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Design, analysis and fabrication of agricultural extraction machine

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ABSTRACT

The dynamic range of a natural scene often spans a much larger scope than the capture range of common digital cameras. An exposure image only captures a certain dynamic range of the scene and some regions are invisible due to under-exposure or over-exposure. Variable exposure photography captures multiple images of the same scene with different exposure settings of the camera while maintaining a constant aperture. In order to recover the full dynamic range and make all the details visible in one image, high dynamic range (HDR) imaging techniques are employed to reconstruct one HDR image from an input exposure sequence. These generated HDR images usually have higher fidelity than convectional low dynamic range (LDR) images, which have been widely applied in many computer vision and image processing applications, such as physically-based realistic images rendering and photography enhancement. On the other hand, the current displays are only capable of handling a very limited dynamic range.

This Project proposes a new exposure fusion approach for producing a high quality image result from multiple exposure images. Based on the local weight and global weight by considering the exposure quality measurement between different exposure images, and the just noticeable distortion-based saliency weight, a novel hybrid exposure weight measurement is developed. This new hybrid weight is guided not only by a single image's exposure level but also by the relative exposure level between different exposure images. The core of the approach is our novel boosting Laplacian pyramid, which is based on the structure of boosting the detail and base signal, respectively, and the boosting process is guided by the proposed exposure weight. Our approach can effectively blend the multiple exposure images for static scenes while preserving both color appearance and texture structure. Our experimental results demonstrate that the proposed approach successfully produces visually pleasing exposure fusion images with better color appearance and more texture details than the existing exposure fusion techniques and tone mapping operators..

1. INTRODUCTION

Though the backbone of India's economy, agriculture faces challenges in feeding its growing population with traditional methods. While mechanization boosts efficiency and output, expensive and bulky equipment exclude many small landholders from this progress. Recognizing this barrier, the need arises for affordable, multipurpose agricultural machines designed specifically for smaller farms. Such innovations could not only reduce costs and increase output but also elevate the economic well-being of millions of Indian farmers, paving the way for a more sustainable and

inclusive agricultural future. Agricultural extraction machines are a broad category of equipment used to harvest and process agricultural products. They can range from simple hand-held tools to large, complex machines. The specific type of machine used will depend on the crop being harvested, the terrain, and the desired level of automation. Agricultural extraction machines have revolutionized agriculture by making it possible to harvest crops more quickly and efficiently. This has helped to increase food production and reduce labor costs. However, the use of these machines can also have negative impacts on the environment, such as soil compaction and water pollution.

Agricultural extraction machinery encompasses a wide array of equipment utilized in harvesting and processing agricultural yields. These machines range from simple handheld tools to sophisticated, large-scale equipment, with the selection contingent upon factors such as the crop variety, terrain, and desired level of automation.

The advent of agricultural extraction machinery has transformed farming practices, enabling faster and more efficient crop harvesting. This advancement has significantly bolstered food production while simultaneously cutting down on labor costs. In order to address this problem a simple, economical & efficient machine extract ground vegetables, cutting purpose & other operations , which would be operated by a single person which saves the person savings & labour time. The machine has been designed ,fabricated & tested The use of hand tools for land cultivation is still predominant in India because tractors require resources that many Indian farmers do not have easy access too

2. LITERATURE REVIEW

1. Design and Fabrication of Harvesting Machine, Dandekar Indraja, at all. India's crucial agricultural sector, contributing 17-18% to the GDP and 2 employing half the population, grapples with infrastructure and tech challenges. Ongoing advancements in onion harvesting, including blade design modifications, aim to streamline processes and lighten the labor burden. Recommendations prioritize safety and economic benefits, emphasizing blade speed and mechanization. Overlooked factors like vibration gain attention, acknowledging aesthetics and ergonomics in challenging environments. In conclusion, a recognized and ongoing scope for improvements exists through integrating electrical systems with mechanical devices.

