VISVESAVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangama, Belagavi-590018

A Synopsis report

On

"IOT (Internet of Things) Areca Nut Dryer"

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

BACHELOR OF ENGINEERING

In

ELECTRONICS AND COMMUNICATION ENGINEERING

By

Sr.No	Name	USN
1	Prajyot Rajgonda Patil	4AL21EC057
2	Rakshith	4AL21EC067
3	Thejas J. Kotian	4AL21EC099
4	Yashwanth G T	4AL21EC114

Department of Electronics and Communication Engineering

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

Shobhavana Campus, MIJAR-574225, Moodbidri, D.K., Karnataka

MAY 2024

IOT (Internet Of Things) Based Arecanut Dryer

Abstract :

The arecanut industry faces significant challenges related to quality assurance, labor-intensive processes, and time-consuming procedures. In response to these issues, we propose an integrated system that combines an IoT-based arecanut dryer with an automated segregation mechanism. The drying process significantly impacts the quality and market value of arecanuts. Our system incorporates IoT sensors (temperature, humidity, and airflow) within the drying chamber.A microcontroller ensures real-time control based on sensor data.Users can remotely monitor and adjust drying parameters via a web or mobile interface.Machine learning algorithms predict optimal drying times, minimizing energy consumption.Quality assurance is maintained through continuous monitoring and alerts for deviations from preset thresholds.

Arecanuts exhibit variations in quality due to factors like husk characteristics. We propose an automated segregation system using image processing techniques. Local Binary Pattern (LBP) and Histogram of Oriented Gradients (HOG) features are utilized for real-time detection. The system categorizes arecanuts based on their husk characteristics.Arduino Uno serves as the platform for implementing this system.By combining these two systems, we enhance efficiency, reduce human effort, minimize errors, and improve overall productivity in the arecanut industry. The IoT-based approach promises consistent quality and increased competitiveness.

Advantages :

1. **Quality Improvement**: By integrating IoT sensors (such as temperature, humidity, and airflow) into the arecanut drying chamber, the system ensures real-time monitoring and control. This leads to better quality arecanuts, as deviations from optimal conditions can be promptly addressed.
2. **Energy Efficiency**: The machine learning algorithms predict optimal drying times, minimizing energy consumption. This not only reduces operational costs but also contributes to environmental sustainability.
3. **Remote Monitoring and Control**: Users can remotely monitor and adjust drying parameters via a web or mobile interface. This convenience allows for efficient management without being physically present at the drying facility.
4. **Error Reduction**: Automation reduces human intervention, minimizing errors associated with manual processes. Consistent monitoring and alerts further enhance quality assurance.
5. **Increased Productivity**: Combining the IoT-based drying system with the automated segregation mechanism streamlines the entire process. This leads to higher productivity and throughput in the arecanut industry.
6. **Competitiveness**: The adoption of IoT technology and image processing techniques positions the industry as more competitive. Consistent quality and efficient processes contribute to market competitiveness.

Disadvantages :

1. **Initial Implementation Cost**: Setting up the IoT infrastructure, including sensors, microcontrollers, and communication interfaces, requires an initial investment. However, this cost may be offset by long-term benefits.
2. **Maintenance and Upkeep**: Regular maintenance of IoT devices, software updates, and addressing technical issues are essential. Neglecting maintenance could lead to system failures.
3. **Data Security and Privacy**: Transmitting data over the web or mobile interfaces introduces security risks. Ensuring robust security measures is crucial to protect sensitive information.
4. **Dependency on Technology**: The system's effectiveness relies on the proper functioning of IoT components and image processing algorithms. Any technical glitches could disrupt operations.
5. **Learning Curve**: Users and operators need to learn how to interact with the system effectively. Training and adaptation to new technology may take time.

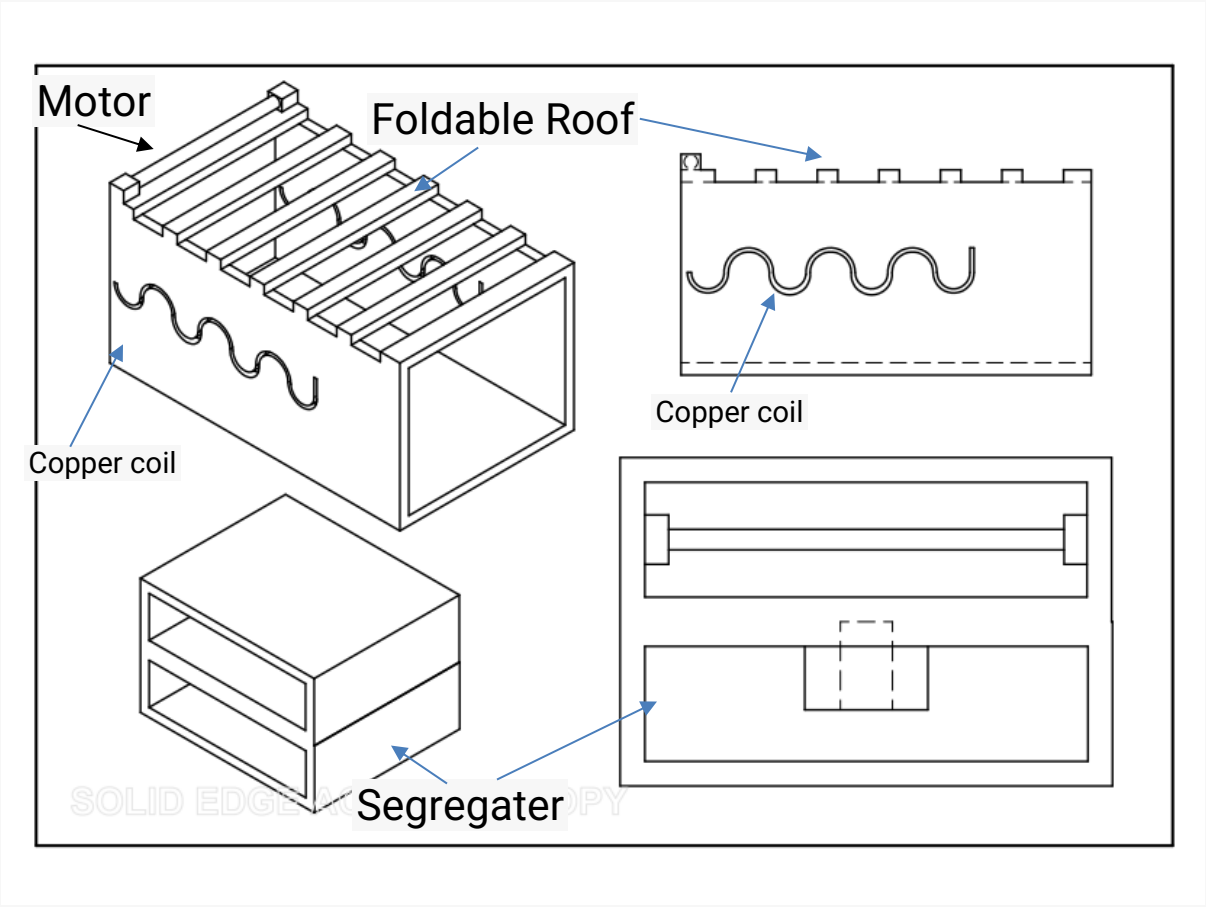
Components Used :

