CHARUSAT
CHAROTAR UNIVERSITY OF SCIENCE AND TECHNOLOGY

Chandubhai S Patel Institute of Technology

Faculty of Technology and Engineering

Department of Computer Science and Engineering

Date: 29/06/2023

Event Application No in E-governance: 2022-23/00769

Event Name: One Day Hands-On Workshop On "Embedded Machine Learning with Nvidia Jetson Nano" Under Nvidia Academic Hardware Grant Program for The Faculty Members

Detail about the event:

On 20th June 2023, a one-day hands-on workshop on "Embedded Machine Learning with Nvidia Jetson Nano" was conducted under the Nvidia Academic Hardware Grant Program for the faculty members of CSPIT. Total 22 faculty members have filled the registration form and among them 15 were remain present for the same. The workshop aimed to introduce the participants to the fundamentals of embedded machine learning and provide them with practical experience in using the Nvidia Jetson Nano platform for developing machine learning applications. The workshop was led by Prof. Harshul Yagnik from the Department of Computer Science and Engineering, CSPIT.

The main objectives of the workshop were as follows:

- Familiarize participants with the concept of embedded machine learning and its applications.
- Introduce participants to the Nvidia Jetson Nano platform and its capabilities.
- Provide hands-on experience in setting up and configuring the Jetson Nano.
- Teach participants how to develop and deploy machine learning models on the Jetson Nano.
- Demonstrate real-world examples of embedded machine learning applications.

The workshop was held in the AI & ML lab (Room No.: 638) of the Department of Computer Science and Engineering. It commenced around 10:00 AM with a brief introduction by Prof. Harshul Yagnik, who outlined the agenda for the day and provided an overview of embedded machine learning and the Nvidia Jetson Nano platform.

The workshop consisted of the following sessions:

Session 1: Introduction to Embedded Machine Learning

- An overview of embedded systems and their role in machine learning applications.
- Discussion on the challenges and opportunities of embedded machine learning.
- Examples of real-world applications of embedded machine learning.

Session 2: Introduction to Nvidia Jetson Nano

- Introduction to the Nvidia Jetson Nano platform and its specifications.
- Explanation of the Jetson Nano development environment and ecosystem.
- Overview of the software stack, including Nvidia JetPack SDK and CUDA.

Session 3: Setting up the Jetson Nano

- Hands-on demonstration of setting up the Jetson Nano development board.
- Installation and configuration of the necessary software and drivers.
- Introduction to the Jetson Nano development tools and IDEs.

Session 4: Developing Machine Learning Models on Jetson Nano

- Overview of popular machine learning frameworks supported by Jetson Nano (e.g., TensorFlow, PyTorch).
- Hands-on exercise on training and deploying a simple machine learning model on the Jetson Nano.
- Discussion on best practices for optimizing and deploying models on resource-constrained devices.

Outcome:

The workshop received an overwhelming response from the faculty members, with a total of 15 participants attending the event. The participants expressed great enthusiasm for the workshop content and appreciated the hands-on approach, allowing them to gain practical experience in working with the Nvidia Jetson Nano platform.

The workshop achieved its objectives by providing the participants with a comprehensive understanding of embedded machine learning and practical knowledge of developing machine learning applications using the Jetson Nano. Participants were able to set up the Jetson Nano, develop and deploy machine learning models, and explore real-world applications.

Feedback from the participants was collected at the end of the workshop, and the overall response was highly positive. Participants commended Prof. Harshul Yagnik for his expertise and effective

delivery of the workshop content. They appreciated the well-structured sessions, hands-on exercises, and the opportunity to interact and ask questions throughout the workshop.

Actionable insights of Event:

These actionable insights from the workshop demonstrate the effectiveness of the training program in equipping faculty members with the knowledge, skills, and practical experience required to leverage embedded machine learning using the Nvidia Jetson Nano platform. The participants are now empowered to integrate embedded machine learning into their teaching, research, and projects, thereby advancing the field of machine learning in academia.

Attach applicable Annexure:

1. Attach CV of expert
2. Photographs
3. Evaluation of Feedback

Annexure-I

CV of experts

1. Mr. Harshul Yagnik

Designation: **Assistant Professor**

Institution/Company: Chandubhai S. Patel Institute of Technology, CHARUSAT.

Field Experience: **12+ Yrs.**

Profile:

Harshul Yagnik is working as an assistant professor in the department of computer science engineering at Charotar University of Science and Technology. He has more than 12 years of academic experience. He has done a master of engineering in signal processing and communication and presently pursuing a Ph.D. in the area of computer vision in part-time mode.

