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THESIS

To obtain the diploma of **Master's Degree**

Field of Study: **Computer Science**

Specialization: **Information Systems Engineering (ISI)**

Mobility Management and Handover Optimization for 5G Enabled IoT Architectures

Presented by

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In front of the jury composed of

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Abstract

With the rapid evolution of mobile networks toward 5G and beyond, efficient mobility management remains a critical challenge, particularly in heterogeneous network (HetNet) environments characterized by frequent handovers and diverse user requirements.

This report presents the design, simulation, and comparative evaluation of an enhanced Context-Aware Handover Optimization (CAHO) algorithm developed for improved mobility control in 5G networks.

The CAHO algorithm dynamically integrates multiple decision metrics including signal strength (RSRP), cell load, user velocity, SINR, and application-level QoS requirements to enable robust, energy-efficient, and ping-pong-free handovers. Using a Python-based discrete event simulator, the proposed CAHO approach is benchmarked against the Auto-Tuning Optimization (ATO) algorithm and other baseline methods such as threshold-based and load-aware schemes.

Simulation results demonstrate that CAHO significantly reduces unnecessary handovers and energy consumption while maintaining seamless connectivity, particularly under variable speed conditions. This work highlights the potential of context-aware, adaptive algorithms in enhancing mobility robustness for next-generation networks.