INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*Honeywell*	**Date Submitted**	*10/04/2024*
Project Title	Smart Energy Augmented Reality app for workforce development and field services (HONEYWELL_SMART)	**Planned Starting Semester**	*Spring 2025*

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

Discipline	Number	Discipline	Number
Mechanical	0	Electrical	0
Computer	5	Systems	

Company and Project Overview:

Honeywell is a global technology and manufacturing company specializing in aerospace, building technologies, performance materials, and safety solutions. Headquartered in Charlotte, North Carolina, it operates in over 70 countries, providing innovative products and software to industries ranging from aviation to industrial automation. Honeywell focuses on solving complex challenges related to safety, efficiency, and sustainability through advanced technologies like the Internet of Things (IoT), artificial intelligence (AI), and data analytics.

This project will be in the Smart Energy & Thermal Solutions (SETS) business within Honeywell headquartered in Raleigh, NC. Honeywell's Smart Energy business focuses on providing innovative energy management solutions to utilities and industrial clients, helping them optimize energy usage and improve grid efficiency. This division offers smart metering systems, advanced grid management technologies, and analytics platforms to enable real-time monitoring and control of energy distribution. By leveraging data-driven insights, Honeywell's Smart Energy solutions help

customers enhance sustainability, reduce costs, and meet evolving regulatory requirements.

Project Overview: Utilities need to routinely dispatch field service personnel to perform diagnostic, service and maintenance operations on smart meters (electricity, gas, water). Service operations often rely on manual procedures, many steps and checklists that the field technician need to know and perform. This includes visual identification of the meter, manual input of information in various apps and forms, manual reading of the meter data, read/interpret meter display, push buttons on meter front, etc. An app with Machine Vision and Augmented Reality capabilities can greatly simplify and streamline the field service operations, by overlaying and prompting focused and intuitive information and instructions. This can greatly decrease the cost of field service operation and limit errors related to manual steps.

Project Requirements:

The team will be designing and developing one of more mobile apps (iOS and Android) with Augmented Reality (AR) and Machine Vision capability. The app(s) will be targeted to Smart Metering systems and will implement a few selected uses case to highlight the benefits offered during field service operations.

Expected Deliverables/Results:

1. Evaluation and selection of Spatial Computing, Machine Vision and Augmented Reality frameworks for Apple iOS and Google Android mobile platforms
   Deliverables:
   - Technical report: analysis and evaluation of frameworks for both iOS and Android platforms; also evaluation of AR wearable devices/technology
   - Proof-of-Concept (POC) apps for the selected frameworks and technology
   - POC and reference source code in GitHub repositories

2. Definition of use cases – voice-of-the-customer -
   Interview with selected Utilities to understand typical processes and operation for smart-meter field service, challenges and ideas/suggestions for improvements
   Deliverables:
   - Summary report: collected feedback, selection of use cases
   - Creation and validation of mockups outlining flow, presentation, key functionality, current operations vs AR/AI-enabled

3. Design and development of the AR app(s)
   Deliverables:
   - Architecture and design specification of the app(s)
   - App development for identified use cases – all source code in GitHub repositories

    - Working apps and demonstration of use cases

4. Project Management and Reporting
   Deliverables:
    - Project plan – detailed per each phase: resources, timeline, milestones
    - Regular project review: status, issues, next steps
    - Demonstration of completed work
    - Final report: key results, recommendations, what's next
    - Final Review and lessons learned

Disposition of Deliverables at the End of the Project:

Who to present to:

- Honeywell Smart Energy Technology and Executive leadership
- Spring and Fall 2025 Senior Design Expos

Specifics on handover of the project:

- Technical reports generated during all phases
- All source codes for the POC and final apps
- Demonstration of apps and all completed functionality
- Final report

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Energy concentration
- Interest in app development