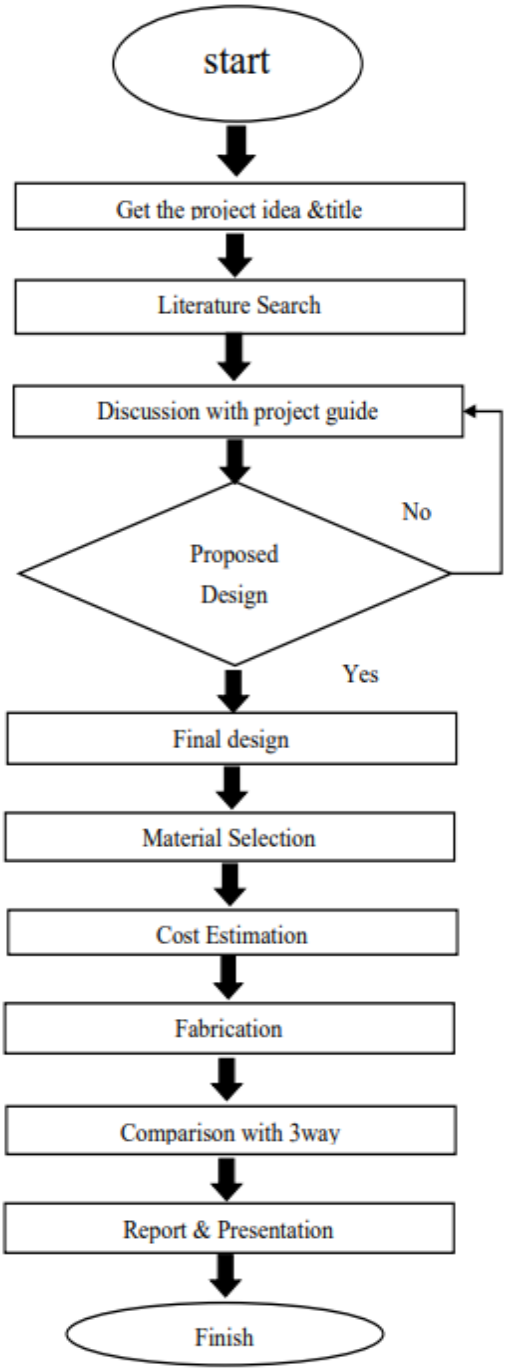
2. Design and Fabrication of Harvesting Machine, Rahul Battase at all. This study aims to develop an efficient potato harvesting machine to minimize losses and reduce human effort compared 13to manual methods. The speculative data-based paper considers future work, including connecting the machine to a vehicle for increased productivity. The focus is on theoretical aspects, aiming to optimize size, ensure smooth movement, and meet customer demands for a quality product at a low cost. The current work involves component design with potential modifications for two-row harvesting and adjustments in height and system loads through wheel size and design alterations.

3. Soil losses due to mechanized potato harvesting, G. Govers, at all. The study in central and northern Belgium examines Soil Loss due to Crop Harvesting (SLCH) during the harvest of crops like sugar beet and potatoes. Focused on potato harvesting machines, the research aims to assess SLCH for potatoes and understand its variability. Average soil loss during potato harvest is 3.2 Mg ha 1, with adhering SLCH varying from 0.2 to 3.6 Mg ha 1. Soil clods significantly impact variability, and soil moisture content is a key factor. Efficient removal of soil clods at the sorting table is identified to reduce soil loss during mechanized potato harvesting. SLCH for potatoes is observed to be lower than for sugar beet, attributed to differences in crop morphology and planting practices. The study suggests further research to explore SLCH in diverse conditions and investigate the impact of soil textures on SLCH intensities.

4. Design and Fabrication of Harvesting Machine, Amar B. Mule, at all. The compact harvester discussed is tailored for small-scale farmers with less than 2 acres of land. Powered by a 3HP two-stroke petrol engine, it efficiently cuts up to two rows of soybean plants using scissor-like blades. The design includes a collecting mechanism for harvested crops, all made from locally available spare parts for easy maintenance. Field tests

confirm its costeffectiveness, proving considerably lower harvesting costs compared to manual methods. The harvester successfully meets objectives of simplicity, compactness, efficiency, and affordability for small-scale landholders, making it a promising solution for their needs.

3. METHDOLOGY



The methodology for an agricultural extraction machine depends on several factors, including the specific crop being extracted, the desired level of automation, the scale of operation, and the specific task.

Some of the steps involved in developing an agricultural extraction machine include needs assessment and market research, design and development, material selection, manufacturing and assembly, field testing and refinement, and distribution and marketing. Specific technologies and considerations can also be incorporated depending on the type of machine, such as sensors and robotics for improved precision and automation, data analytics and AI for optimizing performance and maximizing yield, and sustainability for using eco- friendly materials and minimizing environmental impact The methodology for an agricultural extraction machine depends on several factors, including the specific crop being extracted, the desired level of automation, the scale of operation, and the specific task. Some of the steps involved in developing an agricultural extraction machine include needs assessment and market research, design and development, material selection, manufacturing and assembly, field testing and refinement, and distribution and marketing. Specific technologies and considerations can also be incorporated depending on the type of machine, such as sensors and robotics for improved precision and automation, data analytics and AI for optimizing performance and maximizing yield, and sustainability for using eco-friendly materials and minimizing environmental impact

