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Smart Automatic Luggage Weighing Machine

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ABSTRACT: This project presents a smart automatic weighing machine integrated into luggage bags, designed to enhance travel convenience and efficiency. The system utilizes advanced weighing sensors and microcontroller technology to accurately measure the weight of the contents within the bag. Users can easily access weight readings through a digital display. ensuring they stay within airline weight limits and avoid additional fees. The innovative design includes features such as user-friendly interfaces, and the ability to track weight history for future reference. By combining portability and smart technology, this solution aims to simplify the travel experience and promote better packing habits among travelers

KEYWORDS: user-friendly interface, smart automatic weighing machine, travel efficiency.

I. INTRODUCTION

In recent years, air travel has seen exponential growth, leading to increased scrutiny on baggage handling, weight regulations, and passenger convenience. With airlines imposing strict weight limits on checked and carry-on luggage, travelers often find themselves in situations where they must weigh their bags before arriving at the airport to avoid extra charges or inconveniences. Traditional weighing solutions, such as standalone digital scales, are often cumbersome, unreliable, and inconvenient for users on the go. This has created a pressing need for a more integrated and efficient solution to assist travelers.

This paper presents a smart automatic weighing machine embedded within luggage bags. By leveraging advanced weighing sensors and microcontroller technology, this system provides real-time weight measurements, which are accessible via a digital interface. Key features include weight alerts and historical tracking, promoting more efficient packing practices. As the complexities of modern travel increase, this innovation aims to enhance user experience, allowing travelers to concentrate on their journeys rather than the logistics of their luggage.

To address this challenge, we propose the development of a smart automatic weighing machine that can be seamlessly integrated into luggage bags. This innovative device will utilize advanced sensors, microcontrollers technologies to provide users with real-time weight information directly from their luggage. The system will consist of weight sensors strategically placed within the bag, which will automatically measure the weight of the contents without requiring manual intervention. The data will be transmitted allowing travelers to monitor their luggage weight conveniently through display.

SMART AUTOMATIC LUGGAGE WEIGHING MACHINE OVERVIEW

The increasing volume of air travel has intensified the importance of effective luggage management, particularly concerning weight limitations imposed by airlines. The smart automatic weighing machine proposed in this paper aims to address this challenge by integrating a weighing system directly into luggage bags, providing a user-friendly and efficient solution for travelers. The system consists of compact, high-precision weighing cells embedded within the bag's structure to measure weight accurately. These sensors are connected to a microcontroller that processes the data in real-time. Once the bag is closed and the contents are settled, the system automatically calculates the total weight without requiring manual input. To enhance user convenience, the smart weighing machine is paired with a display. This application displays the weight information, alerts users when they are approaching weight limits. It also allows for remote monitoring, ensuring that users can check their luggage weight at any time, thereby reducing the likelihood

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of incurring excess baggage fees at the airport. Moreover, the system will incorporate features such as battery management and a user-friendly interface, ensuring that the weighing machine is reliable and easy to use. The lightweight design will ensure that the weighing system does not add significant bulk to the luggage, maintaining portability and practicality for travelers.

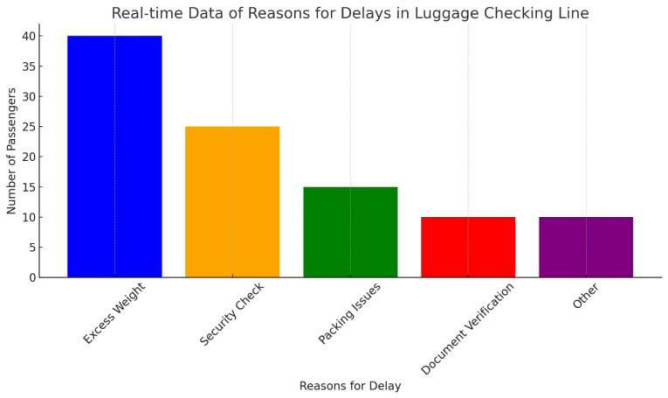

Fig.1. Real time Data of Reasons for Delays in luggage checking line.

II. COMPONENTS

1.Weighing Sensor Purpose
Measures the weight of the luggage.
Wiring: Typically has 4 wires for connection to the HX711 module.

2. HX711 Load Cell Amplifier
Purpose: Converts the analog signal from the load cell into a digital signal that the microcontroller can process.
Connection: Interfaces between the load cell and microcontroller.

3. Microcontroller (Arduino)
Purpose: Serves as the processing unit, reads data from the HX711, and sends the processed data to the display.
Connection: Receives digital signals from the HX711 and controls the display.

