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Mini Washing Machine

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Abstract: ***Day to day the demand of washing clothes is increased. In order to meet the demand, we are finding so many ways along with, it is very necessary to provide compact washing machines due to due rise in prices in the market. As there are many problems with space, this system plays an important role by offering a round plastic container as the main washing machine. Bond Tithe and Metal Sheet together provide improved structural stability and durability. During the spin cycle, the Spinner mechanism effectively drains water by using a High-Speed 12V DC Motor enclosed within a Rectangular Plastic Tub. Notably, an I.V. Infusion Set is repurposed, illustrating a resourceful approach to component sourcing.***
The prototype's complete success and its ability to spin and wash clothes efficiently prove the design's effectiveness. Space limits in urban areas are met by the small size, which is made possible by careful choice of components and materials. In general, the developed Mini Washing Machine presents an effective solution to little laundry requirements, showing an effortless combination of inexpensive components and innovative design.
Keywords: Watertight Seal, Durability, Compact

I. INTRODUCTION

Washing clothes in a fast and easy way is one of the most difficult tasks in a household. Due to emerging technologies, and advancements this proposed system mainly focuses on acquiring less space. This hardware tool has a special feature for all the customers in which the ever-evolving landscape of modern living, where space is a premium commodity, innovative solutions that seamlessly integrate convenience, efficiency, and sustainability become increasingly valuable. Among these ground breaking advancements is the Mini Washing Machine, a compact and portable appliance designed to cater to the unique needs of individuals and small households facing spatial constraints. This revolutionary appliance not only redefines the way we approach laundry but also addresses the dynamic shifts in lifestyle and living arrangements characteristic of contemporary society. This circular design not only maximizes the use of available space but also facilitates efficient washing of smaller laundry loads, addressing the specific needs of individuals living in apartments, dormitories, RVs, or other compact living spaces. The structural integrity of the Mini Washing Machine is fortified through the use of advanced adhesives like Bond Tithe, ensuring that the various components are securely fastened together.

II. LITERATURE REVIEW

This study suggests a new method which is a big-saving to mini washing machine, transmission efficiency, the use of labour saving, small size, low power consumption without the need for easy placement [1].
This paper proposes that the vibration can be reduced by decreasing the volumetric ratio, increasing the mass and increasing the inner radius of the hydraulic balancer. The main issue regarding the audible noise then becomes the harmonic content of the inverter current, which cause the audible noise [2].
Simplicity and robustness make the three-phase induction motor attractive for use in domestic appliances, including washing machine6. The torque speed characteristic of the induction motor, the normal operating point is chosen so that the slip is low, leading to higher efficiency, and also so that there is a margin of torque capability for load torque fluctuations exact fault location along with phase was detected [3].
This study tried to overcome issue of audible noise measurements indicate that if PFM is implemented in such a way that pulse positions are produced with good accuracy, important acoustic noise reduction may be achieved. A conventional washing machines would have a number of user selectable programs to take into account the type of wash, size of load and temperature. Then the machine follows the pre-set routine irrespective of what is actually happening to the clothes inside and cycle stops [4].
This paper shows the data related to specific water consumption for various brand of washing machine, consumption of electricity for various cycles are collected and the energy and water consumption are compared buzzer to alert and take immediate action on it [5].

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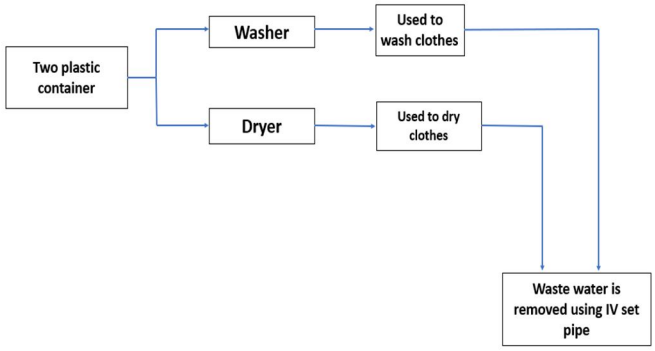
The paper focuses on detecting faults in underground cables. At the end of the spin cycle, the drum is brought to a controlled stop and the clothes can be removed. To obtain a high torque when washing, the motor is usually connected to the drum using a belt [6].
The paper discusses how motor is the main energy consuming device. Motor is not operating at all the cycle. It is idle during water fill and drain cycle, at that time motor does not consume energy. The motor operates during wash, rinse and spin process. The motor consumes more power during wash process when compared to rinse and spin process. comprehensive solution for underground cable fault detection [7].
The paper presents the rotating clothes are not evenly dispersed in the drum, resulting in significant centrifugal imbalance forces, which tend to destabilize the washer. This problem, which has been traditionally solved by adding a large concrete mass to the system, can have three modes: Translational slip, rotational slip and tip. It aims to reduce maintenance costs and improve reliability, public safety, and property values [8].
The paper introduces an innovative method of minimizing vibrations and thus reliably stabilizing the washer was also presented. This technique produces excellent results, although it may
increase the machine's production cost. It was also shown that an improved estimation of the drum angular position and velocity results in greatly reduced residual vibrations [9].
The paper presents how focuses on modelling, design and control of horizontal-axis washing machines, with emphasis on lightweight, portable appliances. It has been concluded that rotational slip can be a major problem if the washer centre of mass is not on the plane of rotation of the laundry mass [10].

