A Multifunctional Smart Home System Model

Lường Thế Hoàng
Thai Nguyen University of Information and Communication Technology
Thai Nguyen University, Thai Nguyen, Vietnam
student548@ictu.edu.vn

***Abstract*—This undergraduate thesis investigates a multifunctional smart-home control model. Home automation can join sensor readings and remote control of household devices in one interface. The author designs a small hardware model with a Wi-Fi microcontroller, sensor input, display, Firebase connection, and device-control logic. The manuscript includes system diagrams, implementation notes, and source code. The conclusion reports that the current model meets its basic device-control requirement. Camera monitoring, burglary and fire alerts sent to an application, dimming, fan-speed adjustment, and control of larger equipment are proposed upgrades rather than demonstrated results. The work is a model, not evidence of a full household installation. Electrical safety, reliable connectivity, access control, and response to sensor or power faults would need explicit evaluation before use with real appliances. The contribution is a documented student study or prototype whose stated scope can guide further testing.**

***Index Terms*—smart home, embedded control, Firebase, sensors**

I. Introduction

Home automation can join sensor readings and remote control of household devices in one interface. This thesis investigates a multifunctional smart-home control model. It begins from a practical engineering need and explains the technologies and workflow chosen for the case. The objective is to document a student implementation or comparative investigation, together with the evidence available in the manuscript. Broader operational or economic effects require separate measurements and are not assumed from the existence of a prototype [1]. Earlier ICTU student work on related designs is included here for context [2], [3], [4]. Related published studies provide context for the subject and methods [5], [6], [7], [8], [9], [10]. These contextual works were selected for this English summary; they are not asserted to appear in the original thesis bibliography.

II. Methods

The author designs a small hardware model with a Wi-Fi microcontroller, sensor input, display, Firebase connection, and device-control logic. The manuscript includes system diagrams, implementation notes, and source code. The source is summarized through its stated design, implementation material, examples, and conclusion. Features shown in the manuscript are distinguished from proposals for later development. This review does not add a new experiment, fill missing measurements with estimates, or treat a planned capability as an observed result. The source thesis remains the provenance for the reported work [1].

Supervisor: Nguyễn Thị Bích Điệp, Thai Nguyen University of Information and Communication Technology (ntbdiep@ictu.edu.vn).

III. Results

The conclusion reports that the current model meets its basic device-control requirement. Camera monitoring, burglary and fire alerts sent to an application, dimming, fan-speed adjustment, and control of larger equipment are proposed upgrades rather than demonstrated results. The report's screens, configurations, examples, or measurements constitute the evidence for this summary. A capability described only as a design intention is not counted as a validated operational outcome. No additional performance, adoption, financial, or safety figure has been introduced here. The result is interpreted within the scope of the student's documented setup [1].

IV. Discussion

The work is a model, not evidence of a full household installation. Electrical safety, reliable connectivity, access control, and response to sensor or power faults would need explicit evaluation before use with real appliances. A later build could test each connected device under safe loads, document network and power failures, and measure response time and control reliability. These limitations affect how the evidence should be read. The current manuscript can support understanding of the design and reported demonstration, while independent tests would be needed for stronger claims. Any later deployment should document its environment and separate observed outcomes from intended benefits [1].

V. Conclusion

The thesis documents a multifunctional smart-home control model. The conclusion reports that the current model meets its basic device-control requirement. Camera monitoring, burglary and fire alerts sent to an application, dimming, fan-speed adjustment, and control of larger equipment are proposed upgrades rather than demonstrated results. The work is a model, not evidence of a full household installation. Electrical safety, reliable connectivity, access control, and response to sensor or power faults would need explicit evaluation before use with real appliances. A later build could test each connected device under safe loads, document network and power failures, and measure response time and control reliability. Accordingly, the present contribution is a source-grounded account of the student work and its tested or illustrated scope. Claims about

broader effectiveness should be assessed in later work using explicit evaluation conditions [1].

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