

“DEVELOPMENT OF MULTI-PURPOSE COCONUT BROOM STICK MACHINE USING IoT”

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Keywords:

This project focuses on the development of a multipurpose coconut broomstick machine integrated with IoT-based remote control using Blynk software. It includes leaf extraction and cutting functionalities, powered by a 0.25 HP motor, with applications such as cow feed preparation and organic manure production. The innovation promotes rural employment, women empowerment, and supports sustainable agriculture under relevant government schemes through a semi-automated, eco-friendly design.

Introduction:

The increasing demand for automation and sustainability in agriculture has spurred the development of innovative machinery capable of maximizing resource utilization while minimizing environmental impacts. This project focuses on the design and implementation of an **IoT-enabled coconut broomstick machine** that automates the process of extracting and cutting coconut leaves. The extracted leaves serve multiple purposes, including the production of biodegradable products such as drinking straws and the creation of organic manure, which aligns with the objectives of sustainable agriculture and environmental conservation.

The core innovation lies in integrating **IoT technology** with traditional agricultural machinery, allowing remote operation, monitoring, and optimization of the system. This

not only reduces the dependency on manual labour but also enhances the precision and efficiency of the machine. Furthermore, the machine's cutting mechanism is adaptable, enabling it to handle diverse agricultural materials, such as grass used for cattle feed.

The project is designed to address several socio-economic and environmental challenges. The production of eco-friendly products like biodegradable straws directly contributes to reducing plastic pollution, while the conversion of agricultural waste into organic manure promotes soil health and reduces the reliance on chemical fertilizers. Moreover, the implementation of this technology in rural areas provides employment opportunities and empowers local communities, particularly women, by introducing a scalable and sustainable business model.

By aligning with central government schemes promoting rural development, women empowerment, and sustainable practices, this project aims to create a holistic impact. The system's modular and scalable design ensures that it can be adapted to meet the needs of various agricultural communities, making it a versatile solution for both economic and environmental challenges.

This introduction lays the foundation for understanding the technical, environmental, and societal objectives of the project, highlighting its potential to drive innovation in agriculture and rural industries.

Objectives:

The project focuses on creating a cutting-edge coconut broom stick machine integrated with IoT technology to enhance production efficiency and adaptability.

Key components of the scope include:

1. IoT Integration:

- **Sensors:** Implement sensors for monitoring material feed rates, machine temperature, and humidity levels, enabling real-time adjustments and performance optimization.
- **Data Analytics:** Use IoT data for predictive maintenance and performance tracking, allowing for timely interventions.

2. Versatility: Design the machine to produce various broom types, catering to

- different market demands and expanding its application.
3. **Sustainability:** Focus on eco-friendly materials and energy-efficient operations to promote sustainable manufacturing practices.
 4. **User Interface:** Develop an intuitive interface for easy operation, featuring real-time monitoring and alerts to improve user experience and reduce downtime.
 5. **Market Impact:** Address the growing demand for sustainable cleaning solutions while supporting local economies through improved production capabilities.

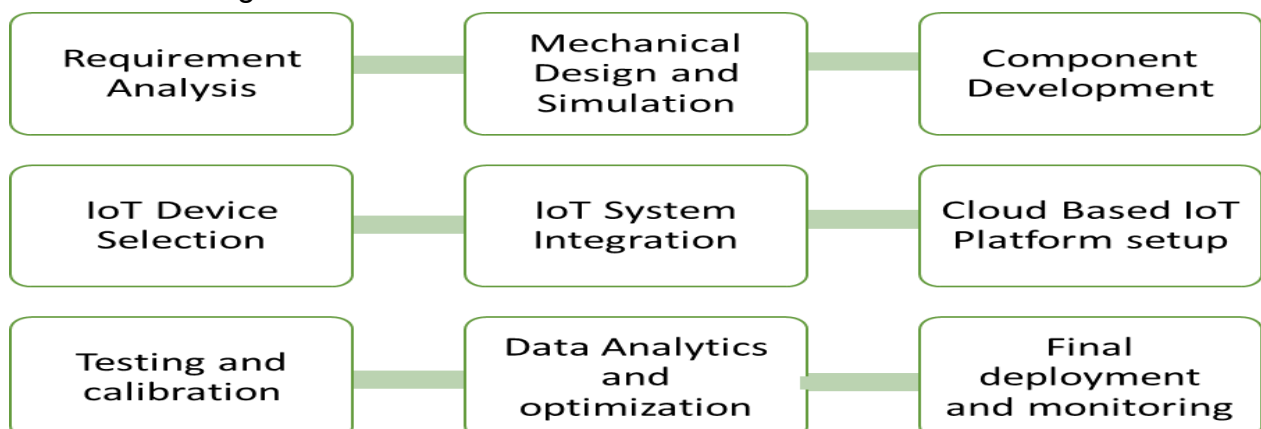
This project aims to set a new standard in automated coconut broom stick manufacturing, leveraging technology to drive efficiency and sustainability in the industry.