- He has received "IEEE Outstanding Branch Counselor and Branch Chapter Advisor Award 2019" from Institute of Electrical and Electronics Engineers, New York.
- His software skills include programming languages like Python, C, C++, VHDL, Verilog, JAVA along with application packages/tools like OpenCV, Tensorflow, Keras, Numpy, Pycharm, Matlab, Scilab, Android Studio, Xilinx, TI Code Composer Studio, AVR Studio, Microwind, NI LabView, Multisim and Orcad.
- He has working experience with hardware boards like ESP8266, ESP32, Raspberry Pi, TI DSPs TMS320 C5x, C6x & LF24x, Xilinx Spartan 3, Altera Quartus II, NI Elvis Boards, Intel 8085,8086, and 8051.
- He has taught subjects Computer Vision, Fundamentals of Image Processing, VLSI Technology, and Design, Cryptography and Network Security, Information Theory and Coding, Digital Signal Processing for Power Electronics, Mobile Computing, and Wireless Communication, Research Methodology, Analog Circuit Design.
- He has guided student projects on Activity Recognition, IoT based Home Automation, Presence Sensing Light Controller, Arbitrary Waveform Generator, Solar-Powered Smart Trash Can and Smart Industrial Table.
- He has published one research paper in a journal and presented one in a conference on the topic of data compression along with one conference paper on the topic of multilevel inverter for photovoltaic systems.

- He has organized a total of more than twenty national/international technical festivals, workshops, Seminars, congress, and expert talk series. He has delivered seven expert talks on topics of 5G, IoT, Robotics, and DSP Processors.

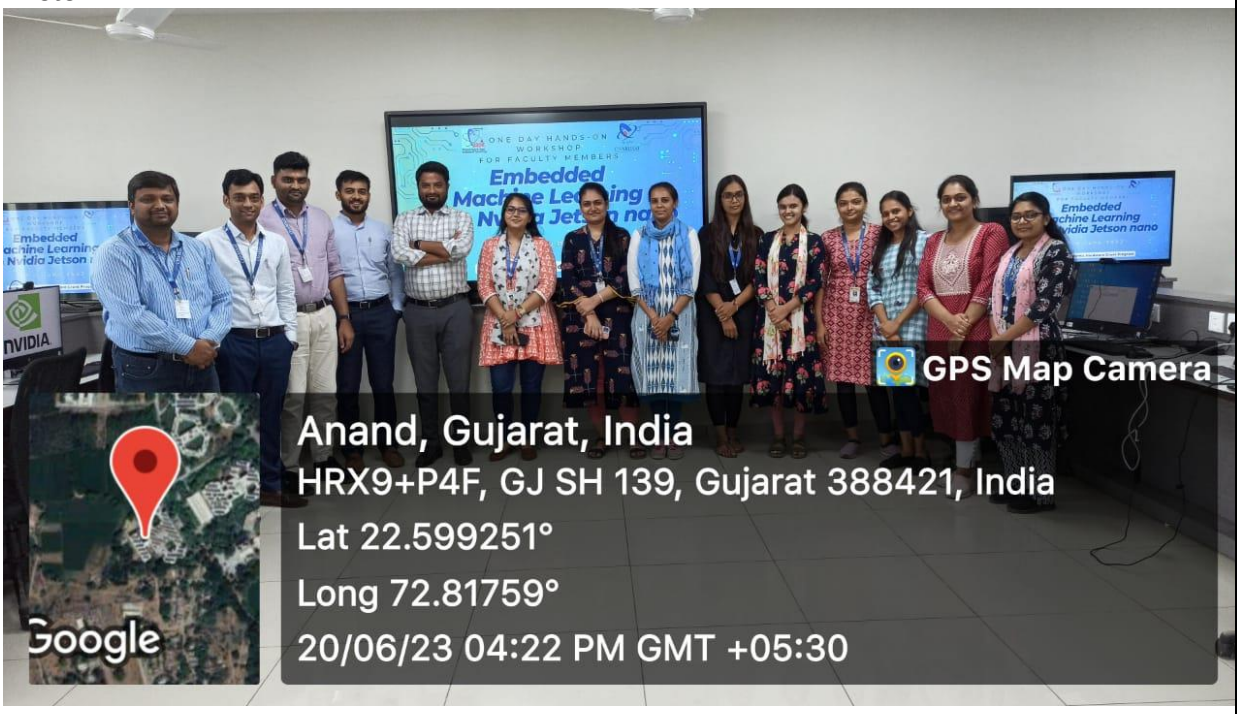
Annexure- II

Photographs with Caption

Photo-1

Faculties are doing object Detection Using Jetson Nano
(Date: 20/06/2023)