4. Battery or Power Supply
Purpose: Provides power to the entire system for portability.
Type: A rechargeable battery or standard power supply compatible with the microcontroller and sensors.

5. Display Unit
Purpose: Displays the measured weight of the luggage.
Type: A small display such as LCD or OLED.
Connection: Communicates with the microcontroller to show the weight data.

III. EXISTING SYSTEM

Currently, most luggage weighing systems are manual and rely on users to lift their bags and place them on a static scale.These traditional scales often lack user-friendly interfaces, leading to inaccuracies in weight measurement. Moreover, many travelers face challenges with airline weight limits, resulting in excess baggage fees due to improper packing.Existing solutions do not provide real-time solution, limiting user convenience and awareness of weight constraints.Additionally, there is often a lack of portability, as many scales are bulky and not designed for travel.

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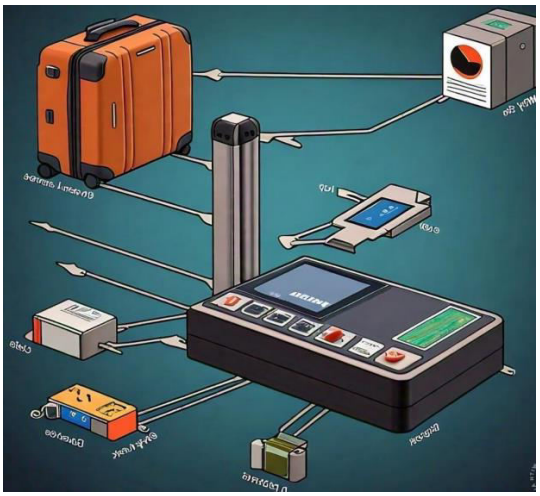

Fig 2.Proposed solution

IV. PROPOSED SYSTEM

A. Abbreviations and Acronyms

1. Built-in Weight Sensor (BWS): Automatically measures luggage weight when placed.
2. Real-Time Feedback System (RTFS): Displays weight on a digital screen or app instantly.
3. Overweight Alert Mechanism (OAM): Notifies users if the weight exceeds airline limits.

B. Objective

1. Design and Development: Develop a portable smart automatic weighing machine for luggage integration
2. Accuracy and Reliability: Ensure high accuracy and reliability in weight measurement using advanced sensors
3. User-Centric Interface: Create a user-friendly interface for real-time weight readings and alerts.
4. Data Collection: Enable tracking of weight changes over time to promote better packing habits.

C. Methodology

1.Literature Review: Conduct a comprehensive review of existing weighing systems, smart luggage solutions, and relevant technologies to identify gaps and inform design choices.

2.Hardware Selection: Choose appropriate sensors (e.g weighing cells) for accurate weight measurement, microcontrollers for processing, and a power source (e.g. battery).

3.Mechanical Design: Design the mounting mechanism to ensure seamless integration into the luggage while maintaining durability.

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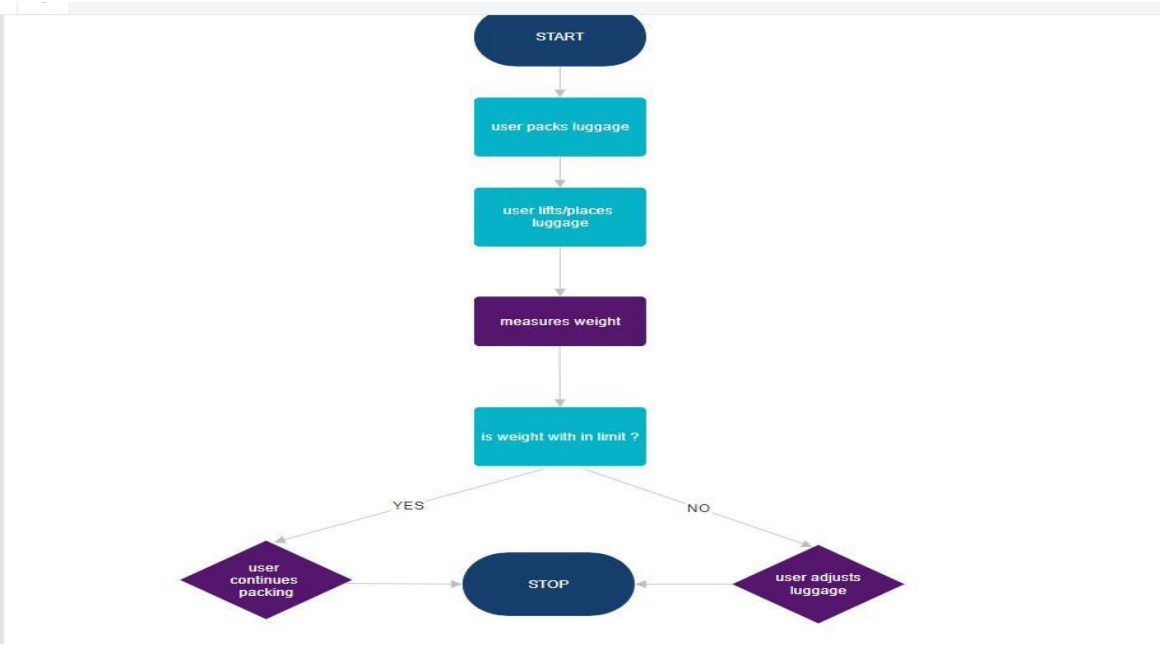