Methodology:

We identified the problems in manually making coconut broomsticks and cutting leaves.

We planned to develop one machine that can do both leaf extraction and cutting.

1. A 0.25 HP motor was used to power the machine.
2. The machine was built using simple, low-cost materials.
3. We added IoT control using the Blynk app for remote operation.
4. We tested the machine to check if it works smoothly and safely.
5. We also tested the mobile app control feature for turning it on and off.
6. The machine was used in a village, and we collected feedback.
7. It helped reduce effort, save time, and supported rural jobs and eco-friendly farming.



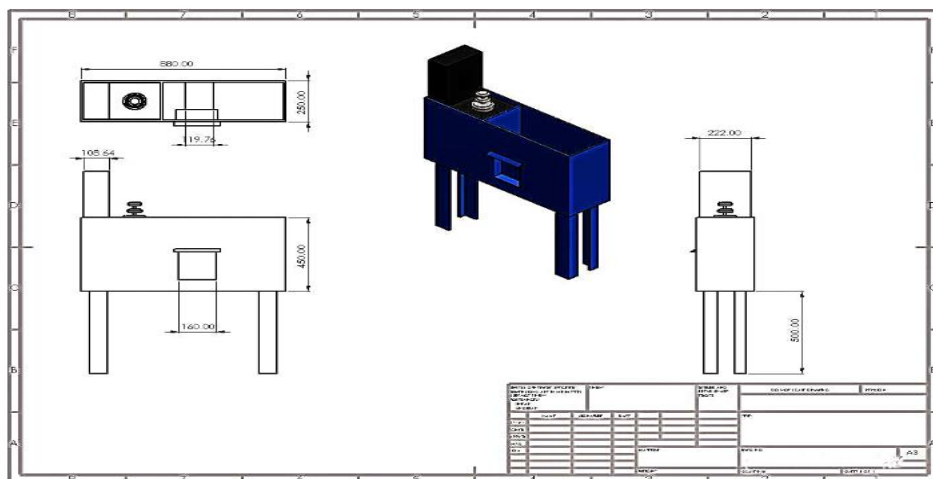
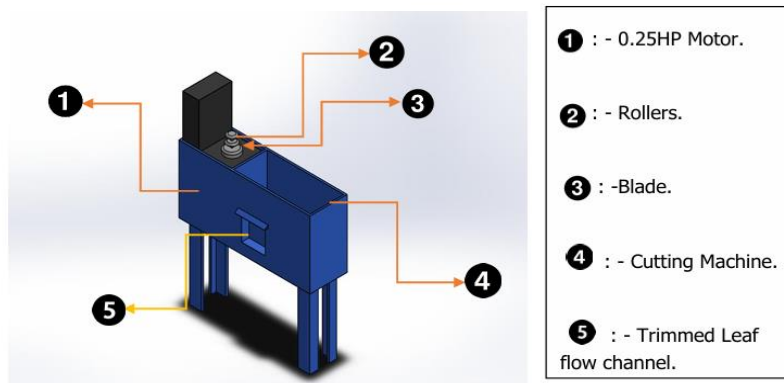
Result and Conclusion:

The coconut broomstick-making machine successfully addresses the challenge of manual labour in processing coconut leaves. By automating the extraction and cutting process, the machine improves productivity, ensures uniformity in product quality, and reduces time and effort required for traditional methods. The integration of IoT technology using Blynk IoT software enables remote control and monitoring, enhancing user convenience and operational safety.

