International Journal of Scientific Research & Engineering Trends
Volume 8, Issue 2, Mar-Apr-2022, ISSN (Online): 2395-566X

Review of AI based Automated Dishwasher

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Abstract-This review deals with the evolution of dishwasher ranging from primitive model to its complex form. The discussed review papers deals with analysis of human effort, power consumption, time consumption required for the operation of dishwasher. In this paper we tried to analyze and learn the working of dishwasher along with its future scope with an attempt to integrate with modern technologies.

Keywords- Water pump, sprinkler, water and detergent, dish, Image processing.

I. INTRODUCTION

This paper examines how we may redefine dishwashing. The automated dishwasher has made dishwashing considerably easier and more efficient. This project work was completed after researching the problems faced in washing different kinds of plates. Our observations in daily life revealed that the majority of people in our area have difficulty conducting manual dish cleaning. The detergent comprises chemical compounds, which can react with our skin. The work is focused on above issue, and an automatic dishwasher is built to assist us in washing dishes without the use of manual action. With the help of an automatic dishwasher, we can significantly address both constraints of time and human requirement. The traditional dish washing method requires a big quantity of human labor as well as a large volume of water. With this in mind, an automaticdishwasher was developed to make dish washing easier

II.WORKING PRINCIPLE

The basic working principle of this dishwasher is that the mechanical force is generated using water pump and then the solution of hot water and detergent is sprayed on dishes. This solution of hot water and detergent helps to loosen and remove oil which eventually makes the dish clean. Furthermore, cold water is sprayed to remove leftover dirt, if any. Figure I Working Of Dishwasher Here, water pump is used to generate high pressure and this high pressure water is sprayed on plates with the help of sprinkler. Water is sprayed in two cycles. In first cycle, solution of hot water and detergent is sprayed. Second cycle consists of spray of cold water. Time range of cycles depends upon number of plates to be washed. After end of two cycles, a plate are allowed to get dry in the atmosphere and thus completes the complete cleaning process of dishes.

II. LITERATURE SURVEY

1. J.HOUGHTON- "Table furniture dish cleaning machine" [1] (1850): The invention of the semi-automatic dishwasher is described in this paper. The purpose of this paper is to offer a quick overview of semi-automatic dishwashers via the perspective of design and construction. The creator created a cylindrical metal or wood container. One side of the cylinder is roughly a quarter of the way open from the top. The inside of the cylinder is made up of a vertical shaft centered on the seat and another vertical shaft rising upwards over the cylinder's top or lid. There is a hole at upper end of shaft to facilitate the pin travel , transferring rotating motion. A cylindrical post or cradle is linked to this shaft and is supported by it. The crib's diameter is less than the cylinder's diameter, allowing it to spin inside freely. Dishes and other tableware are placed along the direction of rack rotation.

Hot water is fed into the machine from above. The shaft is rotated with the help of crib. Simultaneously, the crank is twisted, and liquid is draw up with the help of buckets and sprayed onto the rack‟s surface, and this process is repeated until the contents are completely cleaned. After a few minutes of air exposure, the dishes become dry and may be removed in a ready-to-use condition.

2. J. G. COCHRAN- "Dish washing machine" [2] (1886): In this paper, a simple concept for improving a dishwashing machine is presented. It pertains to an improvement in dishwashing in which a stream of clean water is sprayed on the crate so that it rotates and brings the majority of it beneath thewater. The enhancement of designing elevation of machine and its portion is explored in this study article. The author constructed the gadget and measured the dishes. Here, divisions were custom-made to suit either the plate's cups or the saucer. The engine in it rotated the wheel while hot soap water squirted up from the bottom of the boiler and showered down on the dishes. The results indicate that the model is the first dependable hand-powered machine that cleans the dishes within the machine using water pressure rather than a scrubber.[2]

3. Odesola & Afolabi- "Design, Fabrication and Performance Evaluation of a Domestic Dish Washing Machine" [3] (2012): The purpose of this study is to explain the design, manufacture, and performance assessment of a residential dish washing machine. The goal of this project is to develop and build an efficient and easy-to-use dish washing machine. The machine was built from stainless steel and mild steel because of its availability, economy, and properties. The study's findings reveal that dishes are frequently washed by the spray of hot water, between 55 and 75°C (130 to 170 °F), to release greasy contaminants. For cleaning, a solution of water and detergent is utilized, along with clean water to eliminate the detergent residue. [3]

4. Dhale A. D.- "Design and development of semiautomatic dishwasher" [4] (2015): This paper describes the building and design of a dishwasher. The machine's output was 20 plates per minute (i.e. 1880 plates per hour). The dishwasher is well-designed and simple to use. According to observations, the washing powder used is relatively biodegradable, with no phosphates additions. As a consequence, less detergent is used, and cleaning is primarily done with water. The dishwasher's efficiency and performance were established by the rates of comparison. [4]