Photo-2



Faculty Participants of the workshop
(Date: 20/06/2023)

Annexure-III

Evaluation of Feedback

Feedback was taken from the participants at the end of the workshop. From the feedback form filled by the Participant, Evaluation of Feedback is as per given below:

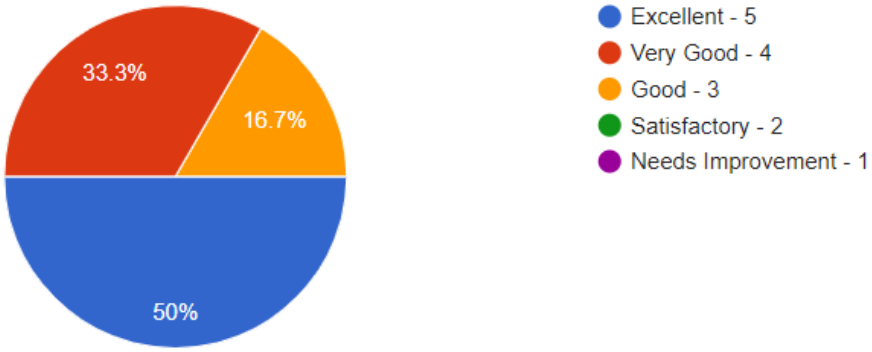
Evaluation of Feedback

Name of Expert Talk One Day Hands-On Workshop On "Embedded Machine Learning with Nvidia Jetson Nano" Under Nvidia Academic Hardware Grant Program for The Faculty Members
Resource Person: Mr. Harshul Yagnik
Date: 20-06-2023
Time: 10:00 AM to 04:00 PM
Venue: AI & ML Lab (Room No: 638), CSE Department, A7 Building, CSPIT.

*Percentage values are rounded wherever required

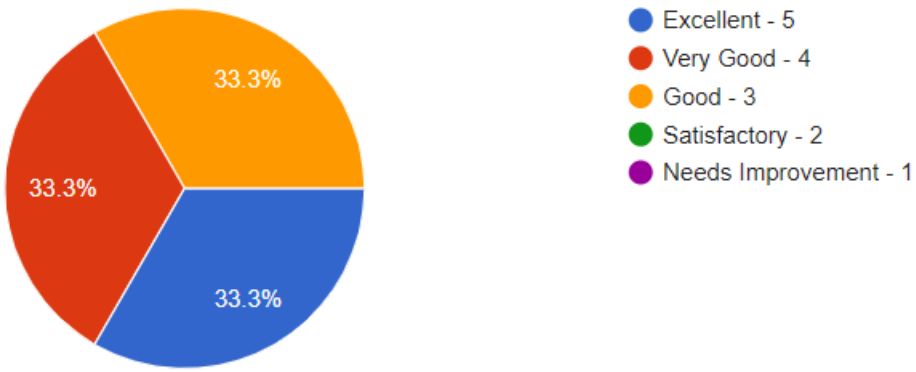
Content of Workshop

6 responses



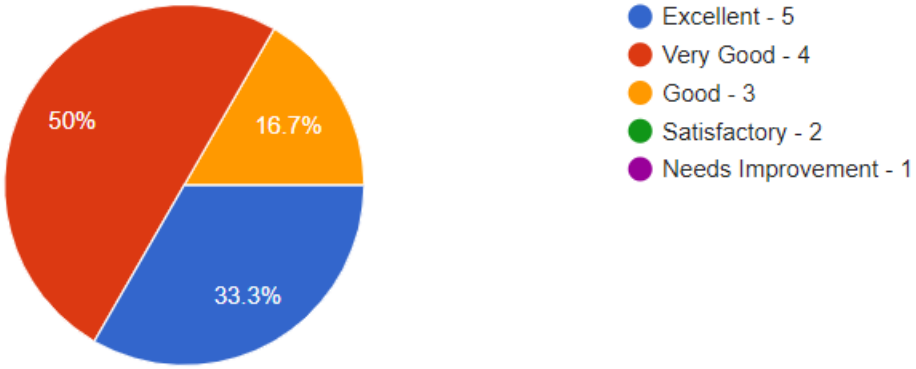
Relevance to industry/research requirements

