IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, July 2024

RoboWash: A Review on Automated Laundry Collection System

Apoorva R Naik[1], Shashank[2], Sanjana Y Kulal[3], Deekshith Poojary[4], Deepthi Kotian[5]
UG Students, Department of Electronics and Communication Engineering [1-4]
Assistant Professor, Department of Electronics and Communication Engineering[5]
Mangalore Institute of Technology & Engineering, Karnataka, India

Abstract: *The system uses modern robots and sensor technology to increase the efficiency and automation of the laundry process. The system's central robot is equipped with infrared sensors to identify obstacles, load cells to measure weight precisely, and traction motors to enable mobility. The robot, which is powered by an Arduino Uno, efficiently collects laundry supplies, recognises them by scanning Data Matrix Codes (DMC) that are attached, and weighs them to calculate the approximate cost and washing time. The robot moves the laundry to the ironing station after navigating to the washing machine and updates the user interface with its present status. After the laundry is ironed, it is wrapped and designated as finished, and the system modifies the status once more. Load cells give accurate weight information, servo motors allow precise laundry item movement, and infrared sensors ensure safe navigation. The goal of this all-inclusive system is to increase the effectiveness of laundry management by automating procedures and giving real-time status updates.*

Keywords: Sensor Technology, Load Cell, Infrared Sensors

I. INTRODUCTION

Automation is revolutionising ordinary chores more and more in this era of fast technological growth. The task of gathering laundry is one of the most promising areas for innovation among them. Presenting Robowash: an automated laundry collection system meant to improve and simplify the process of collecting soiled laundry in homes and businesses. Robowash is a major advancement in home automation technology that makes laundry easier by utilising cutting-edge robotics and artificial intelligence. Robowash provides users with unmatched simplicity and dependability by eliminating the need for labour-intensive manual soiled clothing collection by means of autonomous navigation through pre-designated zones. This introduction lays the groundwork for examining how Robowash uses creative automation to solve the problems associated with traditional laundry management, offering not just productivity but also a window into the direction automated service solutions will go in the future. It provides an advanced technique that automates the entire washing process—from collection to management—with the lowest possible level of human intervention. It combines state-of-the-art technology for robotics, IoT (Internet of Things) detectors, and data collection in real time to give users a seamless and hassle-free experience. It uses a sophisticated DMC (Data Matrix Code) scanning system to accurately identify and categorise each item, ensuring that it receives the best care possible at every stage. Additionally, it has a sophisticated weight detecting technology that enables precise laundry load measurement

II. LITERATURE SURVEY

Kunchev et al., [1]: This research investigates obstacle avoidance as a means of improving robot navigation. It describes the selection of pertinent research, the kinds of studies that were included, and the process of extracting data. An explanation of the analysis method for contrasting approaches and showcasing navigational advances is provided. There may be an optional quality evaluation stage. Robots are capable of moving without the need for human assistance, increasing productivity in a variety of settings, including manufacturing and cleaning. protects the robot and its immediate environment by assisting in the prevention of collisions, which is essential in settings like factories.

Baharuddin et al., [2]: This research proposes a line sensor setup to increase the differential driving line following robot's navigation dependability. A strategy for alf navigation can do this. It is employed for grid junction, 90-degree

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, July 2024

bend, and T-junction navigation. It can also sense any kind of obstruction in its path and, with the aid of a speed regulator, regulate its speed. The robot can be further improved by utilising an array of IR sensors or a larger number of IR sensors.

Ali et al., [3]: The study suggests a novel algorithm that uses infrared sensors to help Robotino robots navigate and avoid obstacles. Using carefully positioned infrared sensors, this system applies a Straight-Line Equation adaption mechanism to make sure Robotino reaches its goal while identifying and navigating past static or dynamic impediments. Because the algorithm can manage dynamic as well as static impediments, it can be used to a variety of real-world RoboWash: Autonomous laundry collecting system scenarios where unpredictable changes in the environment may occur. The program works by dynamically producing actions to avoid barriers in real time.

Matijevics et al., [4]: This document probably describes how to develop a microcontroller and infrared sensor system for mobile robots. System testing, processing information and robot control programming, sensor selection, microcontroller interface, and programming are covered. This gives robots the ability to identify objects, follow lines, and avoid obstacles. Low-cost infrared sensors enable robots to detect objects in the dark or during the day. They are perfect for real-time environment navigation because of their quick response times and minimal battery consumption.

Mustafa et al., [5]: This paper's goal is to construct a robot using a DC motor, motor driver, and microcontroller. PID is one example of software for designing for desired motion. For more accurate control, add sensors (optional). Test, evaluate, and improve for the best possible robot performance. By managing the motors, servomotors, sensors, and other parts that comprise the robot's body and actions, microcontrollers can make robotics possible.

