Parshvanath Charitable Trust's
A. P. SHAH INSTITUTE OF TECHNOLOGY, THANE
(All Programs Accredited by NBA)
Department of Information Technology

eFRESH- Computer Vision and IoT Based Framework for Fruit Freshness Detection

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1. Introduction

- Problem Identified :

  Detection of defected fruits and the classification of fresh and rotten fruits represent one of the major challenges in the agricultural fields. Rotten fruits may cause damage to the other fresh fruits if not classified properly. Traditionally this classification is done by men, which was labour-intensive, time taking, and not efficient procedure. Thus, factories need human intervention for segregation of fruits

- Solution Proposed :

  Hence, we need an automated system which can reduce the efforts of humans and time of production. Our system will automatically do that with help of CNN classification Algorithm. The proposed idea will create a segregation model which would need no human intervention for classifying and segregating fruits.

2. Objectives

- To create a model to classify fresh and rotten fruits.
- To pre-process images before sending them to the model.
- To achieve efficient model considering the cost.
- To train a model with high accuracy.
- To develop a hardware system considering the Industry 4.0 standards.
- To program NodeMCU for collecting and sending images to server.
- To program NodeMCU for segregation.
- To host data analysis dashboard on AWS cloud

3. Scope

1. Can be applied in domestic use.
2. Can be useful in food industry .

4. Technology Stack

Hardware Requirements:

- NodeMCU ESP8266
- OV7670 Camera Module
- Motor/ Rotator(for conveyor belt)
- Wi-Fi module
- Flaps
- Servo-motor
- Alcohol Sensor(MQ3), Methane Sensor(MQ4)

Software Requirements:

- Google Colab
- Tensorflow, Keras, Pandas, Numpy, Matplotlib.
- AWS Cloud.