4. 3D CAD VIEW

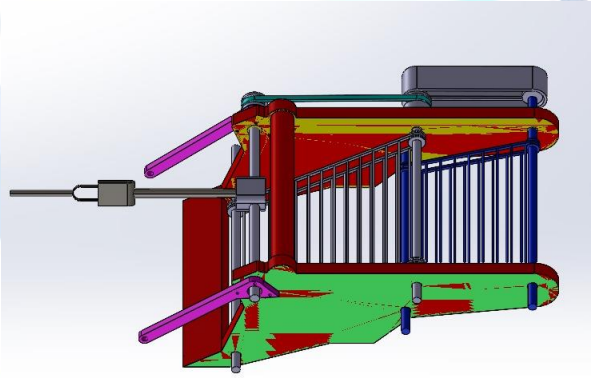


Fig 1

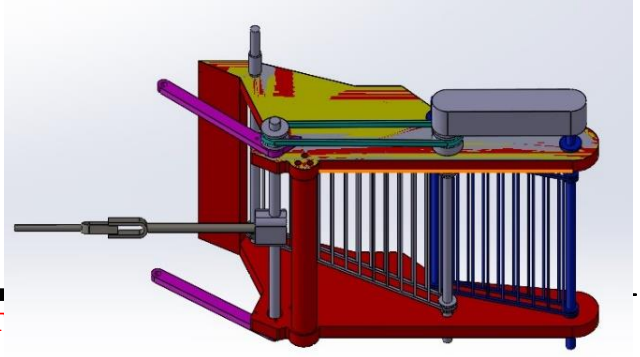


Fig 2

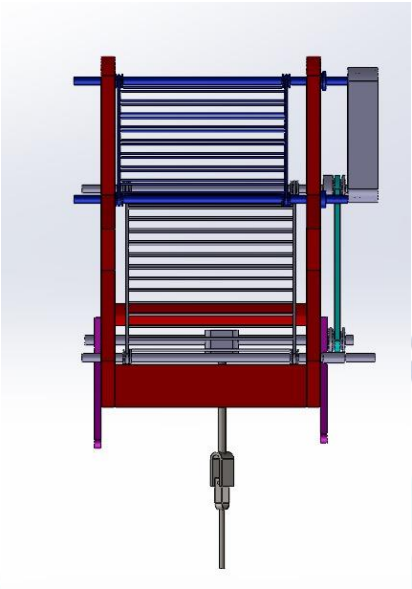


Fig 3

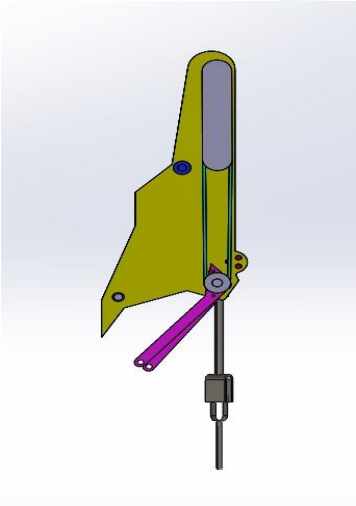


Fig 4

5. CONCLUSIONS

The primary objective of the project was to create a small scale harvester tailored for the specific needs of small landholders, emphasizing simplicity, compactness, efficiency, and affordability. The resulting machine successfully achieved these goals, providing an efficient and cost-effective solution for the harvesting requirements of individuals with limited land resources. The conclusions drawn from the work affirm the machine's effectiveness in meeting its objectives. Notably, the design prioritized operational simplicity and compact form, ensuring ease of use and maneuverability, which are crucial factors for small-scale farming operations with constrained space and resources. Additionally, the conclusions acknowledge the potential for further improvements and modifications, reflecting a commitment to ongoing innovation and optimization. Overall, the developed small-scale harvester stands as a successful and practical tool, addressing the unique challenges faced by small landholders in the agricultural sector

The main aim of the project was to design a harvester specifically tailored to the needs of small-scale landholders, focusing on simplicity, compactness, efficiency, and affordability. The resulting machine effectively met these objectives, offering a practical and cost-efficient solution for harvesting needs among those with limited land resources. The findings from the project confirm the machine's success in fulfilling its intended purposes.

One key aspect of the design was its emphasis on simplicity and compactness, ensuring ease of operation and maneuverability, which are crucial for small-scale farming operations with limited space and resources. Moreover, the conclusions drawn from the project recognize the potential for further enhancements and adjustments, underscoring a commitment to ongoing innovation and refinement.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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