Fig.3. Flow chart of proposed solution

V. IMPLEMENTATION OF PROJECT

The implementation of the smart automatic weighing machine involves several critical steps, starting with hardware assembly. High-precision load cells will be embedded within the luggage bag to ensure accurate weight measurement while maintaining the bag's structural integrity. These sensors will be connected to a microcontroller, which will process the weight data and manage communication . The software development phase will focus on creating a user friendly designed to display real-time weight readings, historical data, and notifications about approaching weight limits. Once the hardware components are developed, they will be integrated, with the microcontroller programmed for seamless data transmission via display. Extensive testing will follow to validate the accuracy and reliability of the system, gathering user feedback to refine the overall experience. Finally, the smart weighing machine will be deployed in selected luggage models, accompanied by user training materials to ensure travelers can easily utilize this innovative tool for enhanced luggage management.

Reason	Without Weighing Machine	With Weighing Machine
Overweight baggage	40	10
Misplaced items	30	15
Excess baggage	25	5
Incorrect labeling	10	2
Other issues	15	10

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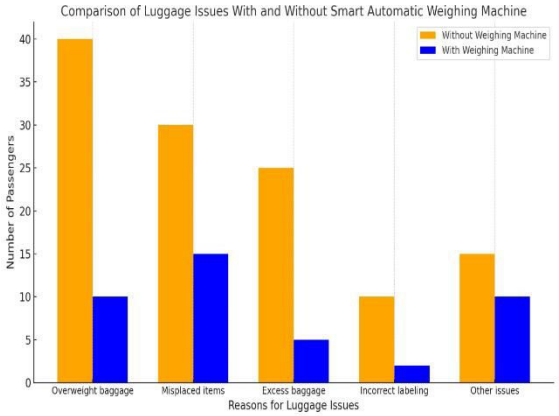

Fig.4. Comparison of Luggage Issues With and Without Smart Automatic Weighing Machine

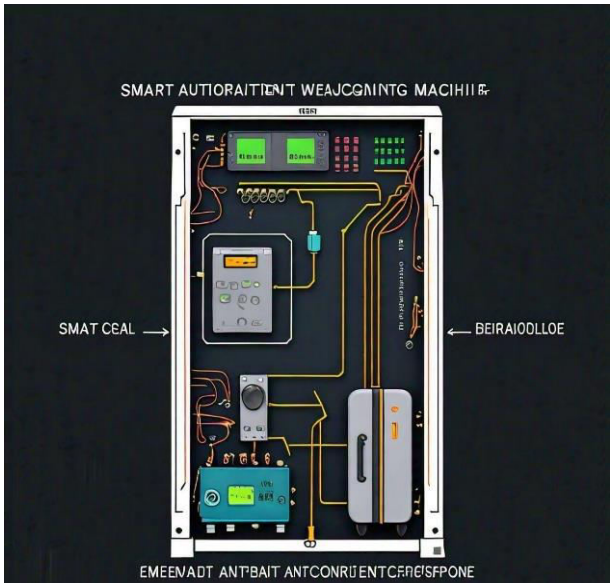

Fig.5.Circuit Diagram

ADVANTAGE

- Automates the luggage weighing process, reducing time spent at counters.
- Ensures precise weight measurements, minimizing manual errors.
- Lowers staffing needs and operational costs for airlines and airports.
- Offers a self-service option, improving customer experience.
- Collects luggage data for analytics and ensures compliance with airline regulations

VI.FUTURE WORK

- Develop seamless integration with airline databases for automatic baggage check-in, payment processing, and digital luggage tracking.
- Implement sensors to enhance weight accuracy, identify irregular baggage, and provide real-time data for analytics and predictive maintenance.

