Gynaecological Patient Information management System:

Functional Requirements

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Contents

1 Project Scope

1.1 Overview of the system

The system should allow data to be entered by medical students, junior doctors and registrars (specialists in training) working in the department. People who enter data should have usernames and passwords (student numbers and HPCSA registration numbers can be used) and they should only be able to enter information and should not have access to data. They should be able to enter data using smartphones, tablets or personal computers in an environment where the hospital is not computerized and computers are not available in the hospital for this purpose.

For purposes of entering data smartphone and tablet applications (apple and android) should be developed to allow smartphone and tablet access to the system.

The data should be securely stored on a site on the Website of the University of Pretoria.

Data will be entered into the system by different employees working in the Department of Obstetrics & Gynaecology at the Kalafong Provincial Tertiary Hospital.

Data of patients entered should include both the patientâĂŹs hospital number as well as RSA Identity number.

The possibility of linking this system to that of the National Health Laboratory System (NHLS) should be investigated to make it possible to access laboratory results through this system. The NHLS has an online accessibility.

The administrator of the system should have access to all relevant data. The different levels and specifications of data output will be defined upfront and the ability should exist to add or edit these specifications as required.

Patient information and data are highly confidential and the website and information should be secure. All users will have to use a username and password. Medical students can use University of Pretoria student numbers and medical interns, medical officers and registrars can use their Health Professions Council of South Africa (HPCSA) unique registration numbers. Doctors and students rotate through the department for different time periods and the usernames and passwords should expire depending on the different categories. Students rotate for four weeks, medical interns for four months and medical officers and registrars for up to five years. Administrative staff and consultants are more permanent and for security reasons should perhaps update information yearly.

