IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁒ Impact Factor 8.102 ⁒ Peer-reviewed / Refereed journal ⁒ Vol. 12, Issue 5, May 2023

DOI: 10.17148/IJARCCE.2023.12575

A TECHINQUE TO IMPLEMENT A ROBOT FOR SCRAP COLLECTION

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Abstract: Scrap collecting robots are becoming increasingly important as waste management and recycling become critical environmental issues. This paper presents a comprehensive review of the literature on scrap collecting robots, focusing on recent advancements, technologies, applications, and future directions. The types of scrap collecting robots, advantages, and technologies used are discussed, including the use of sensors, artificial intelligence, and machine learning. The paper also presents the applications of scrap collecting robots in residential, commercial, industrial settings, and disaster response. The need for continued research and development is emphasized, as scrap collecting robots are poised to play a crucial role in addressing environmental challenges in waste management and recycling.

I. INTRODUCTION

Scrap collecting robots are a type of robotic system that is designed to collect, sort and transport scrap materials from different industries. These robots have sensors, manipulator arms, and conveyor belts that enable them to efficiently handle different types of scrap materials. The use of scrap collecting robots has increased significantly in recent years due to their numerous benefits, including increased productivity, reduced labor costs, and improved safety.

The collection of scrap materials is an essential process in various industries such as manufacturing, construction, and automotive. These industries generate a lot of scrap materials during their production process, and the collection of these materials can be a daunting task that requires a lot of human labor.

Scrap collecting robots are designed to collect these materials and transport them to the required locations, thus reducing the need for human labor and improving efficiency. The design and development of scrap collecting robots involve the integration of various technologies, such as sensors, manipulators, and control systems. The robots must be designed to operate in different environments and handle different types of scrap materials effectively. The performance of these robots is evaluated in laboratory settings and industrial environments to ensure their effectiveness in collecting and transporting scrap materials.

Scrap collecting robots are becoming increasingly popular in various industries due to their ability to improve productivity, reduce labor costs, and improve safety. These robots can work continuously without the need for breaks or rest, reducing the time required for scrap collection. Additionally, scrap collecting robots can handle hazardous materials, reducing the risk of injury to workers.

II. TECHNOLOGY

Sensors: Scrap collecting robots are equipped with various sensors such as infrared, ultrasonic, and laser sensors to detect scrap materials. These sensors are used to determine the location, distance, and size of the scrap materials.

Manipulator arm: Most scrap collecting robots are equipped with a manipulator arm that is used to pick up scrap materials. The manipulator arm may have various degrees of freedom and may be equipped with grippers or other tools to handle different types of materials.

Computer vision: Some scrap collecting robots use computer vision techniques to detect and recognize scrap materials. This may involve image processing algorithms, machine learning, or neural networks.

Navigation systems: Scrap collecting robots are equipped with navigation systems that allow them to move through complex environments and avoid obstacles. These navigation systems may include GPS, inertial sensors, and machine vision.

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Sorting mechanisms: Some scrap collecting robots are equipped with sorting mechanisms that can separate different types of materials. These mechanisms may use techniques such as magnetic separation or air flow to sort materials.

Wireless communication: Some scrap collecting robots are equipped with wireless communication systems that allow them to be remotely monitored and controlled. This allows operators to monitor the robot's performance and adjust its operation as needed.

III.WORKING PRINCIPAL

In the project design and components of the microcontroller-based robot. The important components of this robot are DTMF decoder, PIC17F2 Microcontroller and motor driver. DC Motors controlled by the motor driver is connected to a rotating shaft of sheet metal. A rechargeable Internet Protocol (IP) Camera is used for live streaming of the robot. The Microcontroller is associated with crystal oscillator, controlled power supply, resistors and motor drivers.

The robot is controlled by a mobile phone which makes call to the mobile phone attached to the robot. During the call duration, if any button is pressed, a tone corresponding to the button pressed is heard at the other end of the call. This tone is called Dual Tone Multi Frequency (DTMF). The robot receives this DTMF tone with the help of phone stacked in the robot.