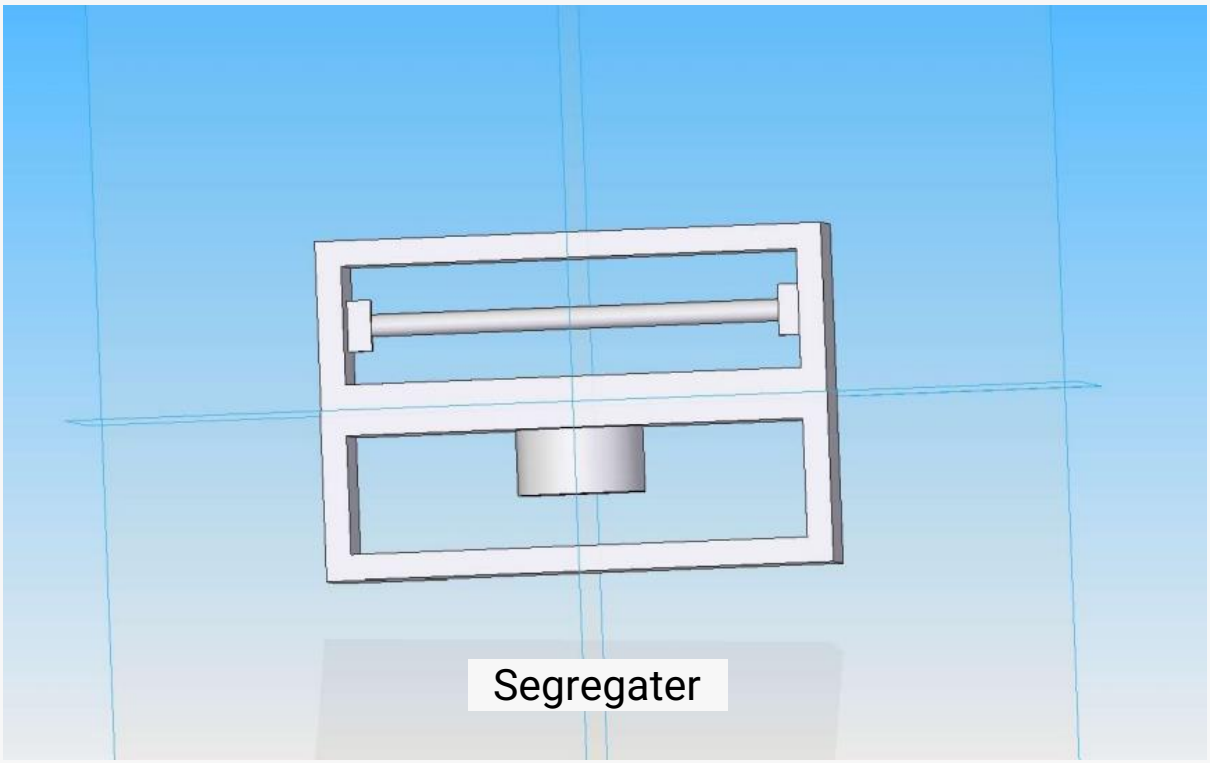
- Heater copper coil
- 2v DC motor
- PVC Plastic Sheets
- Temperature sensor
- Humidity sensor
- Arduino Uno
- ESP-32 CAM
- ESP-32 Board
- White Cement
- Image Sensor (LPB or HOG)

Applications:

- Users can remotely monitor and adjust drying parameters via a web or mobile interface.
- Improves arecanut quality and market value by optimizing the drying process.
- Reduces manual labor and time-consuming procedures.
- Utilizes image processing techniques (Local Binary Pattern and Histogram of Oriented Gradients) for real-time detection.
- Enhances efficiency by automating the segregation process.
- Reduces human effort and minimizes errors.
- Improves overall productivity in the arecanut industry.

Figure :-


Motor
Foldable Roof
Copper coil
Copper coil
Segregater


Segregater