1.2 Patient Information Management System - Global Scope
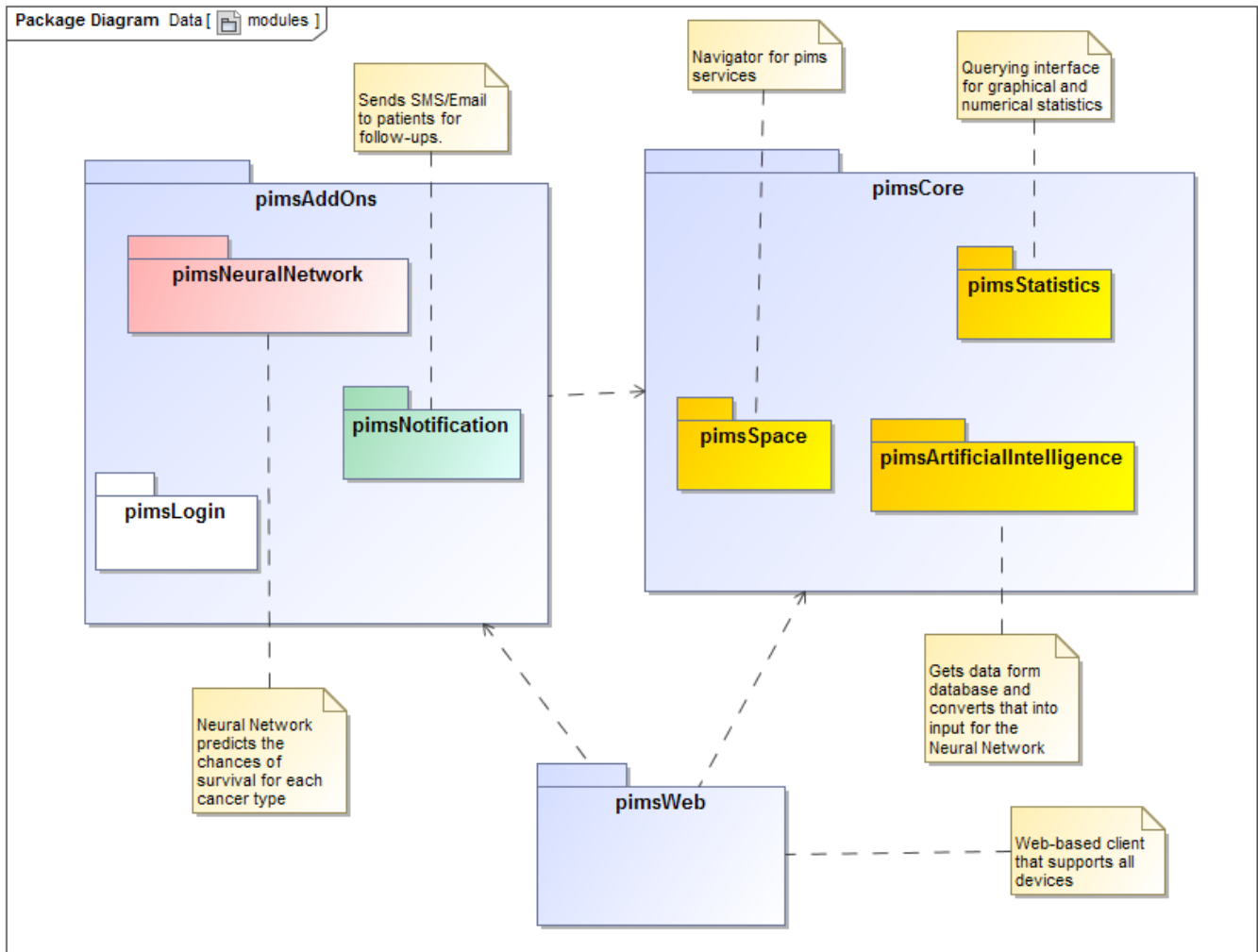

2 Application requirements and design

2.1 PIMS Login Module

This module is responsible for allowing a user to login into and Logout out of Pentec Patient Information Management System. A user should login with the credentials they were assigned upon registration. If the user is not assigned a username then an exception is thrown and the user is redirected to the login page.
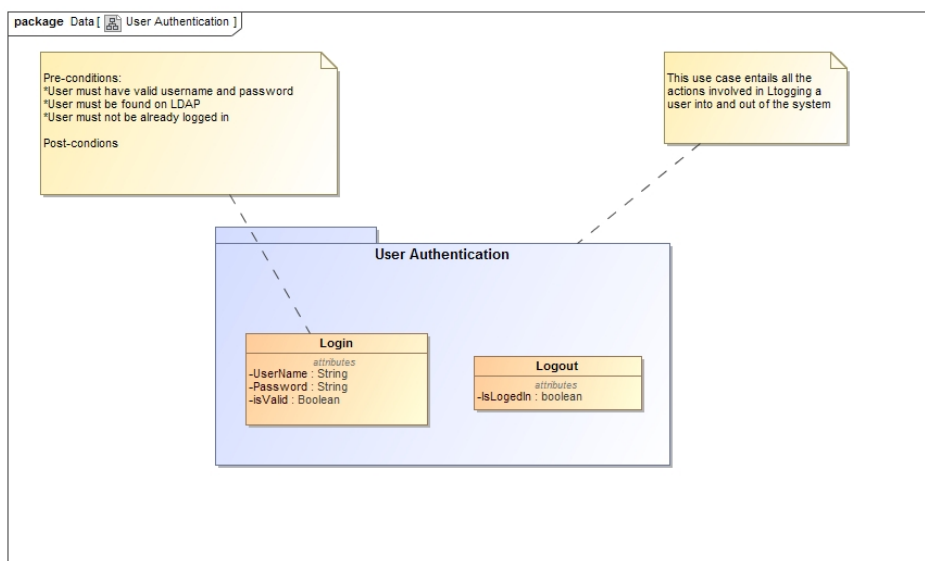
To avoid "Spambots", a CAPTCHA challenge is used.

