BMS INSTITUTE OF TECHNOLOGY & MANAGEMENT

YELAHANKA, BENGALURU - 560064



**DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**

**PROJECT BASED LEARNING**

2021-22 Odd Semesters

**FOOD PRODUCTION VERIFICATION**

*Submitted By*

***Akanksh Rao S. R USN: 1BY19AI007***

***Ananya S. Malagi USN: 1BY19AI009***

***Puja S. USN: 1BY19AI040***

***Siddharth Arora USN: 1BY19AI054***

*Under the guidance of*

Dr. Vishwa Kiran

Asst. Professor of Dept. of AIML

2020-2021

**INSTITUTE VISION**

To emerge as one of the finest technical institutions of higher learning, to develop engineering professionals who are technically competent, ethical and environment friendly for betterment of the society.

**INSTITUTE MISSION**

Accomplish stimulating learning environment through high quality academic instruction, innovation and industry-institute interface.

**DEPARTMENT VISION**

To develop professionals equipped to build sustainable and intelligent solutions that effectively interact with the natural intelligence towards creating a digitally empowered environment for future generations, safeguarding social ethics.

**DEPARTMENT MISSION**

* To enable students with the spirit and power of interdisciplinary acumen by integrating a world of knowledge into a world of intelligent systems and subsystems.
* Boost academic outcome through place-based education and collaborations with established research labs and industries.
* Encourage entrepreneurship efforts among students and develop them into great leaders.

| **Management & Entrepreneurship – 18CS51 - Course Outcomes (COs) w.r.t this PBL** | |
| --- | --- |
| CO # | CO DEFINED |
|  | ASK YOUR subject FACULTY ABOUT THIS |

| **Python Programming – 18AI52 - Course Outcomes (COs) w.r.t this PBL** | |
| --- | --- |
| CO # | CO DEFINED |
|  | ASK YOUR subject FACULTY ABOUT THIS |

| **Database Management Systems – 18CS53 - Course Outcomes (COs) w.r.t this PBL** | |
| --- | --- |
| CO # | CO DEFINED |
|  | ASK YOUR subject FACULTY ABOUT THIS |

| **Mathematics for Machine Learning – 18MAT56 - Course Outcomes (COs) w.r.t this PBL** | |
| --- | --- |
| CO # | CO DEFINED |
|  | ASK YOUR subject FACULTY ABOUT THIS |

| **Automata Theory and Computation – 18CS5 - Course Outcomes (COs) w.r.t this PBL** | |
| --- | --- |
| CO # | CO DEFINED |
|  | ASK YOUR subject FACULTY ABOUT THIS |

**Project to Program Outcomes (PO) Mapping**

**Project Name:** title (ASK YOUR subject FACULTY ABOUT THIS)

| **COURSE** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Subject Name | ✔ | ✔ | ✔ | ✔ | ✔ |  |  | ✔ | ✔ | ✔ | ✔ | ✔ |
| Subject Name | ✔ | ✔ | ✔ | ✔ | ✔ |  |  | ✔ | ✔ | ✔ | ✔ | ✔ |
| Subject Name | ✔ | ✔ | ✔ | ✔ | ✔ |  |  | ✔ | ✔ | ✔ | ✔ | ✔ |
| Subject Name | ✔ | ✔ | ✔ | ✔ | ✔ |  |  | ✔ | ✔ | ✔ | ✔ | ✔ |
| Subject Name | ✔ | ✔ | ✔ | ✔ | ✔ |  |  | ✔ | ✔ | ✔ | ✔ | ✔ |

| **Program outcomes (POs):** | |
| --- | --- |
| **PO1** | **Engineering knowledge:** Apply the knowledge of Mathematics, Science, Engineering fundamentals and an engineering specialization to the solution of complex engineering problems |
| **PO2** | **Problem analysis:** Identify, formulate, review research literature, and analyse complex Engineering problems reaching substantiated conclusions using first principles of mathematics, Natural sciences and engineering sciences |
| **PO3** | **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| **PO4** | **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the Information to provide valid conclusions |
| **PO5** | **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern Engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations. |
| **PO6** | **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| **PO7** | **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for Sustainable development |
| **PO8** | **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |
| **PO9** | **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings |
| **PO10** | **Communication:** Communicate effectively on complex engineering activities with the engineering Community and with society at large, such as, being able to comprehend and write effective reports And design documentation, make effective presentations, and give and receive clear instructions. |
| **PO11** | **Project management and finance:** Demonstrate knowledge and understanding of the Engineering and management principles and apply these to one’s own work, as a member and Leader in a team, to manage projects and in multidisciplinary environments. |
| **PO12** | **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

**ABSTRACT**

Application of Artificial Intelligence and Machine Learning in the field of Agriculture. The practice of cultivating plants and livestock is widely known as agriculture. It is the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. Offalte we witness miss management and adulteration which is extremely harmful. We aim to find the best solution for this problem.

