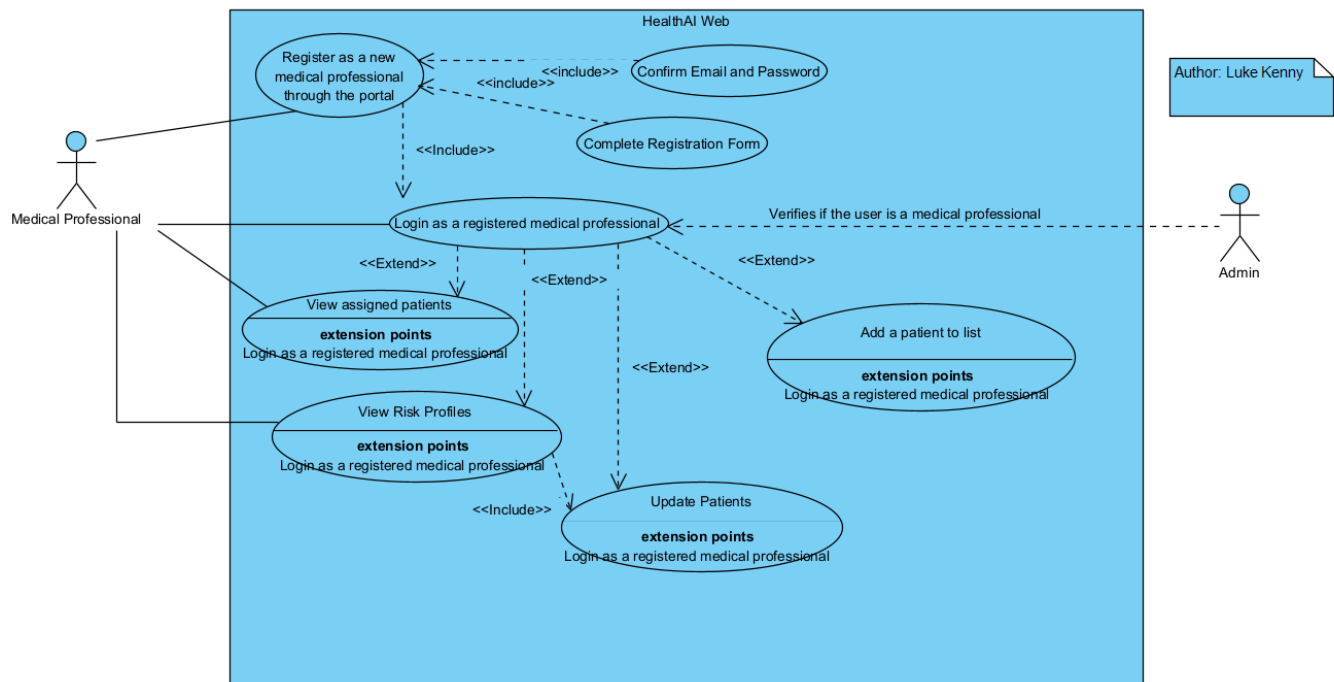


# Modelling Document

Author: Luke Kenny

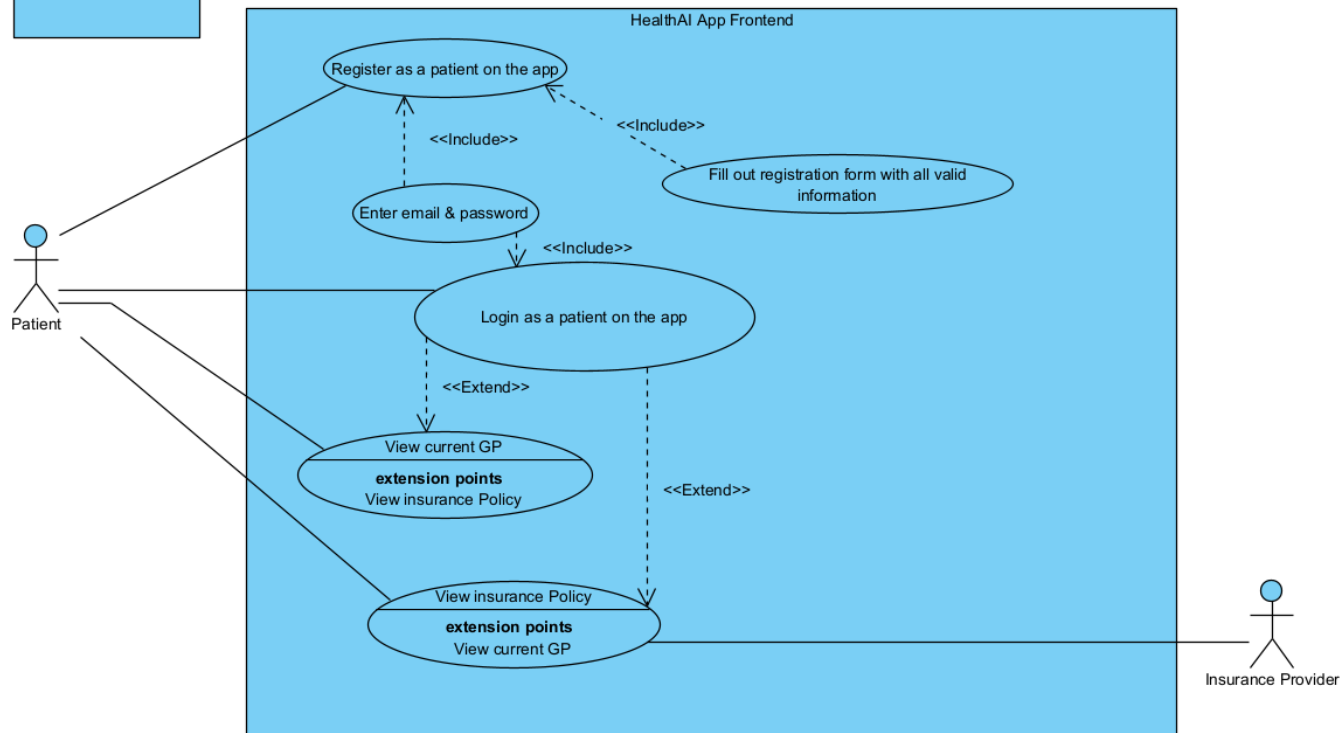
Use case Diagrams for features this sprint:

