iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** IV **Month of publication:** April 2024

DOI: https://doi.org/10.22214/ijraset.2024.59412

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue IV Apr 2024- Available at www.ijraset.com

Design and Fabrication of Automated Counting Machine

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Abstract: ***The design and fabrication of an automatic counting device specifically for wedges are presented in this work. The device effectively counts wedges in a variety of industrial processes by utilizing electronic control systems and precise engineering concepts. The design incorporates a user-friendly interface for smooth operation and sensors for precise detection. In order to assure dependable operation, fabrication entails programming embedded systems and assembling specialized components. For businesses producing wedges, the automated counting machine provides a workable way to improve efficiency and quality assurance.***

Keywords: Wedges, Automatic Counting, Sensor

I. INTRODUCTION

Accurate wedge counting is essential for upholding productivity and quality standards in modern production settings. But conventional hand counting techniques might slow down production since they are frequently prone to mistakes. This work focuses on the design and construction of an automatic counting device made especially for wedges in order to overcome this problem. Through the integration of sophisticated electronic control systems with precision engineering methods, the automated machine seeks to improve overall productivity, minimize human error, and streamline the counting process. This introduction highlights the significance of automated solutions in contemporary manufacturing environments and provides an overview of the research purpose.

II. METHODOLOGY

1) *Step 1:* Research on Journals to gather engineering concepts and design that will suit our industry and infrastructure.
2) Step 2: Designing the machine layout and defining the requirements for implementation.
3) *Step 3:* Fabrication of the design along with automation.
4) *Step 4 :* Testing and analysing the efficiency and the work flexibility.
5) *Step 5 :* Implementation in real time and observation on results

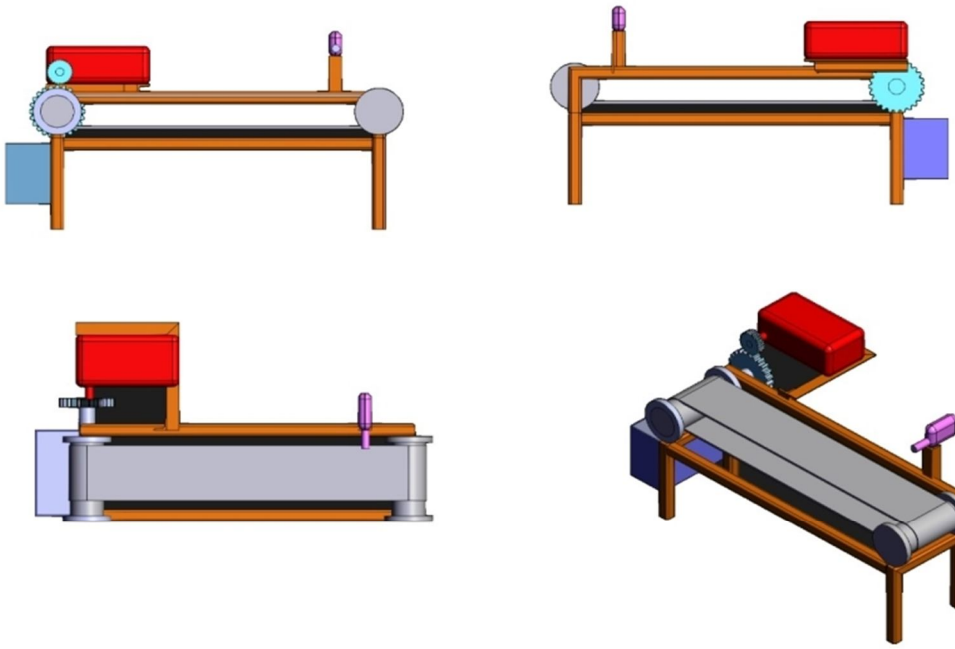
III. LITERATURE REVIEW

1) In order to manage currencies effectively, a number of approaches and technologies are examined in the study on Automatic Sorting and Counting Machines for currencies. It talks about how robots, image processing, and machine learning are being used to automate sorting and counting tasks. The study tackles issues with speed, accuracy, and flexibility in various monetary system.
2) The integration of sensor technology into automated systems is examined in the literature on model design and simulation of automatic counting devices using proximity sensors. It examines proximity sensing's foundational ideas and how precise counting procedures might use it. The study emphasizes improvements in simulation methods to maximize machine dependability and performance.
3) Methods for precisely quantifying items in visual data are explored in the literature on object counting for machine vision applications based on image processing. It looks into neural network, edge detection, and thresholding methods for robust counting in different scenarios. Efficiency, precision, and adaptability are prioritized in the study for a variety of industrial and surveillance applications.
4) Advancements in automated systems for effective sorting of various materials are explored in the literature on Automatic Sorting Machines. In order to improve sorting procedures in sectors like manufacturing, shipping, and recycling, it investigates technologies like robotics, machine learning, and sensor integration. Accuracy, quickness, and adaptability to changing needs are highlighted in the research.

