

# AUTOMATED NURSING ASSISTANT

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### ABSTRACT

In modern healthcare facilities, optimizing nursing efficiency and reducing manual workload are critical challenges. This project presents an Automated Nursing Assistant, a smart nursing trolley designed to autonomously navigate hospital wards and deliver essential supplies to patients based on priority. The system utilizes ESP32 microcontrollers for communication and A\* pathfinding with waypoints for efficient navigation.

### INTRODUCTION

In modern hospitals, nurses and healthcare staff often face challenges in managing time-sensitive patient needs while also handling routine tasks such as food delivery and supply distribution. To improve efficiency and reduce manual workload, this project introduces an Automated Nursing Assistant—a smart nursing trolley that autonomously navigates hospital wards using ESP32 microcontrollers and A\*pathfinding . The trolley operates in three distinct modes: (1)Routine Mode: Moves to each room in a serial order to deliver supplies at scheduled times. (2)Directed Mode: Moves to a specific room to deliver requested supplies. (3)Priority Mode: Responds to multiple patient needs and deliver the supplies based on prioritizing the requests . The trolley comes to the nursing room after executing all the task.The system utilizes A\* way point pathfinding for optimized navigation between waypoints and room.A buzzer alert system notifies both patients and nurses when the trolley arrives at the destination. By automating routine tasks and optimizing supply delivery, this project aims to enhance hospital efficiency and improve patient care.

