**NETWOKK FAULT DETECTION AND DIAGNOSIS OVER A NETWORK AND NETWORK INFRASTRUCTURES**

**A PROJECT WORK WAS CARRIED OUT**

**BY**

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**Signature Date**

**DEDICATION**

This study is wholeheartedly dedicated to my beloved parents who have been supportive emotionally, financially, spiritually, a source of inspiration and strength.

To my siblings, course mates, friends and all those who have contributed positively to me.

My deepest gratitude goes to Almighty Allah who has provided all that was needed to complete this project and the program for which it was undertaken for.

**CERTIFICATION**

This is to certify that this project work was carried out by **Raji-Shittu, A. Babatunde**, for the fulfillment and award of MSc. Computer Science.

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**Student`s Signature) Date.**

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**Prof. Aribisala, B.S.**

**(Supervisor`s Signature) Date**

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**ATTESTATION**

I, **RAJI-SHITTU, ABDULWAHEED BABATUNDE,** with matriculation number 03-05-AV-01018**,** do hereby declare that this research work titled: **(NETWOKK FAULT DETECTION AND DIAGNOSIS OVER A NETWORK AND NETWORK INFRASTRUCTURES)** was carried out by me under the supervision of Professor Benjamin Aribisala in the Department of Computer Science.

I further declare that the study is my original work and I have not infringed the copyright of any person’s paper, study or dissertation.

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**(Supervisor`s Signature) Date**

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**ABSTRACT**

Networks and network infrastructures are the lifelines of modern information technology systems, enabling seamless data flow and communication across various sectors. Ensuring the reliability and availability of these networks is paramount for uninterrupted operations. Fault detection and diagnosis methodologies play a pivotal role in achieving this goal. This study conducts a comprehensive evaluation of fault detection and diagnosis methodologies within network and network infrastructure management. It assesses the effectiveness of various methods, including active monitoring, passive monitoring, threshold-based techniques, and machine learning-based approaches, in diverse network scenarios. The research objectives are to identify methodological strengths and weaknesses, explore performance variability across scenarios, and provide practical insights and recommendations for network practitioners. Key findings indicate that method selection should be driven by specific network characteristics and operational goals, emphasizing the need for tailored approaches. Machine learning-based models show promise but require thorough optimization and continuous monitoring. Passive monitoring exhibits reduced false positive rates, provided anomaly detection algorithms are regularly fine-tuned. Threshold-based techniques offer precision but may face challenges in dynamic network environments. Hybrid approaches that combine multiple methods enhance fault management by providing redundancy and robustness. Ongoing optimization, data-driven decision-making, and collaboration among network management teams are essential for effective fault detection and diagnosis. The study identifies future research directions in machine learning optimization and anomaly detection refinement. This research contributes to the field of network management and infrastructure reliability by offering actionable recommendations. It empowers network administrators, operators, and researchers to make informed decisions, improve network resilience, and minimize false positives. In an era of evolving network complexities, this study supports the seamless functioning of critical services and the protection of sensitive data.