A

MINI PROJECT REPORT

ON

**Fruit Recognition System**

*Submitted in partial fulfillment of the requirements for the degree of*

**Bachelor of Technology**

In

**Information Technology**

*By*

Shantanu Bhadage (T2054491246052)

Anuj Deshmukh (T2054491246007)

Yogesh Wani (T2054491246062)

Durgesh Gaikwad ( T2054491246016)

Under the guidance

of

**Prof. Sachin Kamble**



**DEPARTMENT OF INFORMATION TECHNOLOGY**

SHRI VILE PARLE KELAWANI MANDAL'S

**INSTITUTE OF TECHNOLOGY, DHULE**

Survey No. 499, Plot No. 02, Behind Gurudwara, Mumbai-Agra National Highway, Dhule- 424001, Maharashtra, India.

**Academic Year 2021-22**

SHRI VILE PARLE KELAWANI MANDAL'S

**INSTITUTE OF TECHNOLOGY, DHULE**

Survey No. 499, Plot No. 02, Behind Gurudwara, Mumbai-Agra National Highway, Dhule- 424001, Maharashtra, India.

**Academic Year 2021-22**

***CERTIFICATE***

This is to certify that the TY B.TECH. Mini Project Report Entitled

**" Fruit Recognition System "**

Submitted by

Shantanu Bhadage (T2054491246052)

Anuj Deshmukh (T2054491246007)

Yogesh Wani (T2054491246062)

Durgesh Gaikwad  ( T2054491246016)

is a record of bonafide work carried out by him/her, under our guidance, in partial fulfillment of the requirement for the award of Degree of Bachelors of Technology (Information Technology) at Shri Vile Parle Kelvani Mandal's Institute of Technology, Dhule under the Dr. Babasaheb Ambedkar Technological University, Lonere, Maharashtra. This work is done during semester VIII of Academic year 2021-22.

Date:

Place: SVKM’s IOT, Dhule

Prof. Sachin Kamble Prof. Sachin Kamble Dr. Bhushan Chaudhari Dr. Nilesh Salunke

**(Project Guide) (Project Coordinator) (HOD) (Principal)**

Dept. of IT, SVKM-IOT Dept. of IT, SVKM-IOT Dept. of IT, SVKM-IOT SVKM IOT,Dhule

Name and Sign with date Name and Sign with date

Examiner-1

**II**

**DECLARATION**

We declare that this written submission represents my ideas in our own words and where others ideas or words have been included, we have adequately cited and referenced the sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will cause disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Signatures

Shantanu Bhadage (T2054491246052) \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Anuj Deshmukh (T2054491246007) \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Yogesh Wani (T2054491246062) \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Durgesh Gaikwad ( T2054491246016) \_\_\_\_\_\_\_\_\_\_\_\_\_\_

III

**ACKNOWLEDGMENTS**

### It gives us immense pleasure in expressing sincere sense of gratitude towards our project guide Prof. Sachin Kamble for the assistance, valuable guidance and co-operation in carrying out this Project successfully. It has been a privilege for us to have been associated with Dr. Bhushan Chaudhari, Head of Department, during our project work. We have greatly benefited from his valuable suggestions. We express our deep sense of gratitude to him for his valuable guidance, constant encouragement and patience throughout this work.

We are thankful to all people who have contributed in making this project success. Particularly, we want to thank Prof. Sachin Kamble, Project Coordinator for our Department for making this process seamless for us and arranging everything so perfectly.

### We take this opportunity to express our heartfelt gratitude towards the Department of Information Technology of Shri Vile Parle Kelvani Mandal’s Institute of Technology, Dhule and Dr. Nilesh Salunkhe, Principle of Shri Vile Parle Kelvani Mandal’s Institute of Technology, Dhule, that gave us an opportunity for the presentation of our mini-project in the esteemed organization and for providing the required facilities in completing this project. We are greatly thankful to our parents, friends and other faculty members for their motivation, guidance and help whenever needed.

**Names of Team Members:**

1. Shantanu Bhadage
2. Anuj Deshmukh
3. Yogesh Wani
4. Durgesh Gaikwad

IV

**ABSTRACT**

**Abstract:** The fruit classification process is commercially important. Fruit production at harvest time is quite high. Classification of fruits according to their types and characteristics is usually done by hand and eye. This method can cause huge losses in terms of time, cost and labor. In the proposed study, fruit recognition is carried out by using image processing methods. In the study, the classification process Convolutional Neural Networks (ConNN)\* deep learning model is made. The proposed model is developed on Keras platform. For the realization of the study in real life, 20 different fruits in 2 different data sets are tested. The last designed model is tested on Jetson Nano card in real time.

**Keywords** — fruit classification, pattern recognition, deep learning.

V

**LIST OF ABBREVIATIONS**

|  |  |
| --- | --- |
| **EN** | **Entropy** |
|  |  |
|  |  |

VI

**LIST OF FIGURES**

|  |  |  |
| --- | --- | --- |
| **Fig No.** | **Name of Figure** | **Page No** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

VIII

**INDEX**

|  |  |  |
| --- | --- | --- |
|  | Certificate | II |
|  | Declaration | III |
|  | Acknowlegement | IV |
|  | Abstract | V |
|  | List of Abbreviations | VI |
|  | List of Figures | VII |
|  | List of Tables | VIII |

|  |  |  |  |
| --- | --- | --- | --- |
| **Chapter No** |  | **Chapter Name** | **PAGE NO.** |
| **1** |  | **Introduction** | 1 |
| 1.1 | Introduction of Project | 1 |
| 1.2 | Motivation Of Project | 2 |
| 1.3 | Problem Statement and Objective | 2 |
| 1.4 | Scope | 2 |
| **2** |  | **Literature Survey** | 3 |
| 2.1 | Survey Existing system | 3 |
| 2.2 | Limitation Existing system or research gap | 21 |
| **3** |  | **Proposed System** | 23 |
| 3.1 | Analysis/ Framework/ Algorithm / UML diagrams | 24 |
| 3.2 | Details of Hardware &Software | 25 |
| 3.3 | Methodology (your approach to solve the problem) | 33 |
| **4** |  | **Experimentation and Results** | 42 |
| 4.1 | Block by block results of complete experimentation (include results of steps with justification / observation which gave incorrect results) | 42 |
|  | 4.2 | Testing(Test cases and test Result ) |  |
| **5** |  | **Conclusion and Future Scope** | 51 |
| 5.1 | Conclusion |  |
| 5.2 | Future Scope |  |
| 5.3 | Limitation Of project |  |
| 6 |  | **References** (must be as per the IEEE citation rules) | 52 |
|  | **Appendix** |  |
|  | * Datasheets of all components used in the design |  |
|  | * Formulae / Mathematical support used in algorithm development |  |
|  | * Quality Assessment Measures (used for testing outputs) |  |
|  | **Paper and/or Certificate Published in Journal/Conference (if any)** |  |