2.1.1 Scope

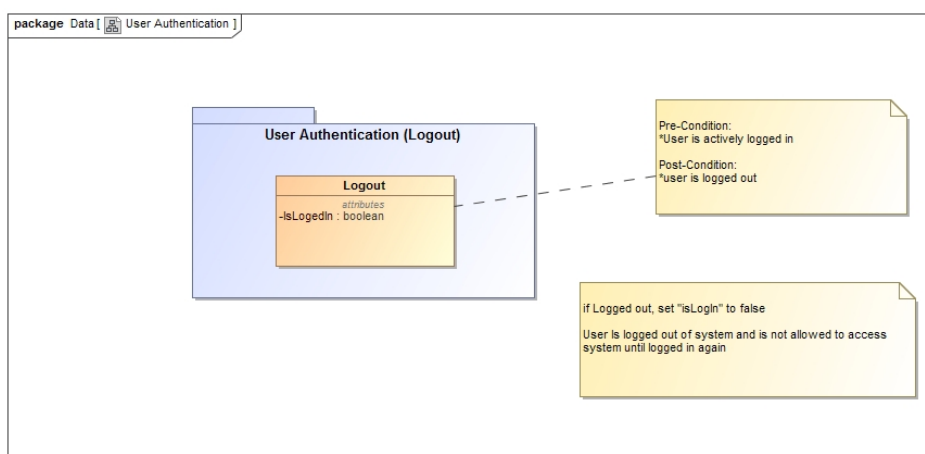The scope is shown in the use case diagram below:
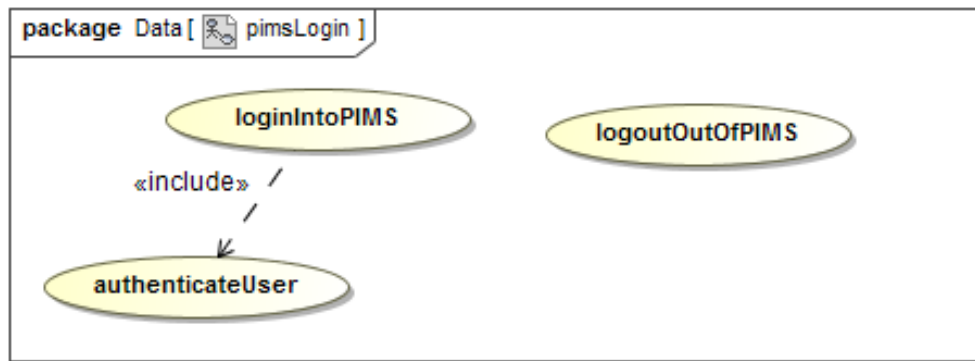
2.1.2 Use cases
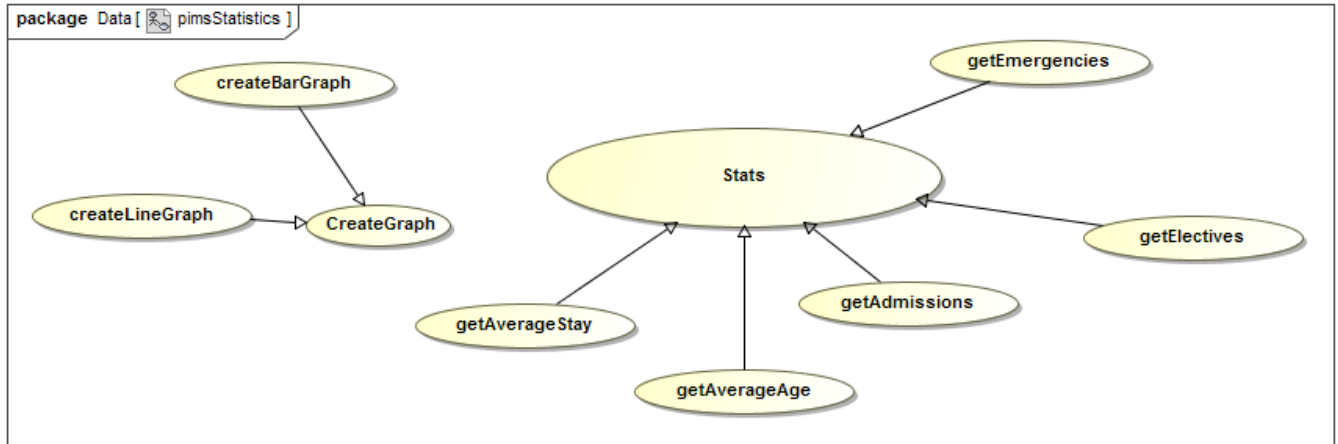
loginToPIMS:

logoutOfPIMS:

2.2 PIMS Stats Module

This module is responsible for displaying statistics from the database. The user has an option to choose the type of graph (either a bar chart or line graph).