5. Data Analysis Parameter

- Color
- Shape
- Size
- Ethanol emission
- Methane emission

6. Architecture

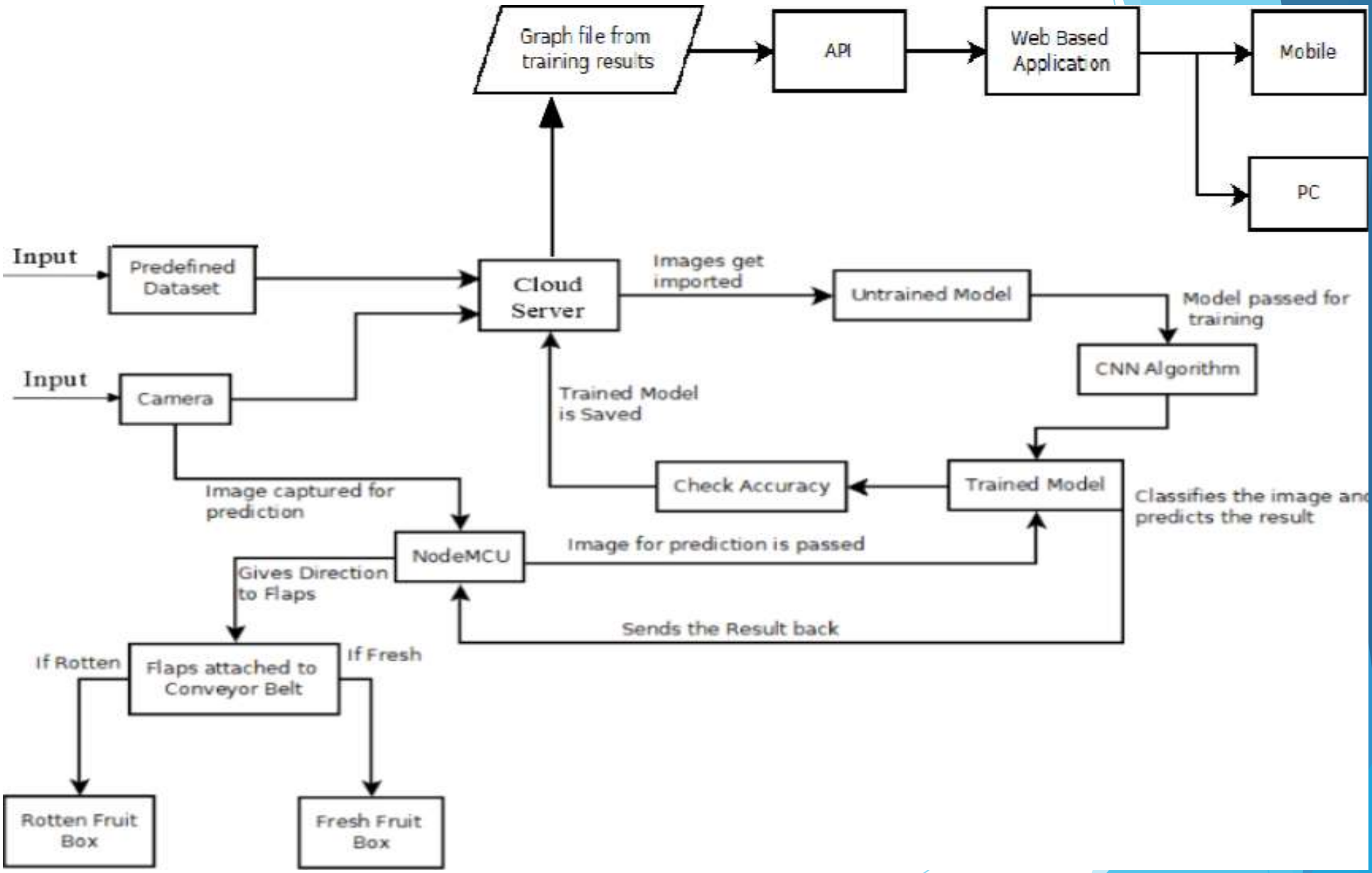


