FALLARM Technical Report

Capstone Project Submitted to
The School of Engineering
In Partial Fulfillment for the
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By

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2. Design and model a software project.
3. Technical knowledge required in the implementation.
4. Teaching us the networking concepts, and Integrating with Android

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ABSTRACT

According to a health report published by Centers for Disease Control and Prevention nearly 1 in every 3 people over age of 65 suffer from severe injuries caused by fall (CDC, 2009). This fall risk factor increase with an increase in age due to change in sense of balance, slow reaction time, mussel weakness etc. Hospitals have incorporated techniques to prevent reduction of fall . Prevention of fall needs a pro active approach from everyone including patient and staff. Since many elderly individuals live alone, remote monitoring system would be a solution to watch for patient activity and send alert message to caregivers directly on their device upon detection of an adverse event .

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Introduction

FallArm is a contemporary technology to prevent accidental falls among both hospitalized patients and the elderly, and help prevent and detect falls. This device will be used within the hospital environment and the hospital staff will use the software to monitor the patients. "FallArm" will continuously sense acceleration and orientation patterns and send this data to server which analyze it and classify risk. This risk class is conveyed back to patient as a feedback. Also the system reports any adverse events and alert is send directly to caretaker. Caretaker/staff can login to website to get full details about the incident or simply to analyze patient data.

This project focuses only on the software part, which in turn can be broadly categorized into three areas:

Internet programming – to develop a client-server model where the sensor will directly communicate with the server to provide the device data and the client interface will be used by the hospital staff to view, track patient's information, and process the data.

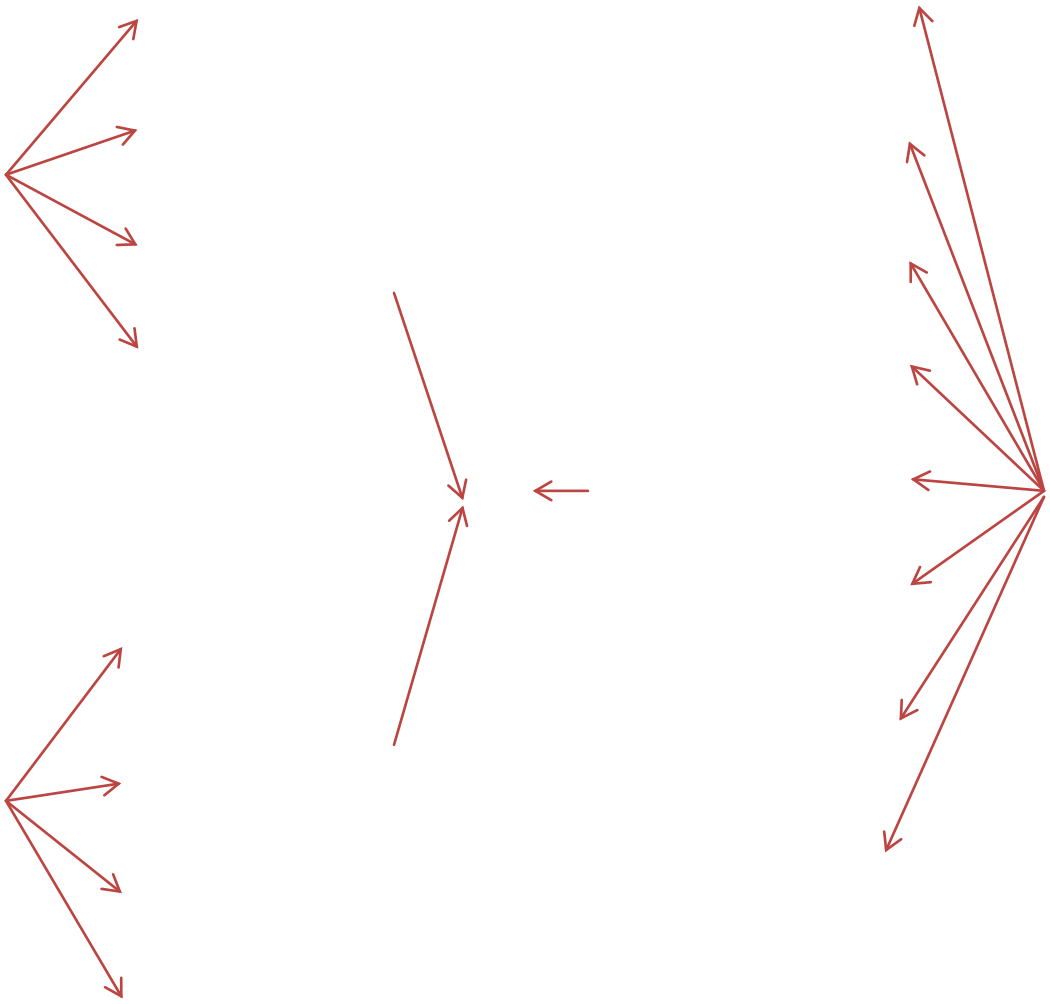
Network programming–socket programming to enable communication between the client and the server.

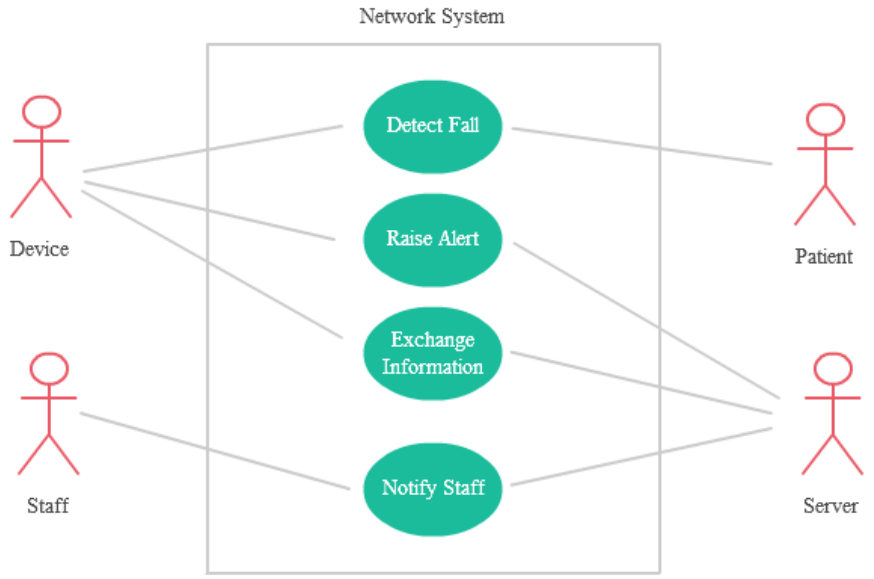
Database – to hold the data related to the system at the server. This will include information about the user profile of the clients, the information received from the device.

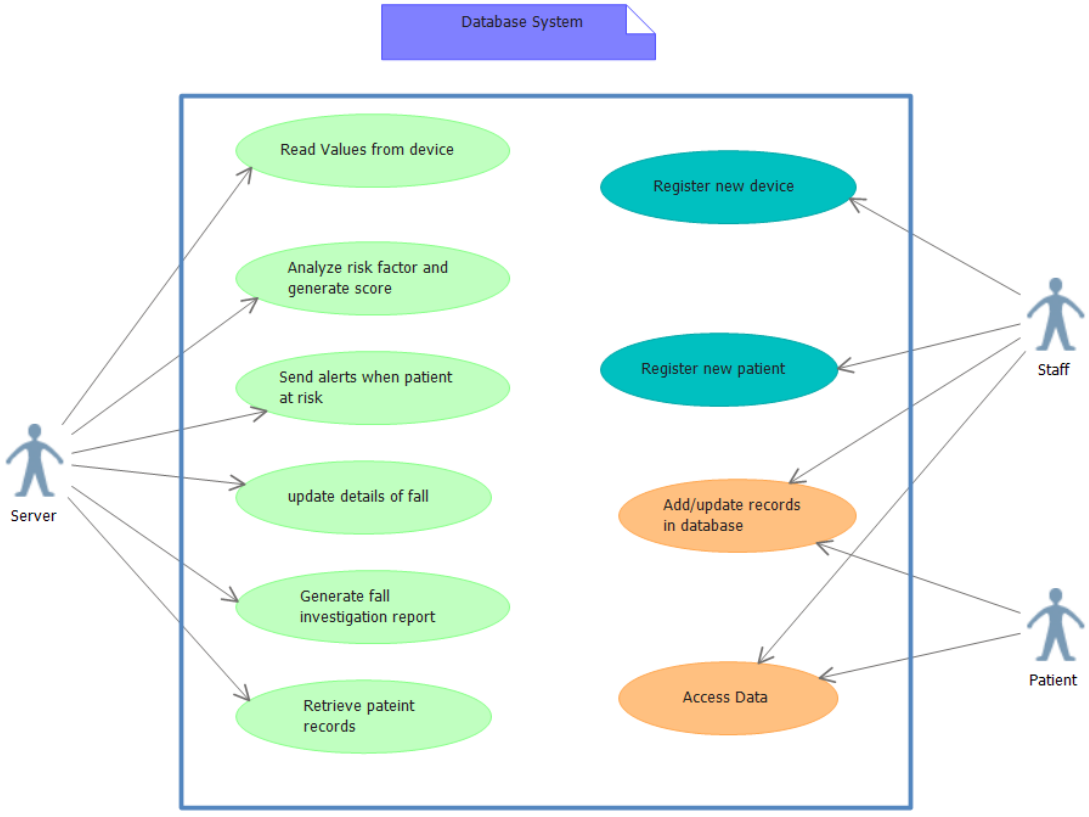
Design Section:

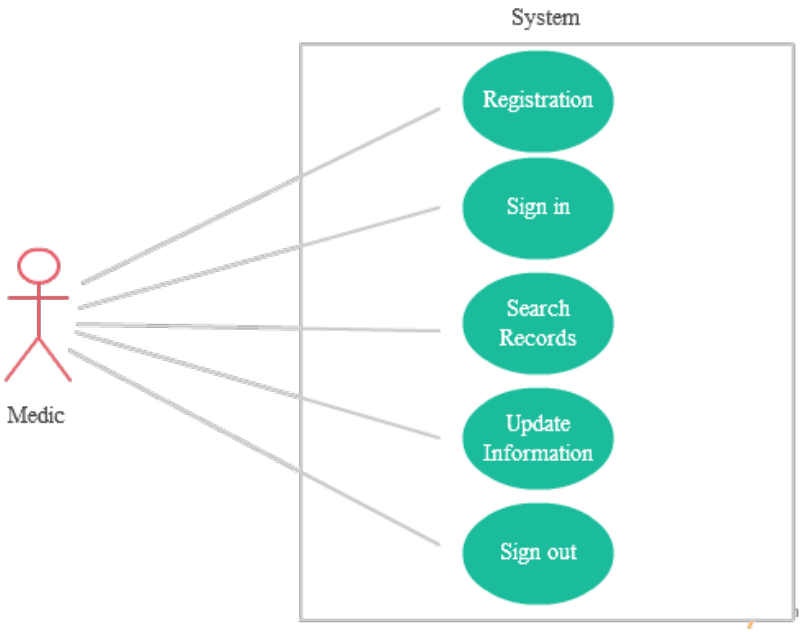
Use Case Diagram

In Visual Studio Ultimate, a use case diagram summarizes who uses your application or system, and what they can do with it. A use case diagram acts as a focus for the description of user requirements. It describes the relationships between requirements, users, and the major components. It does not describe the requirements in detail; these can be described in separate diagrams or in documents that can be linked to each use case.



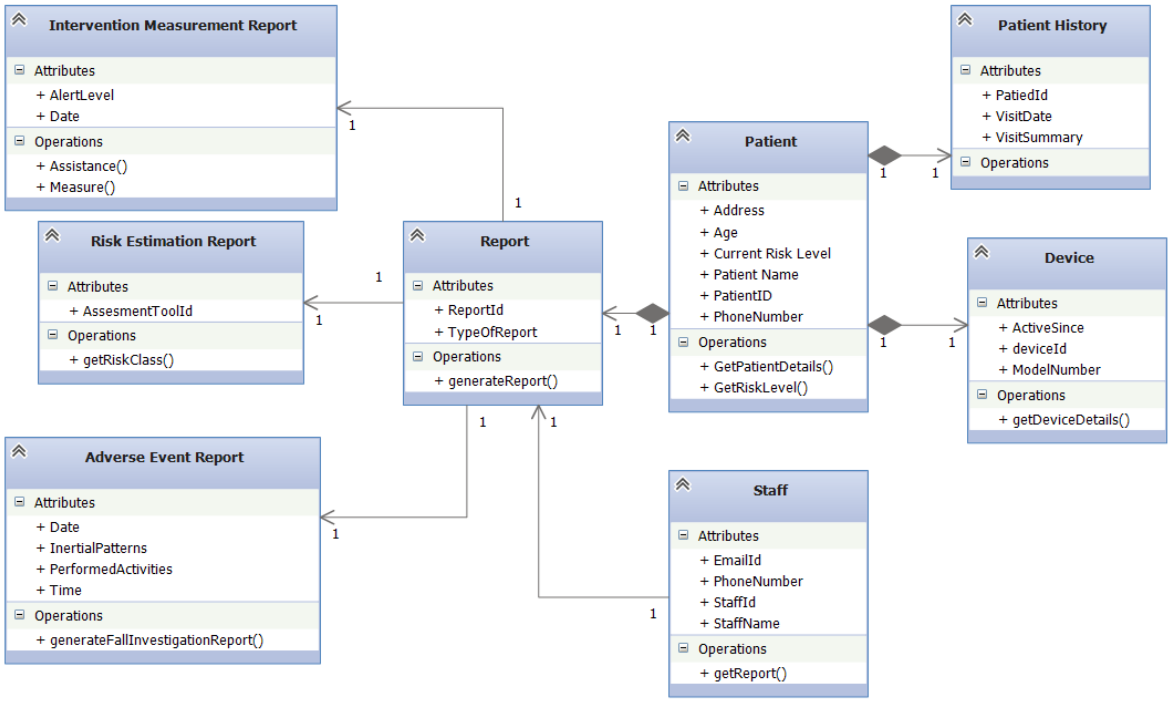

Network System
Detect Fall
Raise Alert
Exchange Information
Notify Staff
Device
Staff
Patient
Server


Database System
Read Values from device
Analyze risk factor and generate score
Send alerts when patient at risk
update details of fall
Generate fall investigation report
Retrieve pateint records
Register new device
Register new patient
Add/update records in database
Access Data
Server
Staff
Patient


System
Registration
Sign in
Search Records
Update Information
Sign out
Medic

Class Diagram:

A UML class diagram describes the object and information structures used by your application, both internally and in communication with its users. It describes the information without reference to any particular implementation. Its classes and relationships can be implemented in many ways, such as database tables, XML nodes, or compositions of software objects.

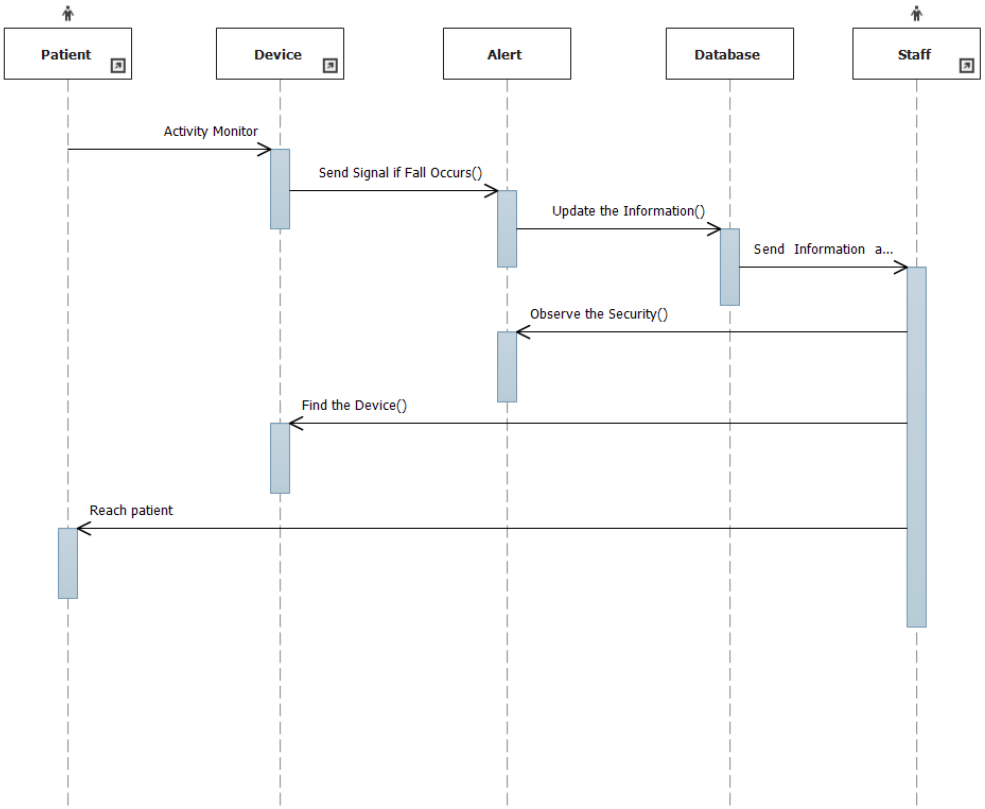


Sequence Diagram:

A sequence diagram shows an interaction, which represents the sequence of messages between instances of classes, components, subsystems, or actors. Time flows down the diagram, and it shows the flow of control from one participant to another. The diagram shows example instances and events, instead of classes and methods; more than one instance of the same type can appear in the diagram, and more than one occurrence of the same message can appear also.
There are two kinds of sequence diagram:

- Code-based Sequence Diagrams can be generated from .NET program code, and can be placed within any project. For more information, see Visualize Code by Generating Sequence Diagrams.
- UML Sequence Diagrams form part of a UML model, and exist only within UML modeling projects..

The two kinds of sequence diagram are similar, although a few of the properties of the elements are different.


Patient
Device
Alert
Database
Staff
Activity Monitor
Send Signal if Fall Occurs()
Update the Information()
Send Information a...
Observe the Security()
Find the Device()
Reach patient

Implementation

Test Result

Enchancement Idea

Conclusion

Fallarm software is developed to help patient in case of an emergency in the situation of fall and also to get feedback about his/her activity in the form of risk report. We provided an alert email/SMS (Short Message) from device to web browser which hospital staff will pay attention. According to the risk report hospital staff can contact patient to see if they need help. The software will store history of each & every activity pattern received from device and also a report on each adverse effect. Using web browser staff can retrieve & check patient information. The complete software package is successfully implemented and available for service.

Bibliography