2.2.1 Scope

The scope is shown in the use case diagram below:


2.2.2 Use cases

createGraph – priority: critical This use case is meant to be used by the front-ends to create and display a graph. This graph can be viewed by the client and the client can predict and print this data for record keeping.

> **Service Contract** The service contract for createGraph is shown below. It is a simple graph function.
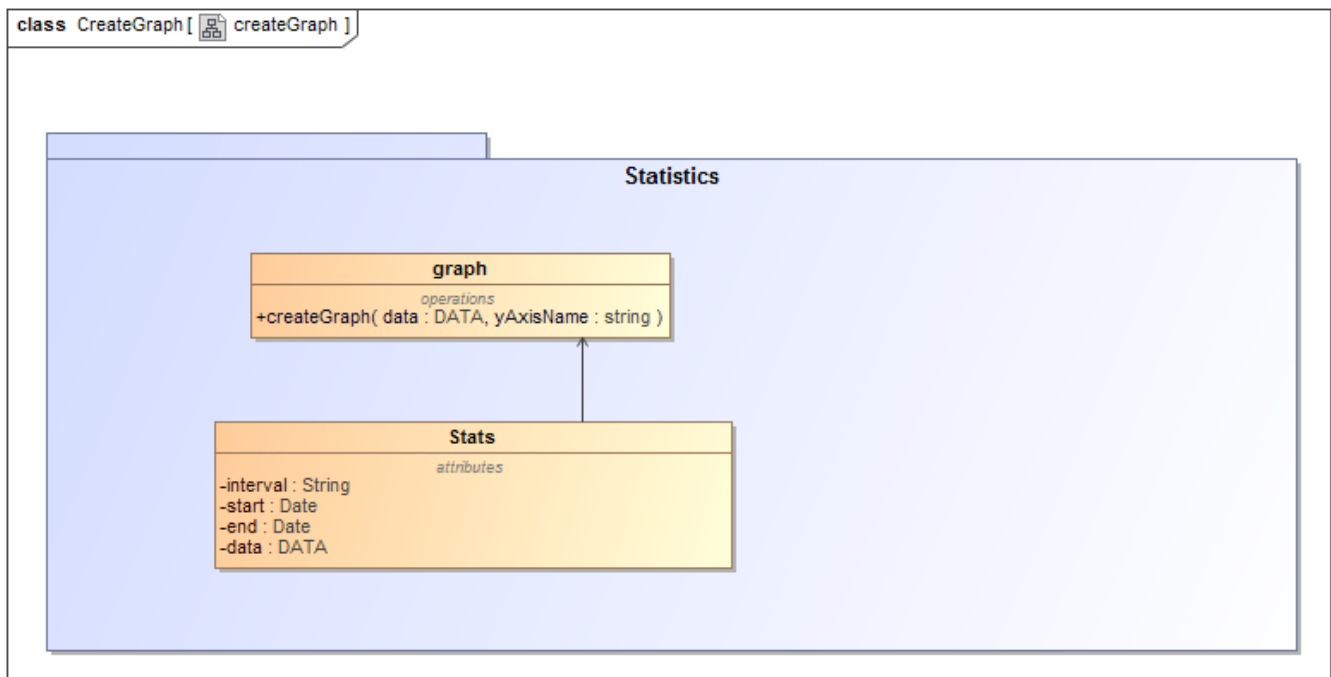
Stats – priority: critical This use case is a generic version of all statistics to be obtained. All statistics will be shown in generic form to allow for simplicity and non-repetition of modules.

