VISVESVARAYA TECHNOLOGICAL UNIVERSITY BELAGAVI,KARNATAKA-590014

A PROJECT REPORT ON

Hierarchical Energy Efficient Secure Routing Protocol for Optimal Route Selection in Wireless Body Area Networks

Submitted in partial fulfilment for the award of Degree of,

BACHELOR OF ENGINEERING

IN

INFORMATION SCIENCE AND ENGINEERING

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2023-24

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CERTIFICATE

This is to certify that the project entitled **"Hierarchical Energy Efficient Secure Routing Protocol for Optimal Route Selection in Wireless Body Area Networks"** has been successfully completed by

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The bonafide students OF **DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING, Alva's Institute of Engineering and Technology**, Moodbidri affiliated to **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the academic year 2023–24. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed in partial fulfillment of awarding Bachelor of Engineering degree.
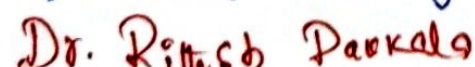
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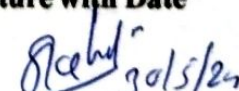**Assistant Professor**
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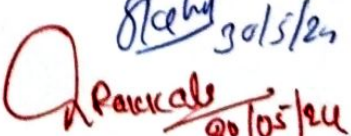
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ABSTRACT

The advancement of technology has significantly enhanced comfort in both domestic and professional settings. However, this progress fell short during the COVID-19 pandemic and other health monitoring scenarios due to unaddressed Quality of Service (QoS) network parameters such as throughput, reliability, and security. Therefore, there is an urgent need for advanced remote health monitoring systems, especially for patients recovering from surgery, bedridden individuals, and those with autism. These systems must monitor postural changes and transmit data to caregivers in hospitals through Wireless Body Area Networks (WBANs).

Given the critical nature of health data, ensuring its security is vital. In response, we propose a Hierarchical Energy Efficient Secure Routing (HEESR) protocol. This protocol categorizes body sensor nodes into direct and relay nodes based on a threshold value. Unlike conventional protocols, HEESR selects cluster heads based on energy levels and data traffic priority, differentiating between critical and non-critical information.

The protocol identifies optimal data transmission routes, compresses data using Huffman encoding, and secures it with an asymmetric cryptographic algorithm. HEESR improves security and routing efficiency through a hierarchical structure and data prioritization. It surpasses conventional routing protocols, achieving a 6% improvement in energy consumption, 92% throughput, and 93% security, thereby balancing the packet drop rate and ensuring timely data delivery.