5. Pranali Khatake- "Design of Gears in Semi Automatic Dish Washing Machine" [5] (2016): In this work, a brief suggestion about the design of gears in a semi-automatic dishwasher is explored. Semi-automatic dishwashers are popular in India because they consume less water, take less time, and are more cost-effective. The use of a semi automatic dishwasher saves time and lowers human effort. The results indicate that semi-automatic dishwashers are frequently used because they are inexpensive; preferably, gears with belt drive are utilized for longer life and higher efficiency. [5]

6. Shilpa N. Dehedkar- "Design of basic model of semiautomatic dishwasher machine" [6] (2016): This study provides an overview and critique of the semiautomatic dishwasher machine. It also outlines the mechanisms involved in this design's dishwashing procedure. The dishwasher in this study employs a direct current motor, universal motor, conveyor belt, and microprocessor for time delay. A microcontroller controls the universal motor, direct control brush motor, and DC geared motor. The dish is first washed in the washing chamber, where it is scraped with brushes and cleansed with sodawater. It is then transferred to the next chamber and rinsed with clean water before being ejected as a fully washed dish. The results demonstrate that the model is composed of very simple materials and that the motor may be altered to make it more standard. The gadget is intended to be low-cost to operate, cost- effective, and ecologically friendly, and it may be used with no effort. [6]

7. Victor Wiley-" Computer Vision and Image Processing: A Paper Review ".[7] [2018]: This study presents a review of modern technologies as well as theoretical concepts that explain the evolution of computer vision, which is primarily related to image processing and applied to various fields. It could potentially be used in conjunction with lighting systems to make image acquisition and processing easier. The stages of image analysis are as follows.

- Image formation, in which an image of an object is captured and stored in a computer;
- Image preprocessing, in which the image quality is improved to improve image detail; and 3) image post-processing, in which the image quality is improved to improve image detail.
- Image segmentation, which is the process of identifying the object picture and separated from the background,
- Image measurement, where several significant features are quantized, and
- Image interpretation, where the extracted images are then interpreted [14]. Figure Ii. Segmentation Stages

In The Literature On Image analysis, the performance of segmentation is demonstrated using a small sample image. Annotations in large scale picture databases, on the other hand, necessitate parameter adjustments. Because computer vision advances are closely tied to image processing and machine learning, it may be applied to a broader range of studies to predict or detect object behavior and features, such as human activities and natural phenomena.[7]

III. FUTURE SCOPE

The current project works on electricity and uses the properties of water to remove dirt. Presently the project has huge commercial applications especially in Restaurants. To further reduce carbon footprints, we can try to supply renewal energy. Also, alternatives having twin properties of water can we used to realize the same results. Further to make it 'more' automated we can use robots to make above processes more democratic and efficient.

IV.CONCLUSION

On different elements of energy analysis, time consumption, and effort requirements, a comprehensive evaluation of the literature on the automatic dish washing machine was successfully completed. Dishwashing machines have been developed that are extremely efficient and easy to use. For this comparison to be legitimate, the result must be statistically significant. It has been revealed that most studies on automatic dishwashing machines focus on time, energy consumption, and effort requirements.

There is a scarcity of study on the degree of dish cleanliness, and only a few studies have been undertaken, as well as limited attempts to modernize the machine. The simulations mentioned above are just that: simulations. Many academics have undertaken analytical and experimental investigations on time, energy usage, and effort requirements. As a result, the focus of our research is on the degree of dish cleanliness and its alteration along modern lines using modern technologies.

REFERENCES

[1] J.HOUGHTON. Table-furniture cleaning machine. m. 7,865. Patented May 14, 1850.
[2] J. G. COCHRAN, Dish washing „machine. No. 355,139. Patented Dec. 28, 1886.
[3] Odesola & Afolabi- "Design, Fabrication and Performance Evaluation of a Domestic Dish Washing Machine". An International Journal of Science and Technology Bahir Dar, Ethiopia. AFRREV STECH Vol. 1 (1) Jan.- March 2012 pp.164-173
[4] Dhale A.D.-"Design and development of semi-automatic dishwasher". International Journal of Engineering Research and General Science Volume 3, Issue 3, May June, 2015 pp.108-112
[5] Pranali Khatake- "Design of Gears in SemiAutomatic Dish Washing Machine". International Journal for Scientific Research & Development Vol. 4, Issue 09, 2016 pp. 836-839
[6] Shilpa N. Dehedkar- "Design of basic model of semi-automatic dishwasher machine". National Conference On Innovative Trends in Science and Engineering (NC-ITSE'16) Volume: 4 Issue: 7 2016 pp. 18-21