Figure no.1: Architecture of proposed model

7. Demonstration Model

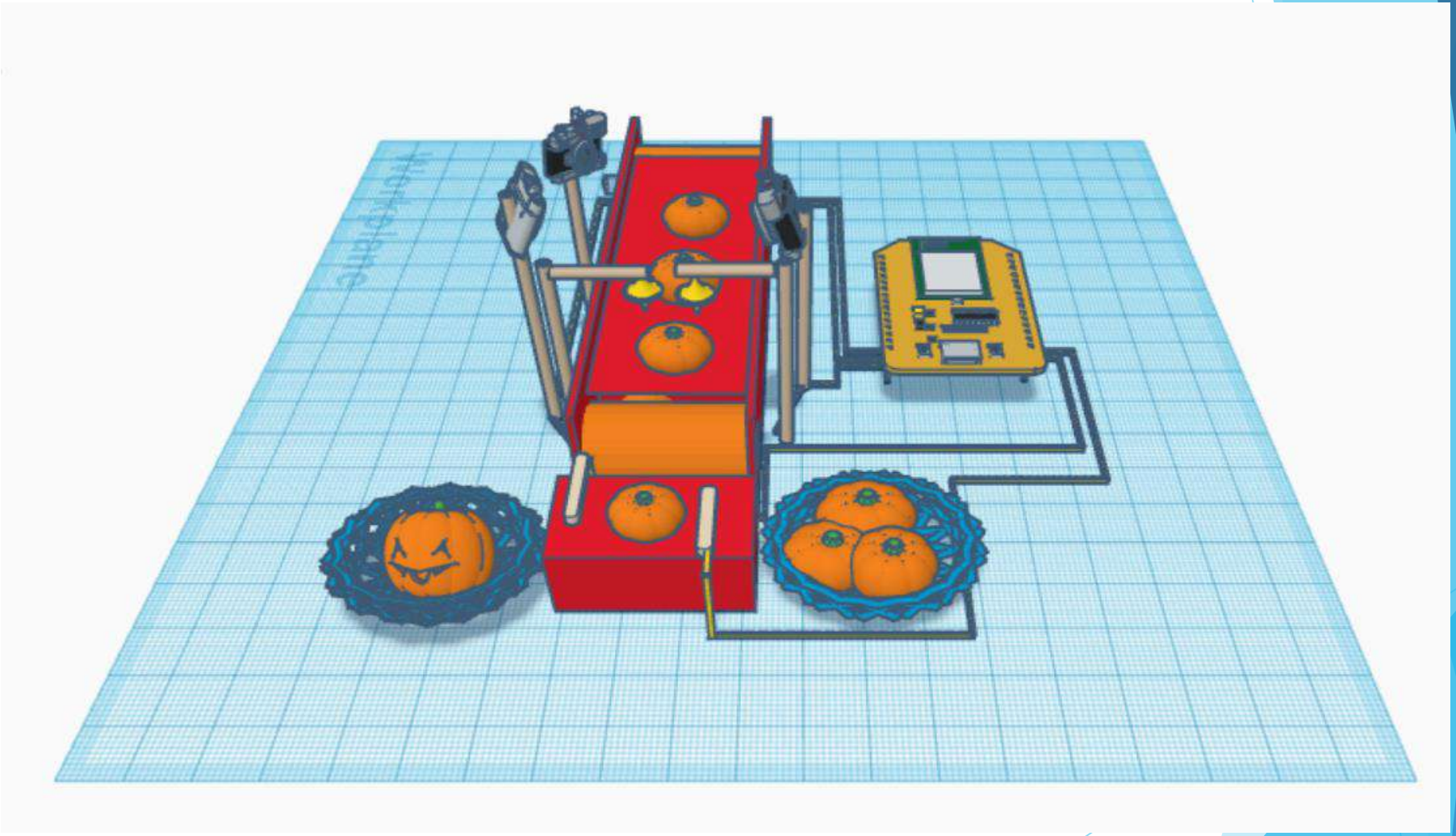
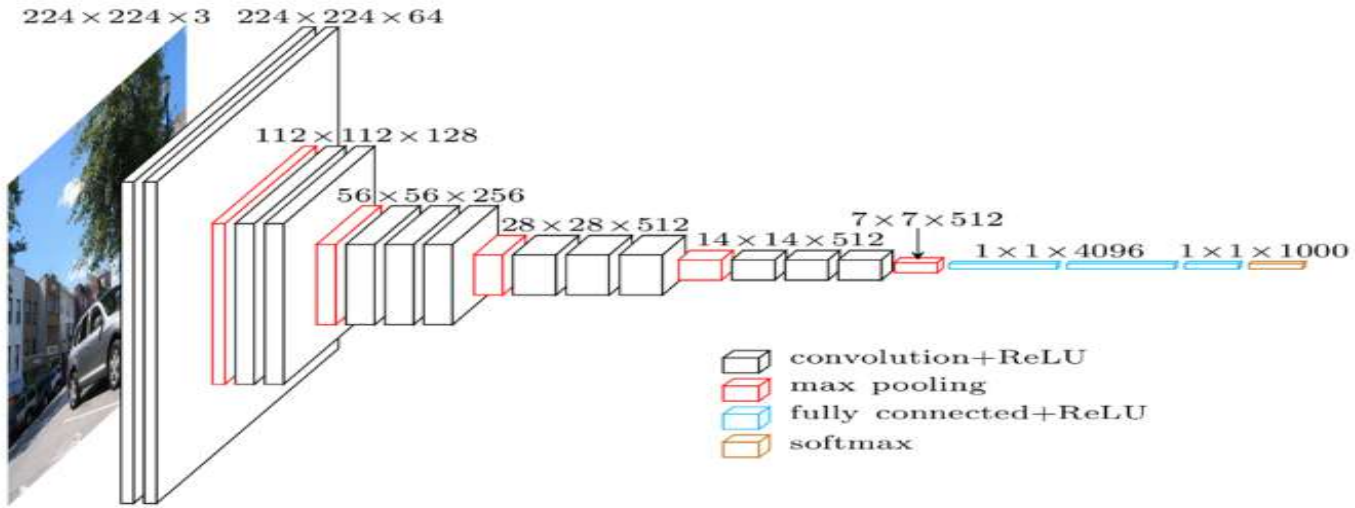


