PROJECT REPORT - INTER DISCIPLINARY

AI-INTEGRATED HOME AND COMMUNITY PROTECTION SYSTEM

SUPPORT SDG 11

(PROJECT PHASE- II)

*submitted in partial fulfillment of the requirements*

*for the award of the degree in*

**BACHELOR OF TECHNOLOGY**

By

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**APRIL 2025**



**DEPARTMENT OF CIVIL ENGINEERING & COMPUTER SCIENCE ENGINEERING**

**BONAFIDE CERTIFICATE**

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# DECLARATION

We **PIOUS NIRANJAN A (211051101615), DHANUSH RAJ N (211051101005), THANUSH K (211191101159), SANTHOSH R (211191101131)** hereby declare that the Project Report (Project Phase-II) entitled **“****AI-Integrated Home and Community Protection System Support SDG 11”** is done by us under the guidance of **Dr.V.PRIYADARSHINI, Associate Professor & Mrs.A.MAHESWARI, Asst.Professor & Deputy HOD** is submitted in partial fulfillment of the requirements for the award of the degree in BACHELOR OF TECHNOLOGY in Civil Engineering & Computer Science Engineering.

# DATE:

# PLACE:

# SIGNATURE OF THE CANDIDATE(S)

# ACKNOWLEDGEMENT

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**Thiru**.**Dr. A.C.SHANMUGAM, B.A., B.L.,** President **Er. A.C.S.Arunkumar, B.Tech., M.B.A.,** and Secretary **Thiru A.RAVIKUMAR** for all the encouragement and support extended to us during the tenure of this project and also our years of studies in his wonderful University.

We express my heartfelt thanks to our Vice Chancellor

**Prof. Dr. S. GEETHALAKSHMI** in providing all the support of my Project (Project Phase-II).

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# LIST OF ABBREVIATIONS

**AI** Artificial Intelligence

**NLP** Natural Language Processing

**IoT** Internet of Things

**SDGs** Sustainable Development Goals

**MQTT** Message Queuing Telemetry Transport

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**ABSTRACT**

Safety in the community is still a major issue in smart city planning, with growing issues of theft, fire risks, gas leaks, and delayed emergency responses. A survey of residential communities in Chennai found that 65.2% of the respondents had theft incidents, mostly in community areas (83.5%), and 55.6% had gas leaks, with 72.8% showing high concern for safety threats. To counteract the limitations, we developed an AI-Based Home and Community Safety System based on IoT-based sensors, real-time communication protocols, and mobile-based monitoring interface. The system consists of flame and gas sensors, OLED display, theft, medical, and false alarm push buttons, and buzzers and LED indicators for notification. A wireless communication framework based on MQTT protocol supports real-time emergency notification among the households to provide immediate response and risk reduction. There is also an IoT dashboard on mobile provided for real-time remote monitoring and controlling of the system, which facilitates ease of access and user interaction. The survey also reflected high community interest in AI-based safety systems with 67.4% considering them to be highly effective and 79.7% willing to trial the system. Prototype testing proved low-latency notifications, efficient hazard detection, and enhanced emergency response systems. The suggested system is in compliance with Sustainable Development Goals (SDG 11 & SDG 9) by increasing the resilience of cities and encouraging smart safety infrastructure.

**Keywords**: Community safety, AI, IoT, MQTT, Smart cities, Emergency response, Sustainable Development Goals, Urban resilience, IoT dashboard, Remote monitoring.

MAJOR DESIGN CONSTRAINTS AND DESIGN STANDARDS TABLE

|  |  |  |  |  |
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| Project Title | AI-Integrated Home and Community Protection System Support SDG 11 | | | |
| Program Concentration  Area | Smart cities and Urban Development, Internet of Things (IoT) and AI Integration, Sustainable Development and Resilience | | | |
| Constraints Example | Technical Constraints, Cost Constraints, Environmental Constraints, User Adoption and Acceptance Constraints, Maintenance and Support Constraints | | | |
| Economic | Yes | | | |
| Environmental | Yes | | | |
| Sustainability | Yes | | | |
| Implementable | Yes | | | |
| Ethical | N/A | | | |
| Health and Safety | Yes | | | |
| Social | Yes | | | |
| Political | No | | | |
| Other | Power Modulation from Solar Panel | | | |
| Standards |  | | | |
| 1 | ISO/IEC 23894:2023 | | | |
| 2 | IEEE 1451 | | | |
| 3 | IEEE 802.11 | | | |
| 4 | IEEE P2413 | | | |
| 5 | NFTA 72 | | | |
| 6 | UL268 | | | |
| Prerequisite Courses for the Major Design  Experiences | 1. IoT and Smart System Integration  2. Artificial Intelligence for Security Applications  3. Wireless Communication and Networking | | | |