IOT-BASED CONDITION MONITORING AND ALERT SYSTEM FOR SPLIT HVAC SYSTEMS AND GAS LAUNDRY DRYERS

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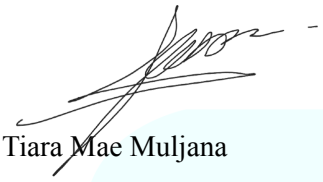
STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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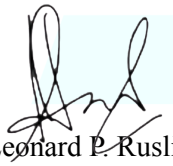

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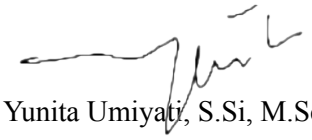

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ABSTRACT

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This thesis presents an IoT-based condition monitoring system for split HVAC units and gas laundry dryers which still rely on reactive maintenance. In this approach, performance degradation often goes unnoticed, leading to downtime and inefficient energy consumption. To solve this, a modular sensor node was developed to continuously track key operating conditions such as cycle behavior, ignition events, temperature variation, and power consumption, enabling Condition-Based Maintenance (CBM). Providing calibration process and accurate sensor accuracy reducing data disparities to 1.04% by using relative calibration and current sensor accuracy with a maximum error percentage of 2.8%. The system provides real-time monitoring through a web dashboard and Discord alerts and automatically sends maintenance notifications when issues are identified by Statistical Process Control (SPC) monitoring. The platform is also designed for scalability, supporting multiple appliances, offline data buffering, sensor calibration, and multi-node deployment.

Keywords: Internet of Things (IoT), Condition-Based Monitoring (CBM), Alert System, Split HVAC, Gas Dryer.

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DEDICATION

I dedicate this work to God, my family, friends, and the progress of Indonesia.

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