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5) The paper provides a thorough examination of an automated sorting system. The goal of the project is to improve sorting efficiency and accuracy through machine learning and sensor integration. The study makes significant contributions to automation technology by evaluating the system's effectiveness across a range of sorting applications and provides insights into realistic implementation options.
6) An important development in agricultural automation is the machine vision-based automatic apple sorting system. By using machine learning techniques and image processing algorithms, the system effectively sorts apples according to their size, color, and quality. In the agriculture sector, this study helps to improve productivity, lower labor costs, and uphold standards for fruit quality.
7) Study on automated counting techniques in aquaculture is essential to enhancing the precision and effectiveness of fish population control. A variety of methods, including computer vision systems, acoustic technologies, and image processing, are synthesized in this review. It outlines the developments, difficulties, and chances for applying automated counting techniques to improve the sustainability and productivity of aquaculture.
8) One innovative solution to reduce human error in traffic data collection is the tablet-based traffic counting application. It provides a user-friendly interface for precise and efficient traffic counting by utilizing tablet technology. With its capacity to improve data reliability and provide well-informed decision-making for traffic management and urban planning, this application represents a change in transportation research toward automation.
9) This study offers a unique take on sorting technology. The project investigates cutting-edge approaches and applications to maximize sorting effectiveness. It helps to improve productivity in a variety of industries by optimizing industrial processes through the integration of automation principles.
10) The study looks into new methods to improve sorting efficiency and accuracy for date fruits using an automated sorting system. It seeks to improve fruit quality control procedures by utilizing automation and machine vision technologies, potentially leading to significant improvements in post-harvest management and agricultural productivity.

IV. DESIGN



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V. CALCULATION

A. Motor Power Calculation

Power (W) = Voltage (V) x Current (I) Power (W) = 12V x 5A = 60W

B. Motor Load Calculation

Load (lbs) = (weight of window + resistance) x 2 Load (lbs) = (10 + 2) x 2 = 24 lbs

C. Motor Torque Calculation

Torque (Nm) = Load (N) x Distance (m)
Torque (Nm) = (10 x 4.44822) N x 0.1 m = 44.48 Nm

D. Spur Gear Torque Calculation

Torque (Nm) = Load (N) x Distance (m) Torque (Nm) = 50 N x 0.2 m = 10 Nm

E. Ball Bearing Calculation

Radial load of ball bearing(Fr) = 700 N Thrust load of ball bearing(Fa) = 300 N
Service factor(s) = 1.2 Hours in use per week = 35 Number of years = 3 Speed N = 500 Rpm
Diameter of Shaft = 15 mm

F. Life Of Bearing

Total life of bearing = 35 x 3 x 52

P = (0.56 X 700 + 1.4 x 300) 1.2

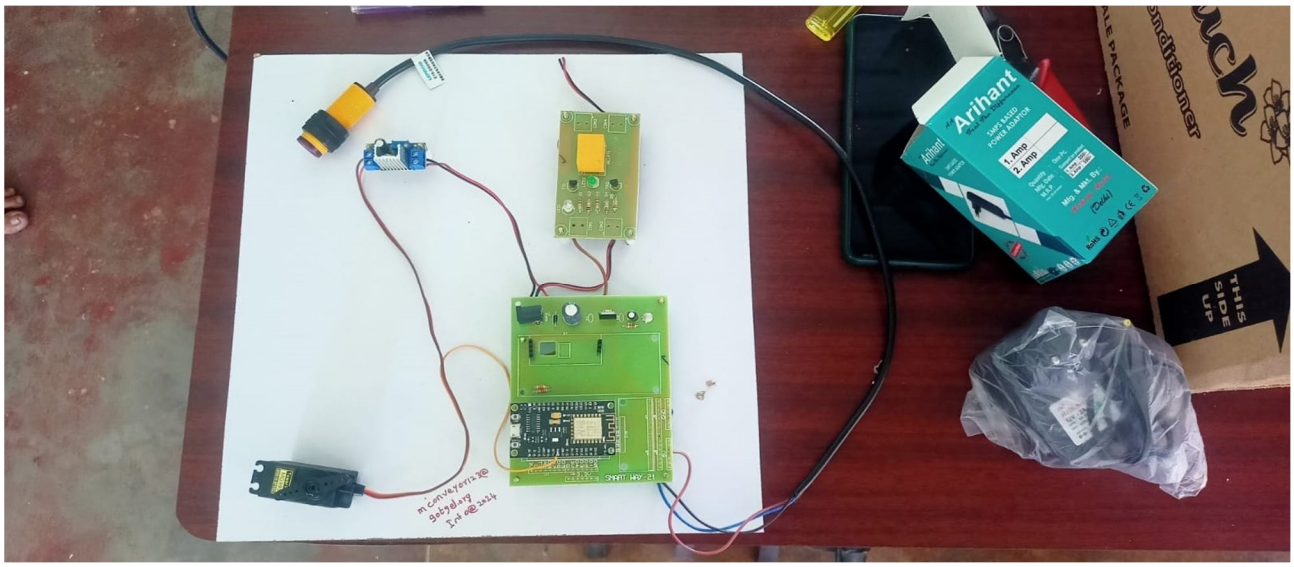
C = 6.2 X P = 6.2 X 812

Since C = 8800 > 5034 , the Selected bearing is suitable. Selected bearing = SKF6302.

