle Accident Prevention, and an Aircraft Stabilizer System.



Figure: The prototypes built by the participants in the Make your own Prototype segment.



Figure: Glimpses of the hands-on workshop. Participants actively experimenting on the Intel Galileo board.



- reeuback
 - Thanks for helping us to enlarge our experience in sensors and their connections. Thank you so much for giving us the opportunity to work on hardware that is hardly available anywhere, Also feel happy to share our experience and clear our doubts.

Maulin Patel

• We can improvise on the speed. We can also increase the workshop timings by starting early or by staying late. Those who want to, can stay late and continue with the hands-on practice on different ideas. Rest all was really good and impressive.

Nakul Patel

It was an awesome and productive session. Learned too much.

Vasaiya Neel Mukesh

Registrar, GTU