

AUTOMATED COPRA GRADING SYSTEM

Project Reference No.: 49S_BE_6451

College : KVG College of Engineering Sullia, Dakshina Kannada
Branch : Department of Computer Science And Engineering
Guide : Prof. Kishor Kumar K
Student(s) : Mr. Darshan Alva
 Ms. Likhitha M Gowda
 Mr. Rakshith M N
 Mr. Srijana Kumara

Keywords:

Image Processing, Copra Grading, Machine Learning, Computer Vision, Automation, Agricultural Technology

Introduction:

Quality assessment of copra is an important process in the coconut industry, but existing manual grading methods are slow and subjective. To address this issue, this project introduces an AI-based system that automatically analyzes copra images and classifies them into different quality grades. Copra, the dried kernel of coconut, is widely used for producing coconut oil and other by-products. The quality of copra directly affects the market value and oil yield, making grading an essential process in the coconut industry. Traditionally, copra grading is carried out manually by human experts based on factors such as size, color, texture, and moisture content. However, manual grading is time-consuming, less accurate, and prone to human errors due to subjective judgment.

With the advancement of Artificial Intelligence (AI) and Image Processing techniques, it is possible to automate the copra grading process efficiently. AI-based systems can analyze digital images of copra samples and identify important features such as shape, color, and texture to determine the quality grade. Image preprocessing, segmentation, and feature extraction techniques help in improving the accuracy and reliability of the grading process. Machine Learning algorithms can classify copra into different quality categories based on trained datasets.

The proposed system aims to develop an automated copra grading system using AI to improve accuracy, reduce processing time, and minimize human effort. The system uses computer vision techniques such as RGB color analysis and shape feature extraction to evaluate the quality of copra samples. Automation in copra grading ensures consistency in results and supports farmers and industries in obtaining better pricing for high-quality

products. This project contributes to smart agriculture by integrating modern technology with traditional agricultural practices, improving productivity and quality standards in the coconut industry.

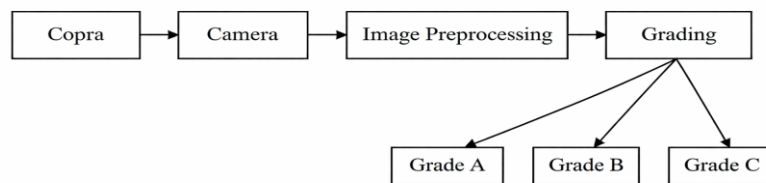


Figure 1: Block Diagram

Objectives:

1. To Automate Copra Grading: Develop an AI-based system for automating the grading process of copra, reducing reliance on manual inspection.
2. To Improve Accuracy in Quality Inspection: Enhance the accuracy of copra quality assessment by identifying key attributes such as size, color, and sulfur content using image processing techniques.
3. To Reduce Time and Labor Costs: Minimize the time and labor involved in manual grading, improving overall efficiency and cost-effectiveness in the copra industry.
4. To Explore Advanced Image Processing Techniques: Implement image preprocessing, segmentation, feature extraction, and classification methods to analyze copra images and derive meaningful insights for grading.

Methodology:

The proposed system uses Artificial Intelligence and Image Processing techniques to automate the grading process of copra.

Step 1: Image Collection

Copra sample images are captured using a high-resolution camera under proper lighting conditions.

Step 2: Image Preprocessing

The captured images are enhanced using preprocessing techniques such as noise removal, resizing, and normalization to improve image quality.

Step 3: Image Segmentation

The copra portion is separated from the background using image segmentation techniques for accurate analysis.

Step 4: Feature Extraction

Important features such as color (RGB values), shape, size, and texture are extracted using computer vision methods.

Step 5: Classification using Machine Learning

The extracted features are given as input to Machine Learning algorithms to classify copra into different grades based on quality.

Step 6: Result Generation

The system displays the quality grade of copra quickly and accurately, reducing manual effort.

Result and Conclusion:

The proposed Automated Copra Grading System using AI helps in improving the efficiency and accuracy of the copra quality inspection process. The system reduces human effort and minimizes errors that occur in manual grading. By using Image Processing and Machine Learning techniques, the grading process becomes faster, more reliable, and consistent. This system helps farmers and industries to identify high-quality copra and get better market value. The implementation of this system contributes to Smart Agriculture and supports the use of modern technology in the agricultural sector.

Aspect	Manual Grading	Automated System
Accuracy	60–70%	85–95%
Time per sample	10–15 sec	< 1 sec
Human error	High	Very low
Consistency	Poor	Excellent
Cost	Continuous labour	One-time setup

Table: Comparison with Manual Grading and Automated System

References:

1. [1] B. Gopalakrishna et al., "Innovative System for the Automatic Grading of Copra Using Image Processing Techniques," 2021.
2. [2] K. Chinnusamy and G. Manikandan, "Image Processing-Based System for the Automated Grading of Copra," *International Journal of Research in Engineering, Science and Management (IJRESM)*.

3. [3] Colubio et al., "Copra Quality Classification Using Convolutional Neural Network Based on Philippine National Standard," 2020.
4. [4] Dorothy et al., "AQUiD: Automated Quality Identification of Copra Using Digital Image Processing," 2019.

Future Scope:

The future scope of this project includes:

1. The system can be enhanced using Deep Learning algorithms for more accurate classification.
2. Integration with a mobile application for easy access by farmers.
3. Implementation of IoT sensors to measure moisture content automatically.
4. Development of a real-time grading device for industrial use.