VI. FABRICATION MODEL



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VII. WORKING

1) Identification of various concepts and methods of automated counting machine
2) Analysing the suitable motor to move the conveyer belt
3) Finalised the level of automation and the way to collect the wedges
4) Counting is done by using proximity sensor
5) Collection of wedges is done by motor used to rotate the pinion

VIII. RESULTS

1) Reduced labour costs
2) Improved efficiency
3) Reduced time for counting

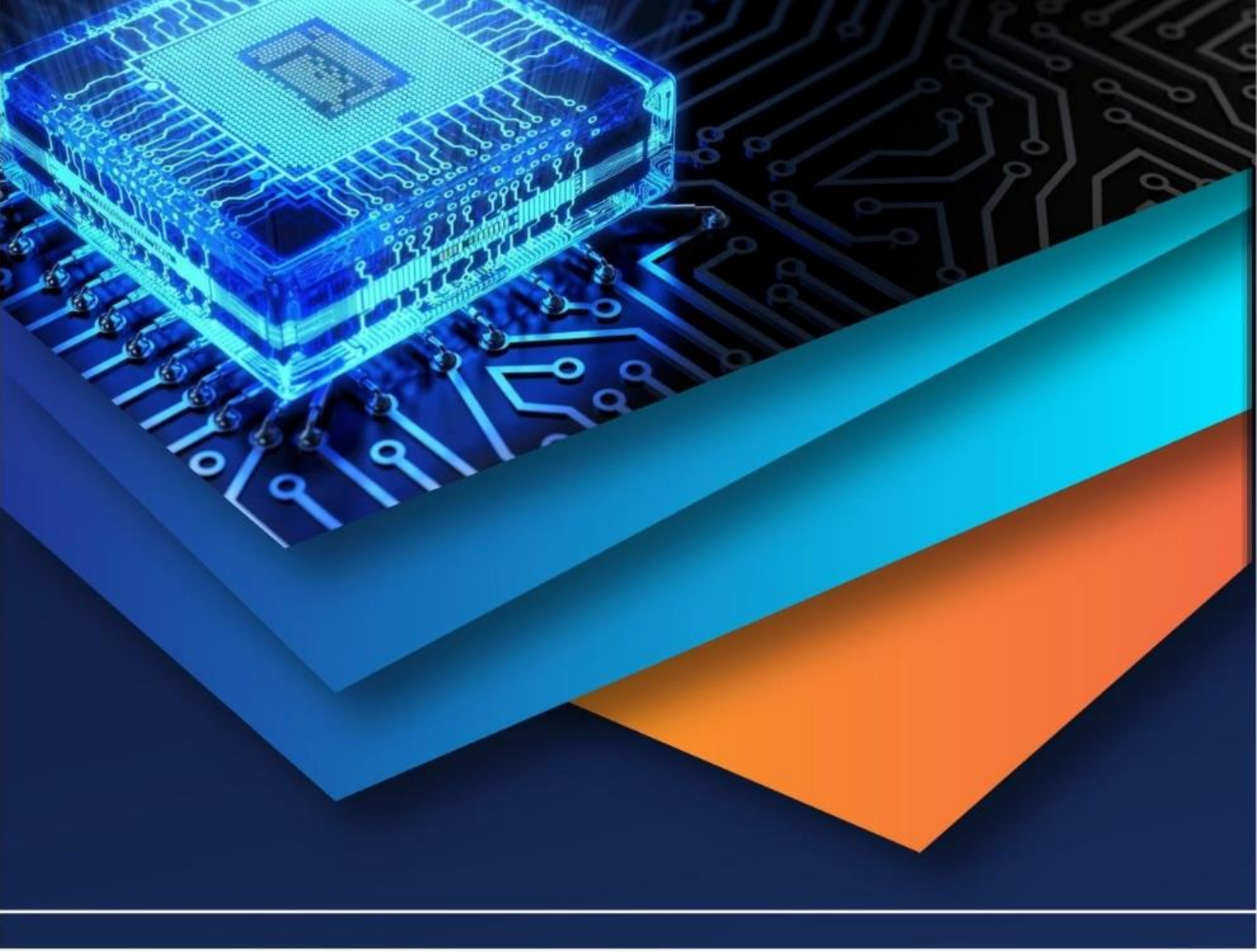
IX. CONCLUSION

The study looks into new methods to improve sorting efficiency and accuracy for date fruits using an automated sorting system. It seeks to improve fruit quality control procedures by utilizing automation and machine vision technologies, potentially leading to significant improvements in post-harvest management and agricultural productivity.

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