Service Contract The generic service contract for all statistics is shown below. It is a simple statistics query:
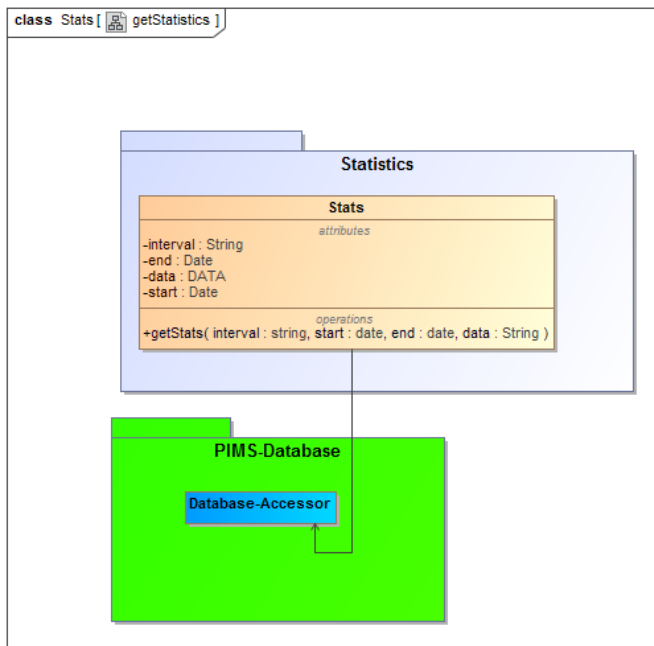
2.2.3 Equations

Statistics Average Equation

$$AM = \tfrac{1}{n} \sum_{i=1}^{n} \sum_{j=1}^{x} a_j$$

Graph Equation

$$f(x) = \sum_{i=1}^{n} x_i$$

2.3 PIMS Artificial Intelligence Module

This module is responsible for predicting the chances of survival for each cancer type. Parameters for each patient are considered to compute this prediction. These parameters are converted into a single value that will be used by the PIMS Neural Network Module as input.

2.3.1 Scope

The scope is shown in the use case diagram below:
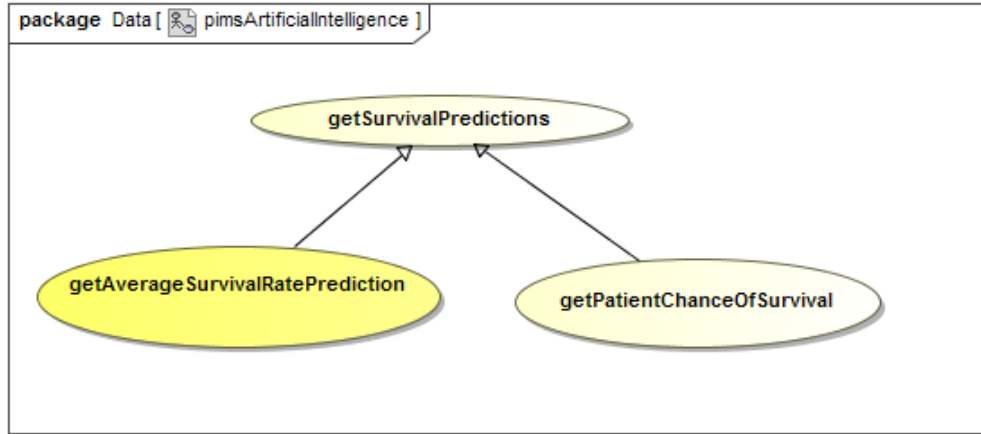
2.3.2 Use cases

getAverageSurvivalRatePrediction:

getPatientChanceOfSurvival:

2.4 PIMS Neural Network Module

This module is a "helper module" for PIMS Artificial Intelligence Module. It takes in the values passed by the AI module and uses machine learning to predict the outcomes for either a specific patient or the average survival rate per cancer.

