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 1, March 2024

IOT Based All-in-One Robot (Agent-Eye)

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Abstract*: Agent-Eye is a versatile project that involves creating a robotic system for surveillance or reconnaissance purposes. The key components typically include a mobile robot platform, camera(s), sensors for detecting mines in military, and a communication module It uses commands to move car in front, back and left right directions. Whatever is recorded by the camera can be viewed in Mobile/PC for reference. There is a metal detector sensor is used for detecting bomb/mines in war. The servo motor is used to rotate wheels of robot car. Using Arduino we implement the logic of move car in directions like forward, backward, right and left*
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Keywords: Night petroleum robot, all-in-one robot, IOT based robot for military defense system, agent eye robot

I. INTRODUCTION

The Wi-Fi receiver at the vehicle is used to transmit control movement data from app to vehicle. For controlling robot there are commands such as Forward, Backward, Right, and Left. The metal detector is inserted, which helps to detect metal ornaments and mine objects. There is camera which is inserting in the robot which helps to capture criminal activities which took place at night. We can use robot for night petroleum. The robot can be used for defense purpose. The robot is a combination of hardware and software.

II. METHODOLOGY

Project The development of the Visual Impaired Voice Assistant will involve the following methodology:

Define Project Objectives:

- Clearly outline the goals of your night petroleum robot. Specify the tasks it should perform, such as monitoring pipelines, inspecting equipment, or handling specific petroleum related operations
- Testing and Evaluation: The testing and evaluation phase will involve testing the Assistant in real-world scenarios to assess its effectiveness and usability
- The testing will be conducted with visually impaired users, and feedback will be gathered to identify areas of improvement and to enhance the functionality and usability of the Assistant.

Market Research

- Conduct research on existing solutions and technologies in the market.
- Identify potential competitors and understand their strengths and weaknesses.
- Analyse user needs and preferences.

System Architecture Design:

- Define the overall architecture of your IOT-based system.
- Identify the hardware components (sensors, actuators, and controllers) and their specifications.
- Plan the communication protocols and data flow within the system.

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Hardware Selection and Integration:

- Choose the appropriate microcontroller or single-board computer for your Night Petroleum Robot.
- Select sensors for detecting darkness, obstacles, and other relevant parameters.
- Integrate actuators for movement and any other necessary hardware.

Software Development:

- Develop the firmware for the microcontroller or single-board computer.
- Implement algorithms for obstacle avoidance, navigation, and any other required functionalities.
- Create a user interface for remote monitoring and control.

IOT Connectivity:

- Implement communication protocols for IOT connectivity.
- Set up a cloud platform to store and analyse data.
- Ensure secure data transmission and storage.

Power Management:

- Design an efficient power management system to ensure the robot's autonomy.
- Implement features such as sleep mode to conserve energy when not in use

Testing and Validation:

- Conduct thorough testing of individual components and the integrated system.
- Test the Night Petroleum Robot in different environments and scenarios.
- Validate that it meets the specified requirements and objectives

III. LITERATURE REVIEW

Autonomous robotic systems are increasingly recognized for their potential in enhancing safety, efficiency, and reliability during tasks such as monitoring, inspection, and maintenance in petroleum-related environments. Existing research emphasizes the integration of advanced sensing technologies, including night vision and infrared sensors, to enable robots to navigate and operate effectively in low-light or dark conditions. Communication systems play a crucial role in facilitating real-time remote control and data transfer, ensuring seamless interactions between operators and robots during nighttime operations. Navigation algorithms and control systems are addressed to ensure precise and reliable robot movements, even in complex industrial environments. As the field progresses, researchers acknowledge the importance of compliance with regulatory standards and highlight potential avenues for future research to further optimize the capabilities of night petroleum robots.

IV. DETAILS OF DESIGNS, WORKING AND PROCESSES

Implement metal sensors for detecting mines. Enable wireless communication for remote control and data transfer. Include DC motors for movement and servo motors for precise control. Choose a suitable power source, considering the power requirements of motors, sensors, and the processing unit. It could be rechargeable batteries or a combination of batteries and external power. Design a chassis that accommodates all components securely. Consider the type of locomotion (wheels, tracks, and legs) based on the application. Develop control algorithms for motor control, navigation, and obstacle avoidance. Implement PID controllers or other relevant algorithms. Choose an IOT monitoring. This could be a mobile app or a web-based interface. Implement efficient power management to extend the robot's operating time Document the design, schematics, and code

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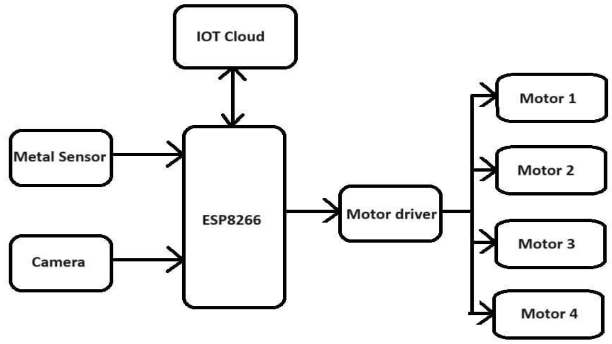

FIG 1.1 DFD Level

The implementation of an IOT-based Night Petroleum Robot involves the integration of hardware and software components to create a smart and autonomous system for night time petroleum inspection. At the core of this implementation is the selection and setup of appropriate hardware, including microcontrollers or single-board computers, sensors such as light sensors and obstacle detectors, and actuators like motors and wheels. The firmware for the microcontroller is programmed with algorithms that enable the Night Petroleum Robot to navigate and detect low-light conditions indicative of night time

FIG. 1.2 Model

V. CONCLUSION

The utilization of high-resolution cameras, infrared sensors, and intelligent data processing empowers the robot with enhanced vision capabilities, enabling it to navigate and inspect petroleum facilities even in low-light conditions. The inclusion of environmental sensors ensures real-time monitoring of factors such as temperature and gas levels, contributing to the safety of both personnel and infrastructure. The IOT architecture implemented in this robotic system facilitates remote monitoring and control, providing operators with instant access to critical data and the ability to make informed decisions from a distance. The wireless communication modules ensure seamless connectivity, enabling the robot to relay information in real-time to a centralized control system or cloud platform. Moreover, the incorporation of machine learning algorithms allows the Night Petroleum Robot to learn and adapt to its surroundings. This capability proves invaluable in identifying anomalies, potential hazards, or irregularities during night time operations, contributing to the overall risk mitigation strategy of petroleum facilities. With a robust chassis design, energy-efficient power management, and an intuitive user interface, this IOT-based robot stands as a versatile tool for surveillance, inspection, and monitoring activities in the petroleum industry during the night. As technology continues to advance, the Night Petroleum Robot serves as a testament to the innovative solutions that can be achieved through the convergence of robotics, IOT, and artificial intelligence, ultimately contributing to safer and more efficient night time operations in the petroleum sector.

VI. ACKNOWLEDGMENT

We extend our heartfelt gratitude to Mr. Anup D. Sonawane HOD of the Department of Information Technology, for his invaluable guidance and constant support throughout our research project. Mr. Anup D. Sonawane great expertise and intense knowledge were important to the project's success. His perceptive guidance steered us through various challenges and significantly contributed to the project's successful completion. Their support, dedication, and valuable contributions greatly enriched our research endeavors; promote an environment of teamwork and innovation. We acknowledge and appreciate the contributions of all individuals involved, whose collective efforts have made this project possible. Their commitment to excellence and collaborative spirit has been instrumental in advancing our research objectives.

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