### CIRCUIT DIAGRAM

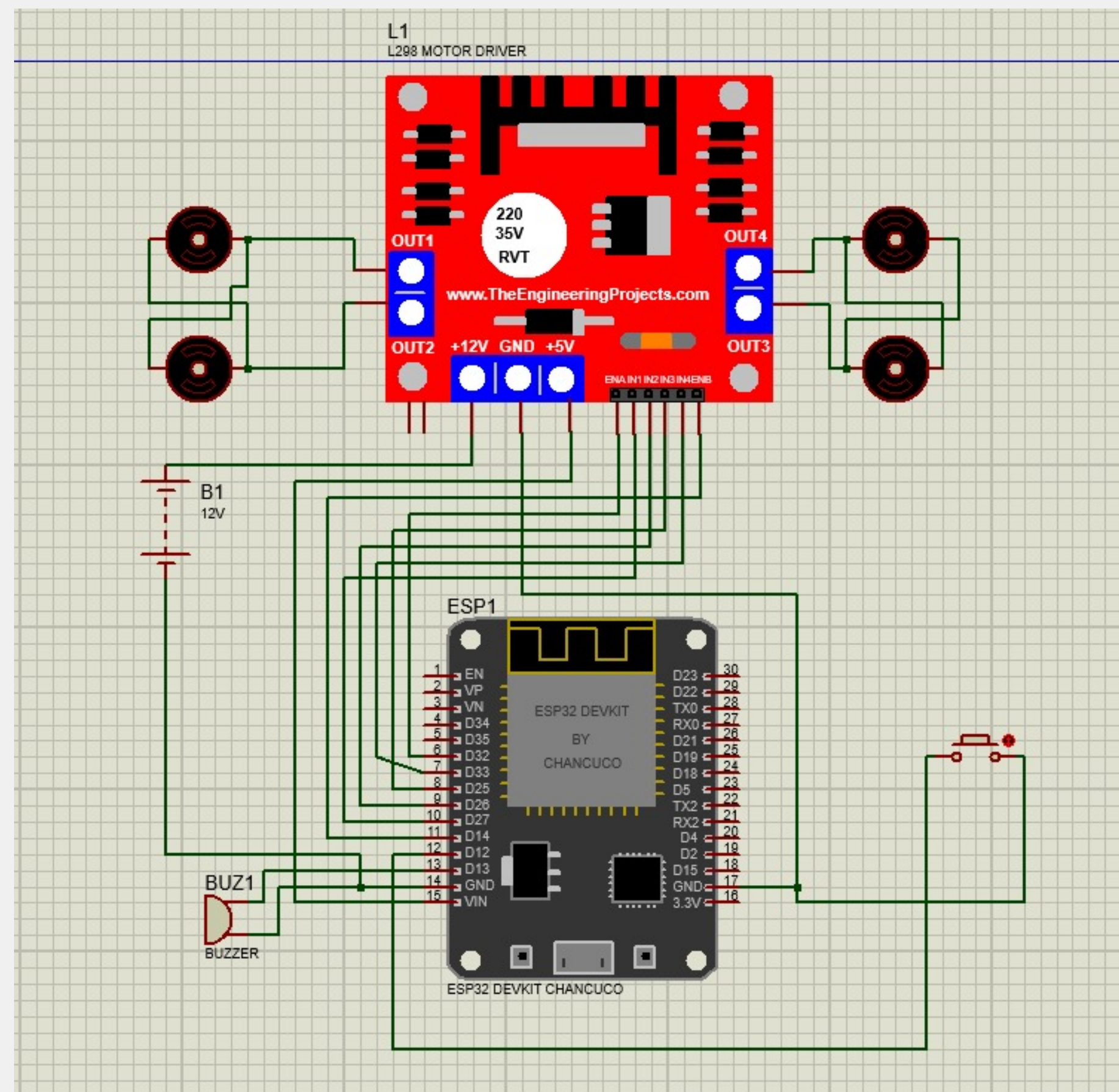


Figure 1:Circuit diagram of Automated Nursing Assistant

### BLOCK DIAGRAM

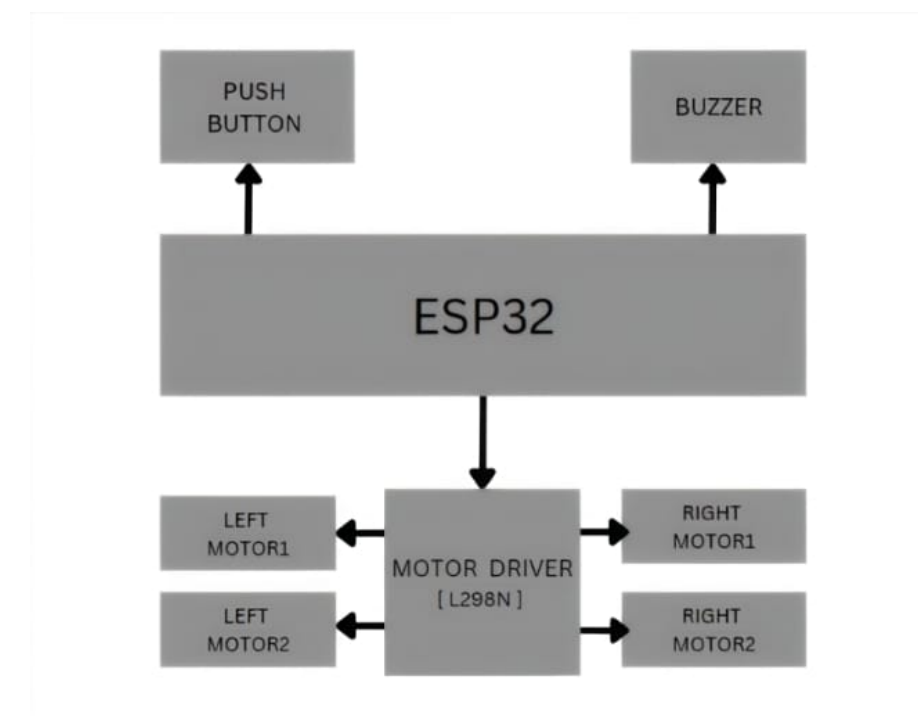


Figure 2:Block Diagram of Automated Nursing Assistant

### COMPONENTS USED

ESP32 Devkit  
L298N Motor Driver  
DC Motors and Wheels  
LED  
Push Button  
3.7V Battery  
Buzzer  
Plastic storage rack

### METHODOLOGY

**Literature Survey:**Review existing research and literature on available autonomous nursing devices.

**Data collection:**Collect necessary data related to its use and compatability.

**Data Analysis:**Analyse useful data and develop an ideal algorithm for the proposed idea.

**Algorithm Development:** Develop an algorithm to develop nursing assistant with smart path navigation.

**Validation and Testing:** Validate the algorithm.

**Deployment:**Integrate the system into a prototype Evaluate the effectiveness of the system and refine algorithm if needed and created a finished product.

### FEATURES OF AUTOMATED NURSING ASSISTANT

- Autonomous Navigation :** Uses the A\* algorithm to move to predefined room locations and return to the control room.
- ESP32-Based Wireless Communication :** Enables remote operation and monitoring via Wi-Fi.
- Motorized Movement :**Controlled by an L298N motor driver and DC motors for smooth and precise motion.
- Buzzer Alert System :**Notifies staff upon reaching the destination.
- Push Button Operation :**Allows to perform Routine task.
- Blynk IoT Integration :**Provides real-time monitoring and control through a cloud-based dashboard.
- Automated Delivery System :** Transports food, medicine, and laundry without human intervention.

### HARDWARE IMPLEMENTATION



Figure 3:Hardware Setup of Automated Nursing Assistant

### PROJECT SUMMARY

The Automated Nursing Assistant robot represents a significant advancement in healthcare automation, designed to assist nurses by efficiently handling medicine and supply deliveries in hospitals. By leveraging waypoint-based navigation and the A\* pathfinding algorithm, the robot ensures precise movement and optimal route selection. It operates in three modes: Routine Mode– Executes scheduled medicine deliveries. Priority Mode – Responds to multiple requests by prioritizing the requests Directed Mode – Delivers items directly to requested rooms. With its ability to dynamically process and prioritize multiple requests, the robot enhances hospital workflow efficiency while reducing the workload on nurses. In conclusion, the development and functionality of the Automated Nursing Assistant demonstrate the potential of robotics to improve patient care and hospital management. Continued advancements in this field hold promise for further enhancing automation in healthcare and optimizing nursing resources.

### RESULT

The Automated Nursing Assistant has successfully demonstrated the potential of robotics in healthcare by efficiently managing deliveries and patient requests. Through its three operational mode. The robot has proven to be a reliable and efficient assistant, significantly reducing the workload of nurses. By integrating waypoint-based navigation with the A\* algorithm, the system ensures precise movement and optimal task execution, even when handling multiple requests simultaneously. The project has shown that automation in hospitals can enhance efficiency, reduce response time, and improve patient care.

### References

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