2.4.1 Scope

The scope is shown in the use case diagram below:
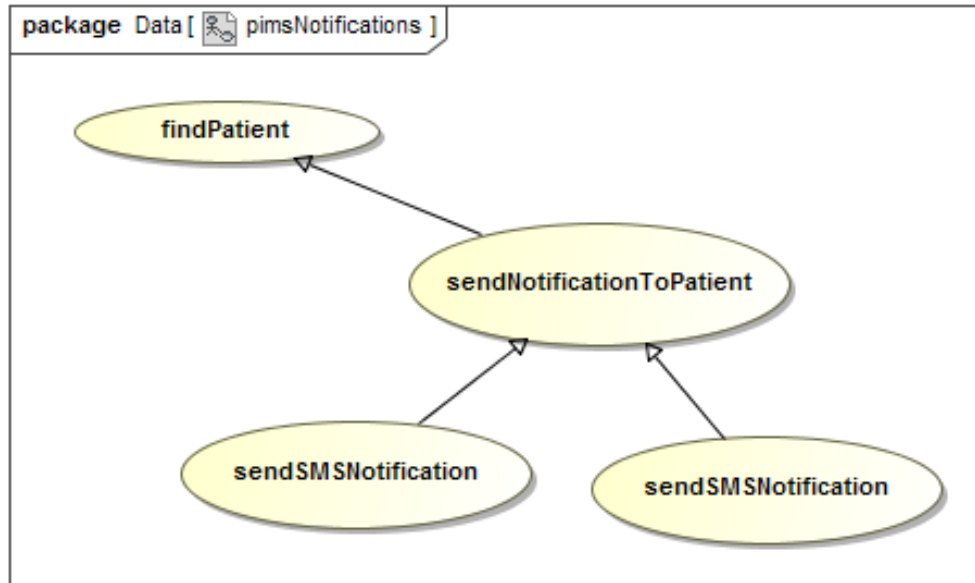
2.4.2 Use cases

2.5 PIMS Notification Module

This module is responsible for sending email/SMS notifications to a patient. This email/text message could be a reminder to a patient about follow up visits to the doctor.

2.5.1 Scope

The scope is shown in the use case diagram below:

2.5.2 Use cases
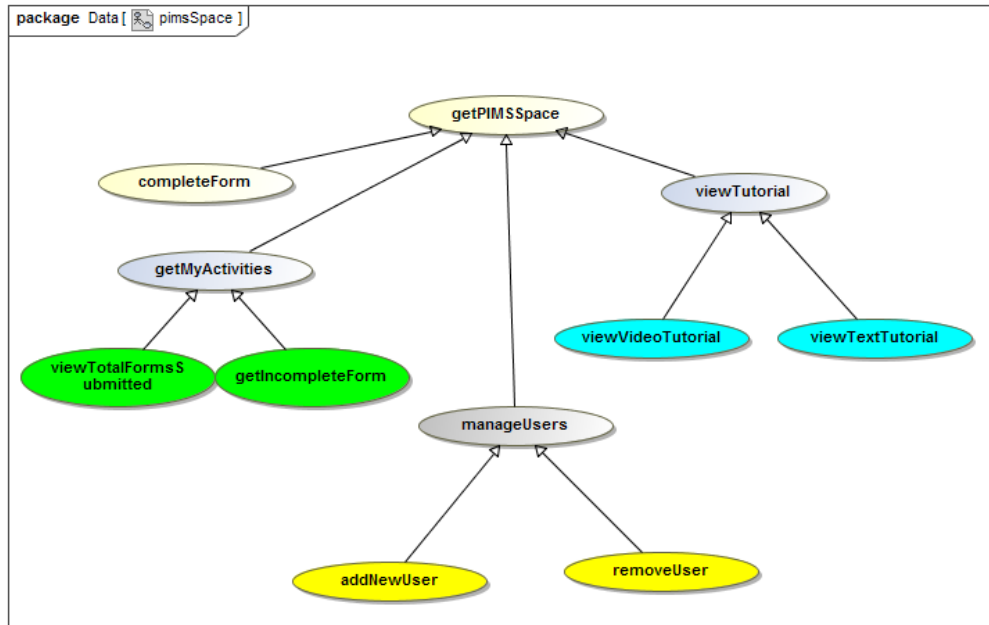
findPatient:

sendSMSNotification:

sendEmailNotification:

2.6 PIMS Space Module

This module is responsible for providing all the core functionality of Patient Information Management System. The front-end component displays all the available services to the user.

2.6.1 Scope

The scope is shown in the use case diagram below:

2.6.2 Use cases

getPIMSSpace:

completeForm:

viewVideoTutorial:

viewTextTutorial:

addNewUser:

removeUser:

viewTotalFormSubmitted:

getIncompleteForm: