

Project Proposal - Urisens Care Monitoring System

1. Introduction

Urisens is a MedTech innovation focused on improving elderly care by offering reliable and accurate monitoring of urinary output and other clinically important parameters. This product is being developed in response to the growing need for effective incontinence management and preventive care for elderly individuals, particularly those in nursing homes, assisted living facilities, or receiving in-home care. The primary end users of the Urisens system are caregivers, who will use it to monitor the health and well-being of elderly individuals, thereby enhancing the quality of care and reducing the burden on caregivers.

2. Project Goals

The primary goal of this project is to develop a comprehensive digital platform that seamlessly integrates with the Urisens MedTech hardware device for patient care monitoring.

The key objectives include:

- Designing a user-friendly interface for real-time monitoring and management of elderly care data for Mobile and Desktop environment.
(There is an existing Figma design, can be utilized)
 - Implementing a robust alert system to notify caregivers of significant changes in urinary output or other critical health indicators.
 - Developing data analytics tools, including AI-driven analysis, to interpret signals and identify trends, providing insights for early detection of conditions such as urinary tract infections (UTIs).
 - Ensuring compliance with data security and privacy regulations such as GDPR.
 - Verifying and maintaining the connectivity of IoT devices to ensure continuous real-time monitoring.
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3. Technologies

The development of the Urisens platform will involve the following technologies: (teams are free to suggest the suitable technologies)

- Front-End: HTML, CSS, JavaScript (React or Angular for a responsive web interface), and React Native for mobile compatibility.
- Back-End: Node.js or Python (Django/Flask) for server-side development, MQTT protocol for receiving communication from IOT device.
- Database: PostgreSQL or MongoDB for handling patient data securely and efficiently.
- Cloud Services: Microsoft Azure (preferred) or AWS for hosting, with integrated security features to ensure data protection and IoT device connectivity verification.
- AI & Data Analysis: Implement AI-driven algorithms to analyze signals from the Urisens device, enabling predictive analytics and early detection of health issues such as UTIs. Modern tools may be used to build and train these models.

The platform will include features for verifying the connectivity of IoT devices, ensuring that the Urisens MedTech device remains reliably connected to the cloud infrastructure. AI-driven data analysis will be

integrated to enhance the system's ability to interpret complex signals and provide actionable insights, crucial for proactive elderly care.

The student team will have the flexibility to choose specific tools within these categories based on their expertise. Urisens will provide guidance and offer support as needed.

4. Requirements for the Students

- **Desired Skills:** Proficiency in web development (front-end and back-end), experience with cloud services, basic knowledge of data security, familiarity with IoT device integration, and experience with AI/machine learning for data analysis.
 - **Difficulty Level:** Moderate to demanding. While the technologies are commonly used, the integration of real-time monitoring, data security, IoT connectivity, and AI-driven data analysis adds a significant layer of complexity.
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5. Legal Issues

Intellectual Property Rights (IPR):

A. All IPRs to all Results will be transferred to the Client.

Confidentiality:

A. The client will share some confidential information with the students.

No additional legal issues are foreseen beyond the standard project contract.

6. Client

Client Introduction:

Urisens is an innovative MedTech project under the Aalto Startup Center's Pre-Business Incubator program funded by Business Finland. The project focuses on improving elderly care through advanced technology that supports caregivers by providing real-time monitoring of urinary output and other important health indicators. We have developed sensors and the hardware device for patient monitoring in Aalto University and VTT.

Client Representatives:

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Guidance and Resources:

The client representatives possess deep expertise in the project domain. They are prepared to spend substantial time guiding the student team. We have a project room within Health Technology House, Otakaari 3, mainly used by the Product owner and hardware developer. We will use Aalto University meeting facilities and virtual collaboration for common work.