**INTRODUCTION**

As per UN projections the population will increase from 7.5 billion to 9.7 billion in 2050, there will be more pressure on land as there will be only an extra 4% of land, which will come under cultivation by 2050. This means that farmers will have to do more with less. According to the same survey, food production will have to increase by 60% to feed an additional two billion people. However, traditional methods are not enough to handle this huge demand. This is driving farmers and agro companies to find newer ways to increase production and reduce waste. As a result, Artificial Intelligence (AI) and Machine learning is used as part of the agriculture industry’s technological evolution.

In order to meet the needs mentioned above, producers malpractice in the production of food and the process of growing it. Soil defects, Nutrients deficiency, Diagnosing pests, Plant diseases, Seed verification, Weed affected areas, Mixture of adultants in the harvested crop yields, etc. are some of the focus points of our solution.

**MOTIVATION**

Modern Agriculture faces tremendous challenges. Today,the agricultural sector has grown into a highly competitive, globalized industry and urbanization is continuing, where farmers have to consider local climatic and geographic aspects as well as global ecological and political factors in order to guarantee economical survival and sustainable production. The farmers are also under a lot of pressure to meet the increasing demand. More and more the public perceives that the adoption of these modern techniques will help reach the goal.

Consequently, Agriculture needs help in handling the complexity, uncertainty and fuzziness inherent in this domain, and it requires new solutions for all aspects of agricultural production—from better and predictable crop planning, to precision farming, optimized resource application, support of efficient and collaborative processes using modern technology, fully or partially autonomous solutions for tedious work, up to the sustained long-term development of useful knowledge resources.

**EXISTING SYSTEM**

Optical crop sensors to evaluate crop conditions during the growing season by directing light waves at crop leaves, and measuring the type and amount of light reflected back to the sensor, Android Based Plant Disease Detection Using Arduino, Farmaid plant disease detection robot and Aerial crop imaging, Rice Crop Detection systems are few of the existing systems.

**LIMITATIONS OF EXISTING SYSTEM**

The limitations of drone technology can be difficult and time-consuming to utilize drones when dealing with a growing crop, the large amount of labor required to retrieve images and the financial investment needed to receive results in a timely manner.

Other limitations include availability of dataset, disease grading, need of an experienced person, regional variations in symptoms of diseases, accuracy and so on.

**PROPOSED SYSTEM**

Farmers can collect and process significantly more data and do it faster with AI than they would otherwise. Analyzing market demand, forecasting prices, and determining the optimal time for sowing and harvesting are key challenges farmers can solve with AI.Through this model the farmers can use sensors and soil sampling to collect data and this data is stored on-farm management systems that allow for better processing & analysis,thereby avoiding the use of drones.

**SYSTEM REQUIREMENTS**

We require the following hardware components :-

1. Raspberry Pi Model
2. Jumper Cables
3. Pi Camera Module
4. Soil Detection Modules

We require the following software components :-

1. Arduino IDE Software
2. Google Colab
3. Jupyter

**PROPOSED METHODOLOGY**

In a farm environment without damaging existing plants or soil and use object detection to find and mark diseased crops .The system is based on a sensor network which comprises of a data server, a convergence node,the sensor nodes are used as the signal input of the intelligent agricultural monitoring system and are used to collect each selected parameter of farming operations to be monitored.

We plan to incorporate different sensors eg. Soil Detection Sensor, image sensors etc and use an already established crop image database to detect crops and their current health and type.

**REFERENCES**

1. <https://www.hindawi.com/journals/js/2018/8672769/>
2. <https://create.arduino.cc/projecthub/teamato/farmaid-plant-disease-detection-robot-55eeb1>
3. <https://www.jetir.org/papers/JETIR1905D18.pdf>
4. <https://link.springer.com/content/pdf/10.1007/s13218-013-0275-y.pdf>
5. <https://en.wikipedia.org/wiki/Applications_of_artificial_intelligence#Agriculture>
6. <https://www.bighaat.com/blogs/news/42151041-biggest-problems-faced-by-farmers-in-india>
7. <https://blog.apnikheti.com/agriculture-problems-and-their-solutions/>