6 responses



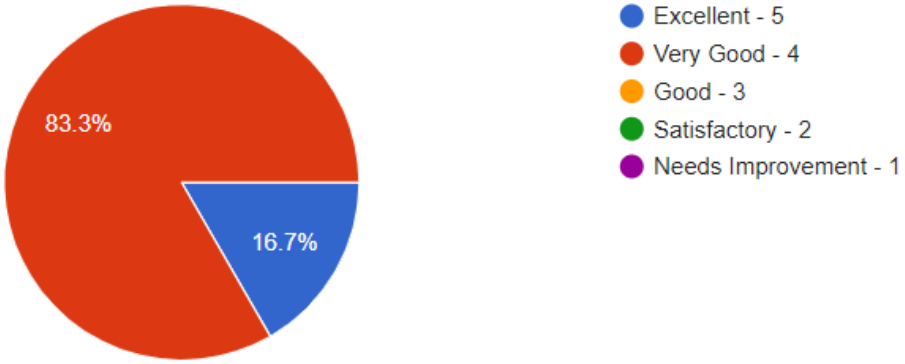
Incorporation of advanced topics

6 responses



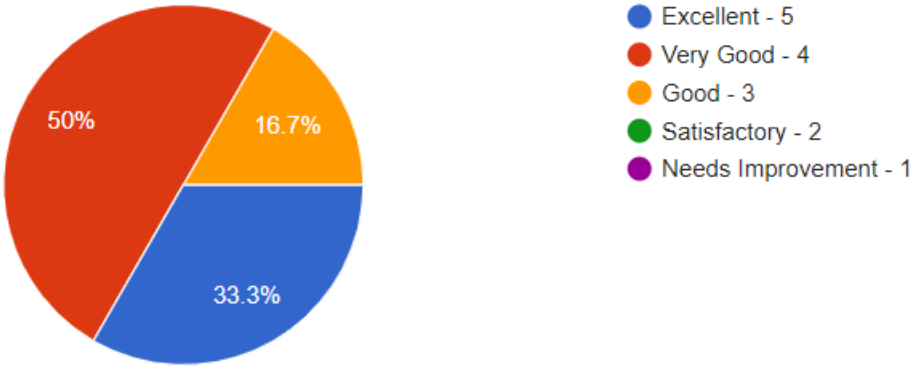
Pedagogy proposed

6 responses



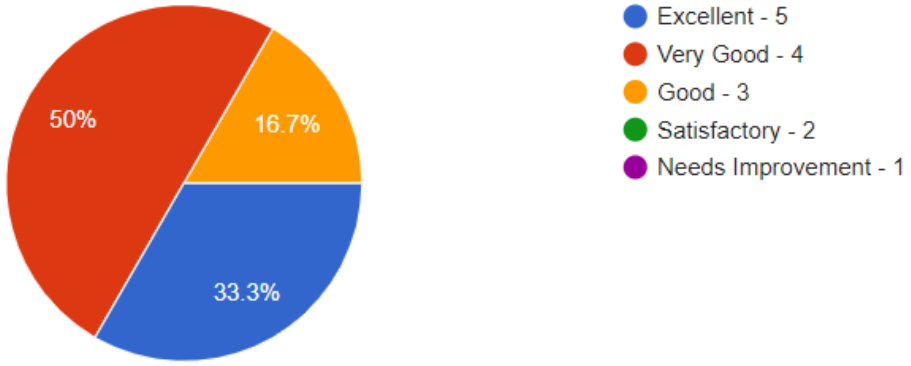
Have a desired balance between theory and practical