The received tone is processed by the PIC16F72 Microcontroller with the help of DTMF decoder which decodes the tone toits equivalents binary digit and this binary number is send to the microcontroller. The microcontroller is preprogrammed to take a decision for any given input and outputs decision to motor drivers in order to drive the motors for forward or backward motion or a turn.

This robotic project does not require the construction of receiver and transmit unit as the mobile phone that makes call to the mobile phone stacked in the robot acts as a remote. Following the directions from the DTMF, the micro controller insists the motor driver to drive the DC Motor connected to the power supply which moves the 4 wheeled robot with rotating shaft with sheet metal collecting the scrap from the surfaces into one spot. The robot can perform actions like moving forward, backwards, left, right and stop.

In DTMF there are 16 distinct tones. Each tone is the quantity of two frequencies: one from a low and one from a high-frequency group. There are four dissimilar frequencies in each collection.

IV.BLOCK DIAGRAM

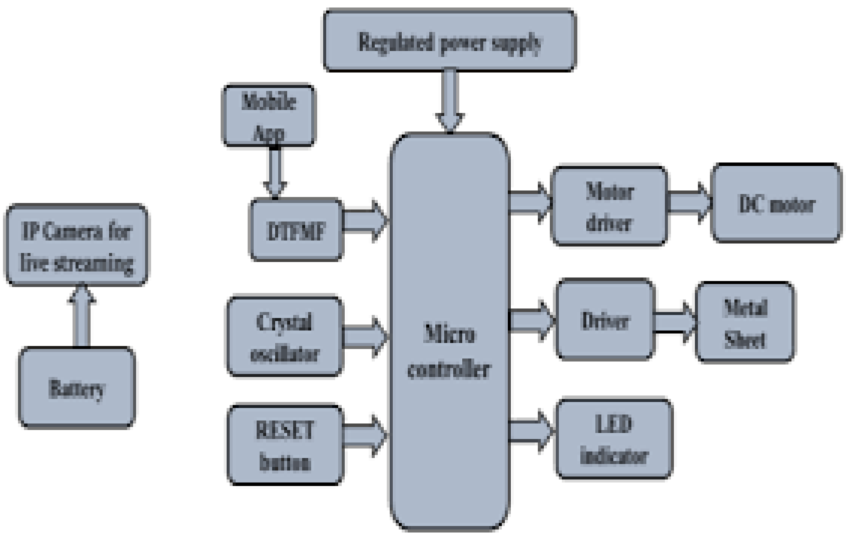

Figure 1.1 :Block Diagram

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V.ADVANTAGES

Efficiency: Scrap collecting robots can work continuously without getting tired, which increases efficiency and productivity. They can also work in hazardous environments, such as areas with toxic fumes or sharp objects, where human workers may not be able to work safely.

Cost-effective: Scrap collecting robots can work around the clock without the need for breaks or rest, which reduces labor costs. They also have the potential to increase the yield of scrap materials collected, which can result in higher profits.

Precision: Scrap collecting robots can be programmed to perform precise movements, which can result in better accuracy and consistency in the collection and sorting of scrap materials.

Safety: Scrap collecting robots can improve safety by reducing the risk of injuries to workers. They can work in hazardous environments, handle sharp objects, and perform other dangerous tasks, which reduces the need for human intervention.

Environmental benefits: Scrap collecting robots can help reduce the amount of waste in landfills and promote recycling. They can collect and sort materials that can be reused, which reduces the environmental impact of waste disposal.

Flexibility: Scrap collecting robots can be programmed to perform different tasks and adapt to different environments. They can be customized to handle different types of materials, and their operations can be adjusted as needed to meet changing production demands.

CONCLUSION

scrap collecting robots are becoming increasingly popular in industrial and commercial settings due to their efficiency, precision, safety, and cost-effectiveness. They can handle hazardous materials and work continuously without getting tired, which improves productivity and reduces labor costs. Scrap collecting robots can also promote recycling and reduce waste in landfills, which has environmental benefits. With advances in technology, scrap collecting robots are likely to become even more sophisticated and customizable in the future, allowing them to handle an even wider range of materials and perform more complex tasks. Overall, scrap collecting robots have the potential to revolutionize the way we collect and manage scrap materials in the future.

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