III. METHEDOLOGY

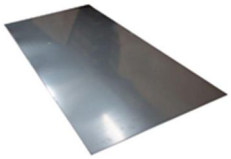


The architecture for a mini washing machine represents a powerful tool for enhancing the reliability, safety and efficiency of electrical systems. Its ability work in less space with high power empowers businesses and organizations to minimize downtime, optimize maintenance procedures, and ensure a safe and uninterrupted flow for washing their clothes.
The system works by loading a small quantity of clothes into a round plastic container, which serves as the washing drum. Water and detergent are added, and the high torque DC geared motor is activated to create a tumbling motion, effectively agitating and cleaning the clothes continuously monitoring the current and voltage of the cable. This will help the user reduce his washing time compared to other washing machines due to its small size. The use of mini washing machines can help to improve the reliability and comfort of the user. By detecting and repairing faults early, the system can prevent power outages, equipment failures, and other problems.
Components used:

1) Bond Tithe: A type of bonding agent that plays a crucial role in securely attaching different components, ensuring structural integrity and preventing leaks.

2) High Torque DC Geared Motor (For Washer): This motor is responsible for powering the washing mechanism. Its high torque allows the motor to generate the necessary force to move the washing drum, creating the agitation required for effective cleaning of clothes.

3) Metal Sheet: The metal sheet forms part of the structural framework of the mini washing machine, providing stability and support to the internal components.



4) M Seal: A type of epoxy putty or sealant that may be used for sealing joints and connections, enhancing the water-tightness of the machine.

5) Plastic Pulley: The plastic pulley is a component in the motor drive system, facilitating the movement of belts or gears.

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6) High-Speed 12V DC Motor (for Spinner): This motor is dedicated to driving the spinning mechanism. Its high speed allows for efficient removal of excess water from clothes during the spinning cycle, aiding in faster drying.

7) Rectangle Plastic Tub: The rectangle plastic tub serves as the main washing drum or container where clothes are placed.

8) I.V. Infusion Set: The I.V. infusion set is used in this project to optimize water distribution within the washing drum. It ensures that water is evenly distributed over the clothes, enhancing the efficiency of the washing process.

Algorithm:

- Set initial parameters, including water level, detergent amount, and cycle duration.
- Prompt the user to load clothes into the washing drum. Add water and detergent using the I.V. infusion set for even distribution.
- Activate the high torque DC geared motor to agitate clothes for effective cleaning during the washing cycle.
- Optionally, perform a rinse cycle to remove detergent residues. Drain the rinse water.
- Activate the high-speed 12V DC motor for spinning to remove excess water through centrifugal force.
- Use the 12V 100RPM DC motor for circuit mechanisms to control the overall operation, including cycle timings. Optionally, perform a final rinse, drain the water, and conclude the washing cycle.

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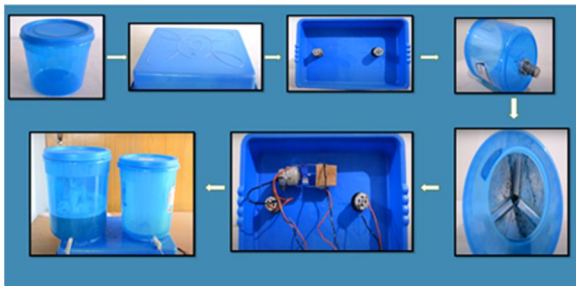
IV. RESULTS AND DISCUSSION



The Mini Washing Machine system underwent extensive analysis and research to ensure that it adheres to important design guidelines, including compactness, energy efficiency, minimal water use, and ease of maintenance. The model stands out as a comprehensive and inventive laundry solution with its unique integration of a round plastic container, high-torque DC geared motor, plastic pulley, metal sheet, M Seal, high-speed 12V DC motor, and a 12V 100RPM DC motor, in addition to the creative addition of an I.V. infusion set. It meets the needs of single people and small homes and represents a major breakthrough in small-home technology by offering a practical, effective, and environmentally friendly substitute for conventional laundry appliances.

One of the main design principles of the model is energy efficiency. The high-speed 12V DC motor and the high-torque DC geared motor were selected due to their little energy waste during operation and their effectiveness in transforming electrical energy into mechanical power.

This design choice not only contributes to cost savings for users but also positions the model as an environmentally friendly option, reducing its ecological footprint.

V. CONCLUSION

The carefully chosen high-torque DC geared motor and high-speed 12V DC motor, which minimise energy consumption and environmental effect, demonstrate the model's dedication to energy efficiency. By including a separate spinner compartment with its own motor, customers may conveniently do partial drying within the same small machine, greatly increasing efficiency. The design philosophy of the compact washing machine prioritises water saving as a response to modern environmental issues. Because of its focus on minimal water usage, the model encourages responsible living and presents itself as an environmentally friendly option for customers. The circuit mechanism's incorporation of an I.V. infusion set further highlights the entire design's attention to detail by demonstrating a dedication to control and precision during the washing process. The compact washing machine's dedication to low maintenance, enabled by robust materials and user-friendly adhesive technologies, amplifies its allure as a useful and easy-to-use device. This emphasis on longevity and simplicity in upkeep ensures a reliable and long-lasting laundry solution.

VI. FUTURE SCOPE

The suggested system aims to foster ongoing development and innovation. Compatibility with virtual assistants such as Google Assistant and Amazon Alexa is one of the advancements, making it easier for users to monitor and control their laundry. Voice commands provide the ability to start washing cycles, monitor the machine's status, and send out alerts when the laundry is finished. Overall, the future scope of Mini washing machine includes a product's life cycle, efficient recycling and repurposing programs could be established to minimize electronic waste and encourage responsible disposal practices.

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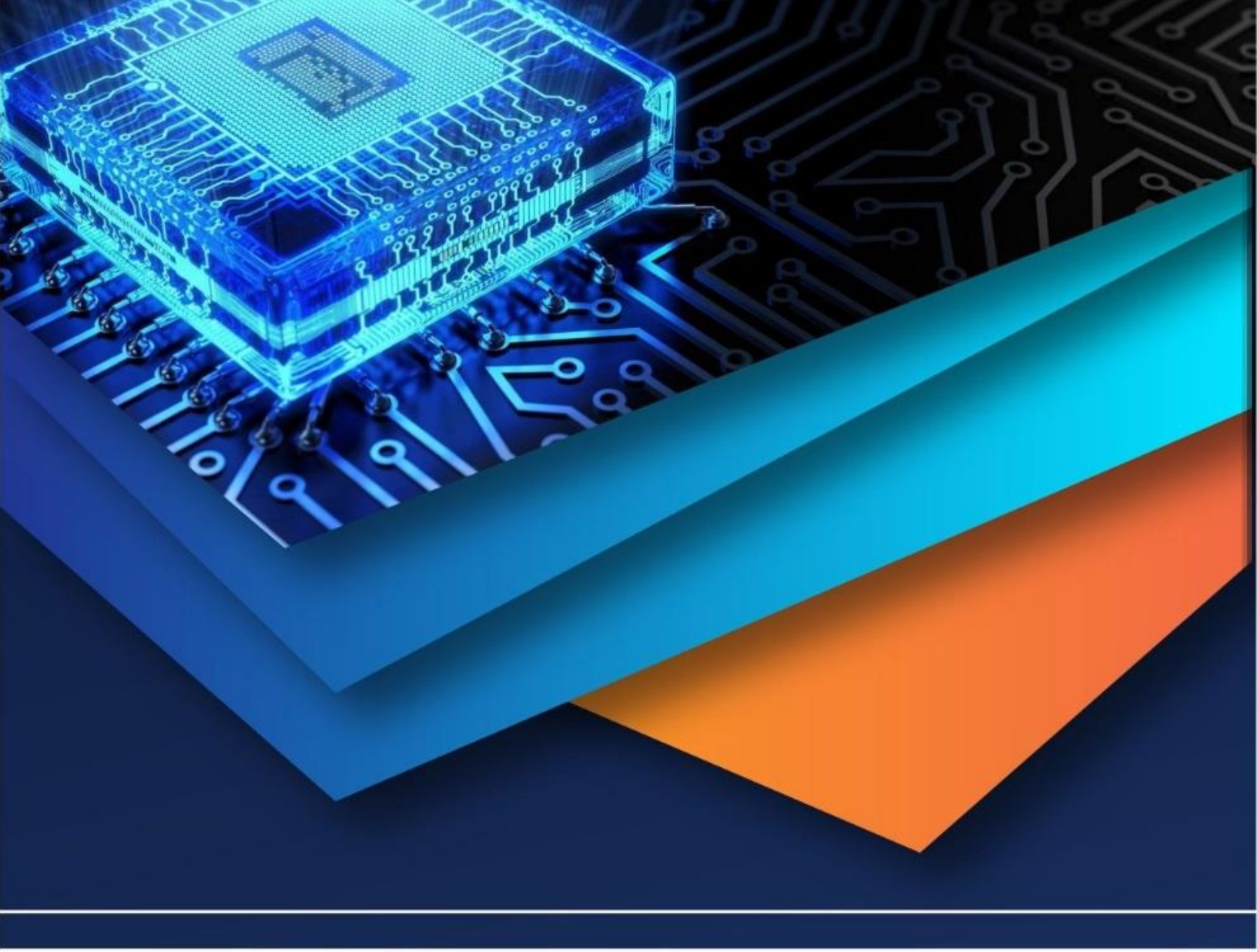

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