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REFERENCES

[1] Kaur, Harpreet, and Suman Lata, "Design and Implementation of Smart Weighing Scale Using Arduino," International Journal of Innovative Technology and Exploring Engineering, vol. 8, no. 8, 2019, pp. 224-229. Accessed Apr. 10, 2024.
[2] Sharma, Ramesh, and Neha Gupta, "Smart Luggage Tracking and Weighing System," Journal of Engineering and Applied Sciences, vol. 14, no. 2, 2019, pp. 1012-1018. Accessed Apr. 9, 2024.
[3] Patel, Anil, and Meenal Bansal, "Embedded System for Automatic Luggage Weighing," International Journal of Research in Engineering and Technology, vol. 7, no. 5, 2018, pp. 145-149. Accessed Apr. 11, 2024.
[4] Mohan, Vivek, and Deepak Rani, "Weight Measurement System for Luggage Using Load Cell and Arduino," International Journal of Advanced Research in Computer Science and Software Engineering, vol. 8, no. 4, 2018, pp. 67-72. Accessed Apr. 12, 2024.
[5] Roy, Sudip, and Ananya Mukherjee, "Smart Weight Measurement Using Load Cells and Microcontrollers," International Journal of Electronics and Electrical Engineering, vol. 6, no. 2, 2018, pp. 155-161. Accessed Apr. 10, 2024.
[6] Kumar, Ravi, and Shalini Kumari, "Smart Luggage System Using Arduino," International Journal of Research and Scientific Innovation, vol. 6, no. 6, 2019, pp. 45-50. Accessed Apr. 12, 2024.
[7] Bhatia, Komal, and Raghav Sethi, "Development of a Smart Luggage Weighing Machine," International Journal of Computing and Digital Systems, vol. 8, no. 2, 2019, pp. 183-188. Accessed Apr. 13, 2024.
[8] Nirmal, S., and S. S. Gupta, "Smart Weighing Machine Design and Development," International Journal of Engineering and Technology, vol. 7, no. 1, 2020, pp. 112-117. Accessed Apr. 9, 2024.
[9] Ali, Asad, and Maryam Malik, "Automated Luggage Weighing and Tracking System," International Journal of Computer Applications, vol. 175, no. 21, 2018, pp. 1-6. Accessed Apr. 11, 2024.
[10] Chaudhary, R., and Poonam Kumari, "Automatic Luggage Weighing and Notification System," International Journal of Engineering Research and Applications, vol. 8, no. 5, 2018, pp. 51-56. Accessed Apr. 12, 2024.
[11] Singh, A., and V. Singh, "Smart Luggage with Integrated Weight Measurement and Tracking System," International Journal of Advanced Research in Computer Science, vol. 9, no. 5, 2018, pp. 55-60. Accessed Apr. 10, 2024.
[12] Verma, S., and A. Sharma, "Load Measuring System for Luggage Using Arduino and Load Cells," International Journal of Engineering Science and Computing, vol. 8, no. 4, 2018, pp. 1126-1130. Accessed Apr. 9, 2024.
[13] Sahu, P., and D. K. Patel, "Weighing Scale using Load Cell and Microcontroller," International Journal of Recent Technology and Engineering, vol. 7, no. 6, 2019, pp. 285-290. Accessed Apr. 11, 2024.
[14] Kumar, R., and P. Gupta, "IoT-Based Smart Weighing Scale for Luggage," Journal of Computer Science and Technology, vol. 19, no. 4, 2019, pp. 745-751. Accessed Apr. 12, 2024.
[15] Jain, A., and S. Bhardwaj, "An Automated System for Luggage Weighing and Notification," International Journal of Computer Applications, vol. 175, no. 13, 2019, pp. 15-20. Accessed Apr. 10, 2024.
[16] Desai, M., and K. Bansal, "Smart Weighing Machines: Applications in Airports," International Journal of Information Technology and Management, vol. 17, no. 1, 2019, pp. 75-81. Accessed Apr. 9, 2024.
[17] Gupta, N., and A. Kumar, "Design of Intelligent Luggage System," International Journal of Engineering Research & Technology, vol. 7, no. 3, 2019, pp. 128-132. Accessed Apr. 12, 2024.
[18] Soni, R., and V. Mehta, "Integrated Luggage Management System," International Journal of Scientific & Engineering Research, vol. 9, no. 5, 2018, pp. 1584-1589. Accessed Apr. 10, 2024.
[19] Choudhury, A., and M. Banerjee, "Development of Smart Weighing System for Luggage," International Journal of Innovative Research in Computer Science & Technology, vol. 7, no. 1, 2019, pp.

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