Figure no.2: Demonstration Model

8. Convolutional Neural Network



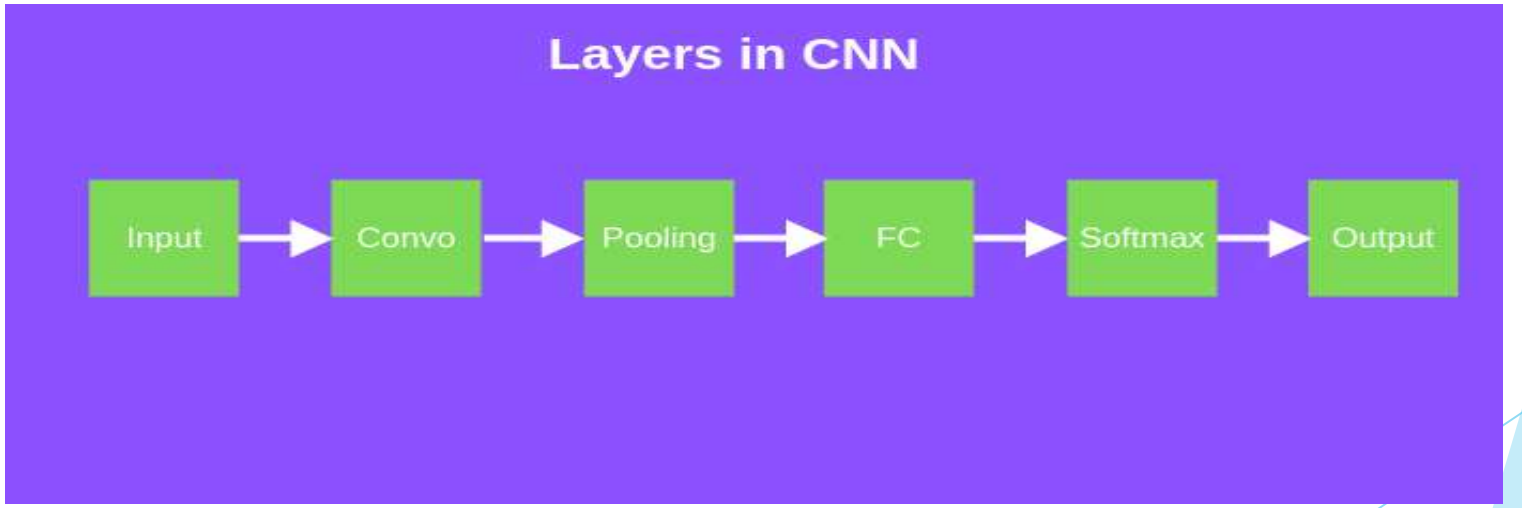
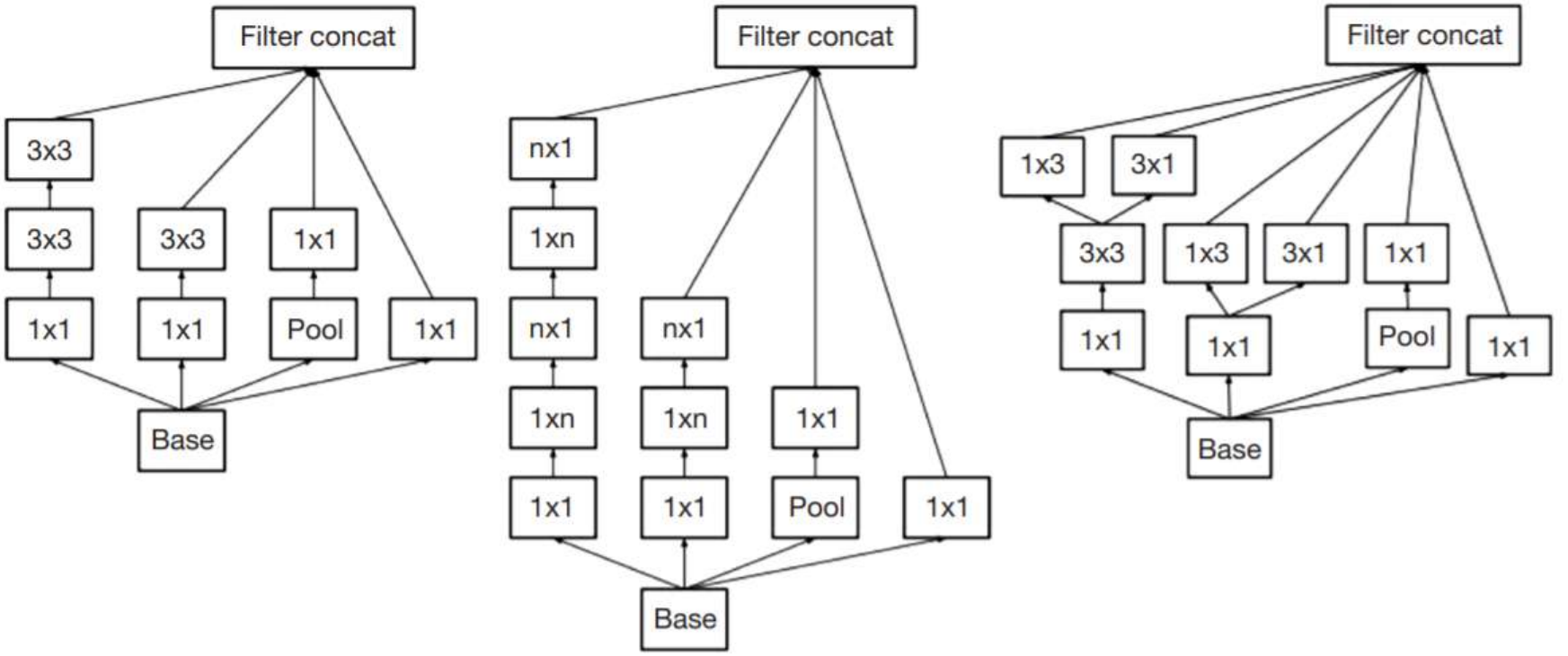


Figure no.3: Convolutional Neural Network (CNN)

9. Inception V3



Block A Block B Block C

Figure no.4: Inception V3 blocks

10. Sensors

Figure no.5: MQ4 sensor

Figure no.6: MQ3 sensor

11. Implementation Status

- Successfully implemented CNN model with Inception V3 architecture.
- Achieved accuracy of 98.5% .
- Finalized the architecture required but might need some changes ,since we are in testing phase.
- Working on Web Portal

12. Status of Paper Draft & Targeted Conference

Status of paper: Paper writing completed

Conferences:

- Submitted at IEEE 2021 Conference on Advances in Computing, Communication and Control - (20th September)
- Submitted at CSP-ICE 2021 (4th Information and Computing Education Conference (CSP-ICE 2021)) - (25th September)
- Submitted at 2022 7th International Conference for Convergence in Technology (I2CT), Pune, India(15th October, 2021)

Thank You...!!