Karrach et al., [6]: This paper goal is to find Data Matrix candidates in the image, the suggested Data Matrix code localisation method makes use of common Timing Pattern and Finder Pattern trends, local thresholding technique, connecting nearby points form continuous regions, and exterior region borders. They seem to be the best options for industrial applications when considering their advantages, which include cheap cost, precision, speed, dependability, adaptability, and effectiveness as well as the capacity to capture vast volumes of data in a little space.

G Eleftheriou et al., [7]: The main objective of this article is to optimise the line-tracking and tracking control technique that is applied to fast speeds autonomous movable IoT devices, including robotic cars that follow lines. Comparisons with the conventional PID technique show that the suggested method helps and enhances the effectiveness of line-following robots. Infrared technology is easy to use and incredibly inexpensive, and it interferes with electrical devices in no way. Since the shield is straightforward, no licenses are needed.

Wan et al., [8]: The proposed mobile model, a genetic algorithm, the Little Helper prototype, a suitable application in industry (multiple-part feeding), an industrial application's implementation concept (the Barman Concept), and a mobile robot system design are all suggested. RoboWash is a computerised laundry the collection system based heuristic. When obstacles are in its way, it automatically recognises them and changes course to avoid them. Any autonomously mobile robot must be able to avoid collisions, and this design makes that possible.

Baballe et al., [9]: An apparatus that transforms electrical power into mechanical power is a motor. The motor is made up of two parts: an electrically powered fixed rotating part and a fixed fixed part. It possesses kinetic energy in the rotating portion and is represented by voltage and current. Torque and speed serve as its representations. Servos are mostly employed for particular acceleration and velocity as well as angular or linear locations. Servo motors are widely used by businesses because to their strength and small design. It is renowned to be very energy-efficient and produces a good amount of power despite its small size.

Pazil et al., [10]: In this paper the Arduino Uno microcontroller is utilised. The microcontroller is linked to Bluetooth modules so that it can communicate with the user. The speaker and Aurdino module are connected to warn of the presence of an obstruction. If the robot follows some logical instructions, it can be used for a number of different activities. More IR sensors will allow the robot behind you to be more precise. This robot could be used by the military, as well as by companies and hospitals. This robot can replace conveyor belts.

III. PROPOSED SYSTEM

Robowash: Automatic Laundry Collection System" introduces a fully computerised collection system with the goal of revolutionising the management of laundry services. This creative initiative uses robotic technology to pick up clothes from pre-designated locations in an effort to reduce the stress that comes with using standard laundry services. The

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, July 2024

system, which serves both the residential and commercial sectors, promises efficiency, ease, and dependability. Robowash aims to streamline laundry collection logistics through automation, guaranteeing prompt and flawless service delivery. This project offers a glimpse into the potential of automated service solutions and constitutes a significant leap in the laundry management industry. The goal of "Robowash: Automation Laundry Collection System" is to automate robotically and streamline laundry management while offering convenient and effective collection services for both the home and business sectors. The purpose of the washing robot is to save time and effort when doing laundry, especially for people who are busy or have physical restrictions. The robot seeks to improve convenience, streamline resource utilisation, and simplify the laundry process by combining automation with cutting-edge technology like weight monitoring and obstacle recognition. In the process, it hopes to raise people's quality of life and highlight the possibilities of smart home technologies. Create an autonomous laundry robot that can handle, sort, and move clothing with efficiency. It should have weight sensors and detect obstacles. By incorporating modern technologies, the automated system will maximise resource efficiency, simplify the laundry process, and improve convenience—thereby showcasing the possibilities for advances in smart home automation. Controlled by an Arduino microcontroller, the system consists of an advanced washing robot with weight sensors to precisely measure the weight of the cloth and trace any missing material. It transports and sorts laundry on its own, using sophisticated navigation algorithms and obstacle detection. Remote control and monitoring are made possible by integrated IoT capabilities.

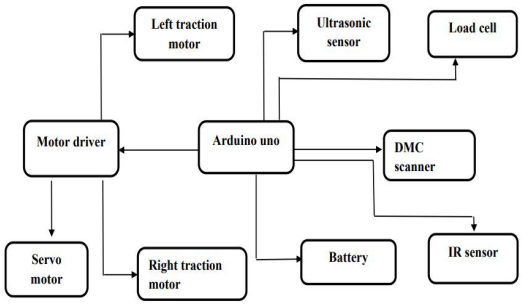

Fig.1.Block Diagram

IV. FUTURE SCOPE

Automatic laundry collection promises to become even more customised in the future. Imagine a washing machine that not only gathers your clothing but also automatically dispenses the correct amount of detergent using weight sensors to ensure clean clothes and reduce waste. Additionally, by anticipating possible issues like overloaded units, these sensors could enable proactive maintenance. To ensure proper care, the device could be able to move around fragile items like damp clothing with the use of advanced obstacle identification using cameras or AI. The device might establish a seamless laundry environment by interacting with smart washers and dryers and automatically transmitting data to optimise wash cycles. This clever strategy customises the washing process for maximum convenience. Potential developments in energy-efficient operations and environmentally friendly materials to lessen their negative effects. expanding to serve bigger businesses like hotels, launderettes, and hospitals. applying data analytics to enhance service reliability, optimise collection routes, and do predictive maintenance. incorporating user feedback to improve customer satisfaction overall, service customisation, and interface design. With these developments, Robowash is now positioned as a cutting-edge automated laundry management system, ready to adapt to changing customer demands and technical breakthroughs in the years to come.