This machine also aligns with sustainable development goals, as it:

1. Promotes rural employment and women empowerment.
2. Reduces waste by utilizing by-products (leaves as organic manure and sticks for brooms).
3. Lowers reliance on plastic straws by encouraging natural straw production

ISOMETRIC 3D VIEW



EXPERIMENTAL DETAILS

Power Source	0.25hp (single Phase)
Dimensions	35*12*31(Inches)
weight	25Kg
Capacity	4 to 5 Kgs/hr
No of blades	1No's
No of Rollers	2 No's

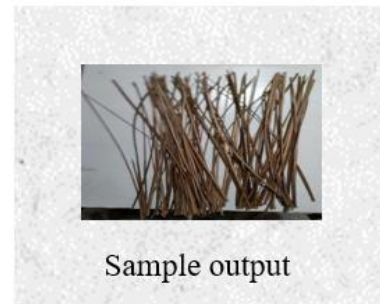
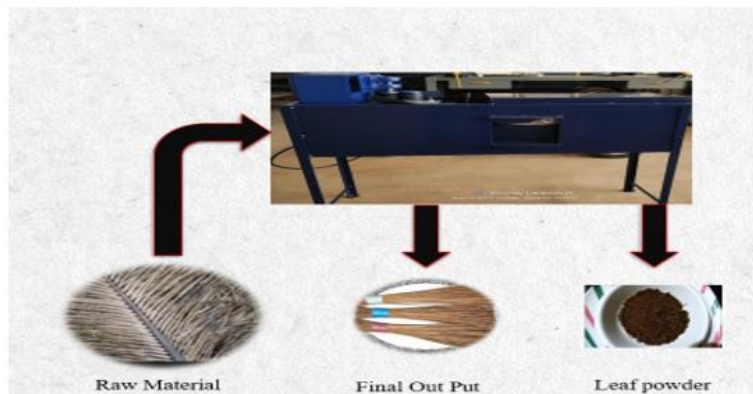


Figure 8: Leaf powder



Figure 10: Coconut leaf straw



Snap shot images while fabricating machine



Project Outcome & Industry Relevance:

- 1. Waste as Manure:** Trimmed coconut leaves will be processed into organic manure, promoting sustainable agriculture by reducing waste.
- 2. Women Empowerment and Rural Employment:** The project will create jobs for rural women, empowering them through skill development and financial independence. It will also generate rural employment opportunities, fostering local economic growth.
- 3. Government Schemes Alignment:**

The project aligns with:

1. Pradhan Mantri MUDRA Yojana (PMMY): For small enterprise financing.
2. National Rural Livelihood Mission (NRLM): Encouraging women-led initiatives.
3. Swachh Bharat Mission: Promoting cleanliness through eco- friendly products and waste reduction.
4. Boost to Local Economy: By providing jobs and supporting small businesses, the project will stimulate the local economy and reduce urban migration.
5. Technological and Environmental Innovation: IoT integration ensures remote monitoring, data-driven optimization, and improved resource efficiency.
6. Scalability: The machine can be deployed across coconut-producing regions, expanding employment and contributing to rural development.

Overall, the project aims to create a transformative impact on the coconut broom stick manufacturing industry by merging traditional craftsmanship with cutting-edge technology, benefiting manufacturers, consumers, and the environment.

Industry Relevance

This project addresses real-world needs in agriculture, rural industries, and small-scale manufacturing. The multipurpose coconut broomstick machine can significantly reduce manual labour in broomstick production and leaf cutting, making it ideal for cottage industries and self-help groups. With IoT integration, the machine supports the shift toward smart farming and automation, aligning with Industry 4.0 trends. It is especially relevant for industries focused on sustainable practices, low-cost automation, and rural development. The machine also promotes value addition from agricultural waste, opening new opportunities in organic farming and eco-friendly product manufacturing.

Working Model vs. Simulation/Study:

This project involved the development of a physical working model. The machine was designed, fabricated, and tested to perform real-life tasks such as coconut leaf extraction and cutting. Additionally, the IoT control system using the Blynk app was implemented and tested on the actual hardware. This hands-on approach allowed us to validate the machine's performance in real-world conditions and gather user feedback for improvements.