6 responses



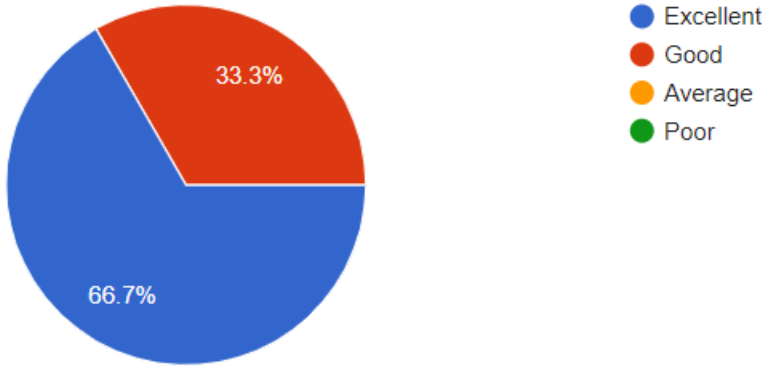
Industrial training/ practical exposure

6 responses



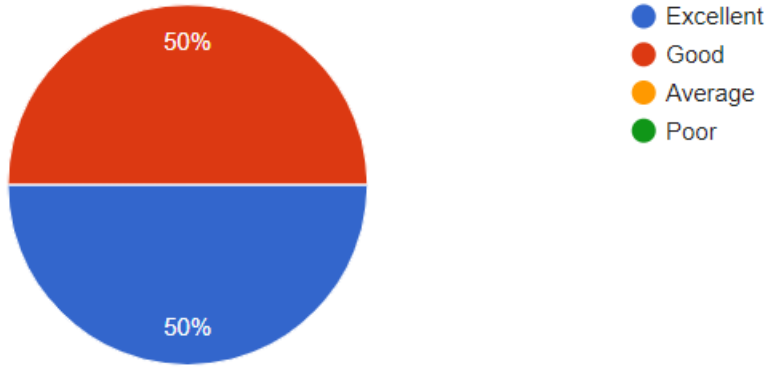
The content of workshop

6 responses



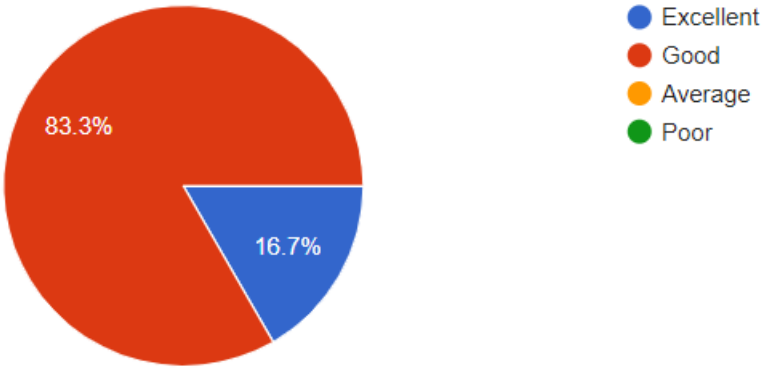
Method of Presentation

6 responses



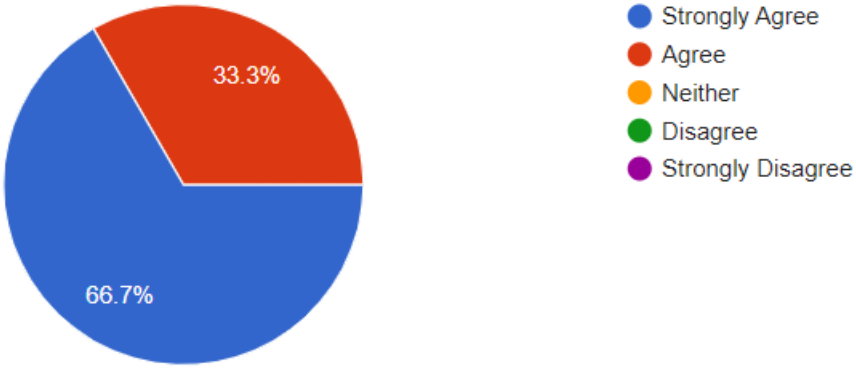
Innovativeness

6 responses



After attending the workshop, are you able to understand use of Jetson Nano?

6 responses



The workshop not only enhanced the participants' understanding of embedded machine learning but also inspired them to explore further possibilities in their own research and teaching endeavors. The success of this workshop highlights the importance of such initiatives in promoting cutting-edge technologies in academia and fostering innovation in the field of machine learning.

We extend our sincere gratitude to Prof. Harshul Yagnik for his invaluable contribution in conducting this workshop, Prof. Abhishek Patel who have managed all the technical requirements and organizing the workshop, Prof. Amit Thakkar (Head of Department- CSE) who always encourage for such kind of technical events and we also thank Nvidia for their support through the Academic Hardware Grant Program.

Prof. Abhishek Patel	**Prof. Harshul Yagnik**	**Prof. Amit Thakkar**
Coordinator	Coordinator	Convener
Asst. Prof., CSE-CSPIT	Asst. Prof., CSE-CSPIT	Prof. & Head, CSE-CSPIT