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MINISTRY OF
AGRICULTURE AND
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Team Details

- Team Name: Sushruta
- Team Leader Name: Yash Petkar
- Problem Statement: Inefficient Sugarcane Harvesting

Brief about the idea

Sugarcane cultivation faces significant challenges including labor-intensive processes, time-consuming manual cutting and planting, inconsistent yields, high labor costs, disease transmission, and variable juice quality. To address these issues, mechanization and automation can reduce dependency on manual labor and increase efficiency and optimize resource use and monitor crop health in real-time. Integrated pest management and enhanced training programs for workers can further improve cultivation practices, resulting in higher yields, better quality, and increased profitability.

Opportunities

How different is it from any of the other existing ideas?

- Automated precision cutting for consistent results
- Reduced labor costs and time
- Minimized risk of disease transmission

How will it be able to solve the problem?

- It will reduce:
- High labor costs
- Inconsistent yield
- Risk of disease transmission
- Improve the quality of sugarcane juice

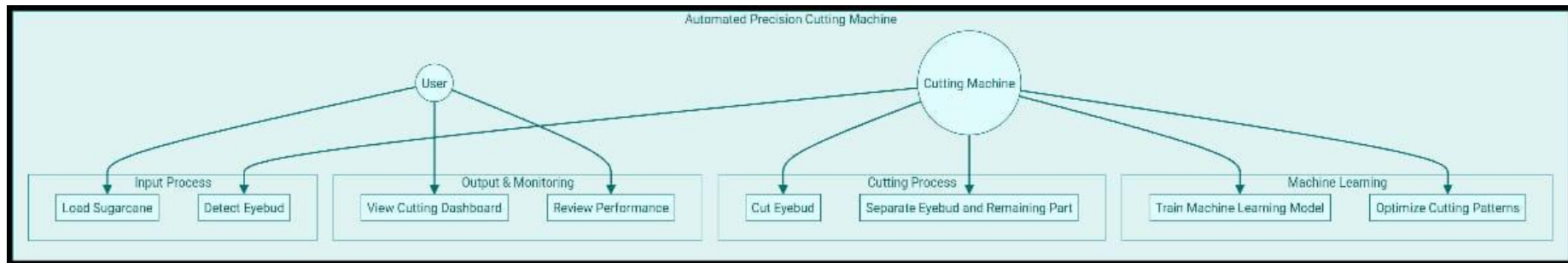
USP of the proposed solution

- Customizable Cutting Patterns
- Uniform size of all buds.

List of features offered by the solution

- Automated precision cutting for consistent results
- Reduced labor costs and time
- Minimized risk of disease transmission
- Increased overall yield and profitability
- Customizable Cutting Patterns
- Uniform size of all buds.

Process flow diagram or Use-case diagram



Architecture diagram of the proposed solution

The Intelligent Sugarcane Eyebud Cutter leverages machine learning to enhance precision in agricultural processes. The architecture integrates a high-resolution camera for capturing real-time images of sugarcane stems. These images are processed by a convolutional neural network (CNN) to detect and locate the eyebuds accurately. The model is trained on a diverse dataset of sugarcane images to ensure robustness. Once the eyebuds are identified, the system employs robotic arms equipped with precision cutters to remove them. The entire setup is controlled by a central processing unit that coordinates image processing, decision-making, and actuation, ensuring efficient and accurate cutting operations.

Technologies to be used in the solution

We used machine learning to detect sugarcane eye buds accurately, automating the planting process to make it more precise and efficient. Advanced algorithms analyze images to find eye buds, ensuring they are planted at the right depth and spacing. This automation cuts labor costs and reduces mistakes, leading to more uniform crop growth and higher yields. By combining machine learning with farming machinery, we make the cultivation process smoother, boosting productivity and profits.

Snapshots of the prototype



Detection of sugarcane Eyebud

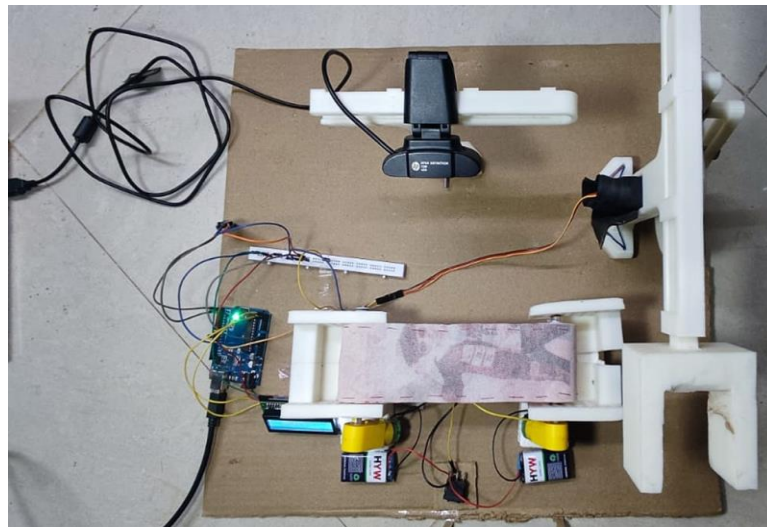


Image of Prototype

Prototype Performance report/benchmarking

- Project Description: The Intelligent Sugarcane Eyebud Cutter is an automated solution for sugarcane propagation, ensuring precision cutting, reduced labor costs, and minimized disease transmission. It features customizable cutting patterns and a monitoring dashboard.
- Key Features:
 - Automated Precision Cutting
 - Customizable Cutting Patterns
 - Cutted Sugarcane Bud Dashboard
- Benefits:
 - Reduced Labor Costs and Time
 - Minimized Risk of Disease Transmission
 - Increased Yield and Profitability
 - Improved Quality of Sugarcane Juice

Prototype Performance report/benchmarking

- Problem Addressed:
 - High Labor Costs
 - Inconsistent Yield
 - Risk of Disease Transmission
 - Quality of Sugarcane Juice
- Key Milestones Achieved:
 - Prototype Video Showcased
 - Detection of Sugarcane Bud
- Project Outcome: The project has successfully detected sugarcane eye buds, laying the foundation for automated cutting. The patent process is ongoing.
- Conclusion: The Intelligent Sugarcane Eye bud Cutter promises to revolutionize the sugarcane industry by reducing costs, increasing yield, and improving product quality

Additional Details/Future Developments

- The patent process is currently in progress.
- A video of the prototype has been showcased.
- We have successfully done the detection of Sugarcane bud.

GitHub Public Repository Link & Demo Video Link

<https://github.com/Yashpetkar/cane-edge>



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