V. CONCLUSION

The autonomous laundry robot, which addresses the labour-intensive and time-consuming aspect of conventional laundry operations, represents a significant step in domestic automation. The robot optimises resource utilisation and user convenience by streamlining the laundry process with the integration of load sensors, detection of obstacles, and an Arduino microcontroller. The project's methodical approach included requirement analysis, design, software

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 2, July 2024

development, component selection, testing, prototyping, and field validation. The possibility of incorporating embedded system and Internet of Things technologies into common appliances is demonstrated by the robot's capacity to sort, handle, and carry garments on its own. User feedback directed iterative changes that improved the robot's performance and user experience, while thorough testing and calibration guaranteed the system's reliability and precision. By lowering physical labour, this project not simply enhances quality of life but also establishes a standard for further study and advancement in the field of home robotics. To sum up, Robowash is a revolutionary development in the washing industry that uses robotic automation to improve dependability, convenience, and efficiency. Robowash streamlines everyday tasks by automated the collection process, and it also establishes a standard for further advancements in service automation. Robowash aims to revolutionise how people and businesses approach washing services with its potential to enter new industries, integrate with smart technology, and develop through data-driven innovations. Robowash is leading the charge to transform routine tasks and open the door to a more automated and connected future as it keeps innovating and adjusting to consumer needs.

REFERENCES

[1]. Kunchev, Voemir, Lakhmi Jain, Vladimir Ivancevic, and Anthony Finn. "Path planning and obstacle avoidance for autonomous mobile robots: A review." In Knowledge-Based Intelligent Information and Engineering Systems: 10th International Conference, KES 2015, Bournemouth, UK, October 9-11, 2015. Proceedings, Part II 10, pp. 537-544. Springer Berlin Heidelberg, 2015.

[2]. Baharuddin, M. Zafri, Izham Z. Abidin, S. Sulaiman Kaja Mohideen, Yap Keem Siah, and Jeffrey Tan Too Chuan. "Analysis of line sensor configuration for the advanced line follower robot." University Tenaga Nasional (2015).

[3]. Ali, Tariq Younis, and Mohammad M. Ali. "Robotino obstacles avoidance capability using infrared sensors." In 2015 IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT), pp. 1-6. IEEE, 2015.

[4]. Matijevics, István. "Infrared sensors microcontroller interface system for mobile robots." In 2017 5th International Symposium on Intelligent Systems and Informatics, pp. 177-181. IEEE, 2017.

[5]. Mustafa, Mustafa M., and Ibrahim Hamarash. "Microcontroller-based motion control for DC motor driven robot link." In 2019 International Aegean Conference on Electrical Machines and Power Electronics (ACEMP) & 2019 International Conference on Optimization of Electrical and Electronic Equipment (OPTIM), pp. 547-552. IEEE, 2019.

[6]. Karrach, Ladislav, and Elena Pivarčiová. "Recognition of data matrix codes in images and their applications in production processes." Management Systems in Production Engineering 28, no. 3 (2020): 154-161.

[7]. Eleftheriou, G., Lefteris Doitsidis, Zinon Zinonos, and Savvas A. Chatzichristofis. "A fuzzy rule-based control system for fast line-following robots." In 2020 16th International Conference on Distributed Computing in Sensor Systems (DCOSS), pp. 388-395. IEEE, 2020. RoboWash: Automated laundry collection system .

[8]. Wan, Siyu. "Efficient Path Planning and Real-Time Obstacle Avoidance for Mobile Robots." In 2020 5th International Conference on Robotics and Automation Engineering (ICRAE), pp. 24-30. IEEE, 2020.

[9]. Baballe, Muhammad Ahmad, Mukhtar Ibrahim Bello, Abubakar Abdullahi Umar, A. K. Shehu, D. Bello, and Faiz Tijjani Abdullahi. "Different Types of Servo Motors and Their Applications." In 1st International Conference on Engineering and Applied Natural Sciences, pp. 974-979. 2022.

[10]. Pazil, Anis Fariza Md, Ahmed Alhasani, and Vinukumar Luckose. "Development of Autonomous Assistive Robot For Healthcare Application." Journal of Engineering & Technological Advances 7, no. 2 (2022): 23-39