AUTONOMOUS ENVIRONMENT MONITORING USING IOT FOR INDOOR DATA COLLECTION VIA AMR

A Project report submitted to Jawaharlal Nehru Technological University-GV in partial fulfilment of the requirements for the award of degree of

BACHELOR OF TECHNOLOGY

In

ELECTRONICS AND COMUNICATION ENGINEERING

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DEPARTMENT OF

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AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

(Approved by A.I.C.T.E, Permanently Affiliated to JNTU-GV, AP)

(A NAAC A+ Accredited Institution)

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CERTIFICATE

This is to certify that the project entitled **"AUTONOMOUS ENVIORNMENT MONITORING USING IOT FOR INDOOR DATA COLLECTION VIA AMR"** in partial fulfilment for the of degree of Bachelor of technology in Electronics and Communication Engineering, at AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, **MAKAVARAPALEM, VISAKHAPATNAM** is an bonified work carried out by R. SWETHA SREE(20811A0462), P.LAHARI (20811A0456), V.TARUN KUMAR (20811A0472), Y.BALESWAR REDDY(20811A0479) Under the guidance and supervision during 2023-2024.

INTERNAL GUIDE

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ABSTRACT

Autonomous Environment Monitoring Using IoT is a project aimed at gathering indoor data autonomously through an AMR (Autonomous Mobile Robot). Leveraging IoT (Internet of Things) technology, the AMR is equipped with sensors to collect environmental data such as temperature, humidity, and air quality. The robot navigates through indoor spaces, systematically collecting and transmitting data to a central server for analysis and visualization. This innovative approach to environment monitoring enables real-time insights into indoor conditions, facilitating proactive decision-making and enhancing overall environmental quality and safety. Machine Learning (ML) techniques on the other hand are more robust in capturing the dynamics in the environment. In this paper, a novel approach is proposed to build a cost-effective standardized environment monitoring system (IoT-EMS) in volunteer computing environment. In volunteer computing, the volunteers (people) share their resources for distributed computing to perform a task (environment monitoring). The system is based on the Internet of Things and is controlled and accessed remotely through the Arduino platform (volunteer resource). In this system, the volunteers record the environment information from the surrounding through different sensors. Then the sensor readings are uploaded directly to a web server database, from where they can be viewed anytime and anywhere through a website. Analytics on the gathered time-series data is achieved through ML data modeling using R Language and RStudio IDE. Experimental results show that the system is able to accurately predict the trends in temperature, humidity, carbon monoxide level, and carbon dioxide. The prediction accuracy of different ML techniques such as MLP, k-NN, multiple regression, and SVM are also compared in different scenarios.