## Health AI- Web (Registering and logging in)

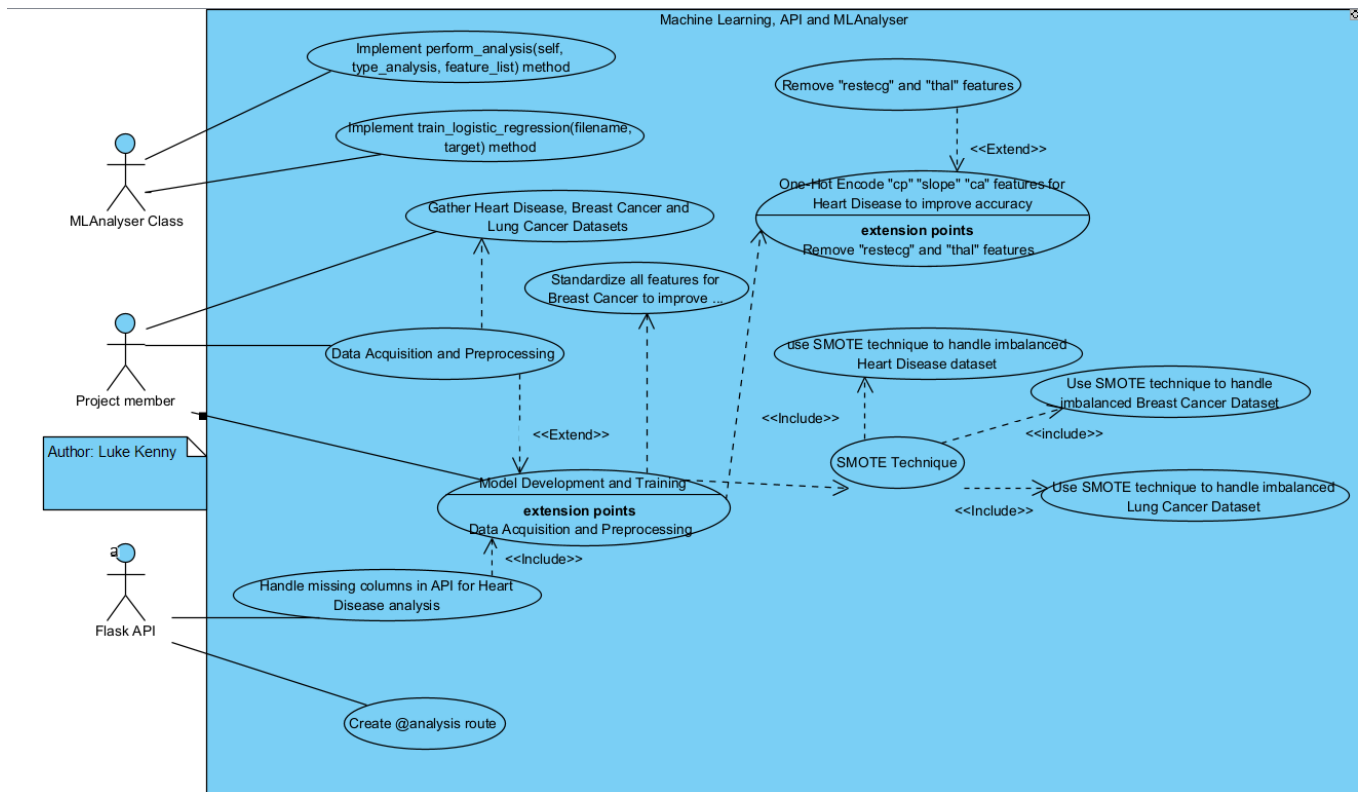


# HealthAI – App (Registering and logging in)

Author: Luke Kenny



# Machine Learning Models, Flask API and MLAnalyser Class:



## User Stories:

# Health AI – Web

(web)Registerin  
as a new  
Medical

Fill out  
registration  
form

Fill Out unique  
ID

Confirm Email  
and Password

(web)Login as  
registered  
medical

Enter valid  
login form

Release 1 





As a new  
medical  
professional, I


As a registered  
medical  
professional, I





UeXceler

Story Map

Estimate & Spike

Sprint

Team Configuration



As a new medical professional, I wish to register as a new user on the portal, so that I can access the site securely

(web)Registering as a new Medical Professional / Fill out registration form

New

Description ^

User Story Id: US003

ACCEPTANCE CRITERIA:

1. There should be a clear and easily accessible "Sign Up" or "Register" link on the website's homepage.

2. The registration form should include fields for entering my name, email address, password, and any additional required information.

3. Upon submitting the registration form, I should receive a confirmation email with a verification link.

4. Clicking the verification link should confirm my email address and prompt me to set a password.

5. After completing email confirmation and password setup, I should be automatically logged into the website.

6. The registration process should include measures to prevent spam or fraudulent account creation.

7. If any registration fields have validation errors, the website should provide clear error messages.

Assignee

kenny

Days

0.1

Sprint

Sprint 1

Tags

Follow

Split User Story

Remove from Development Backlog

As a registered medical professional, I wish to login to the portal so that I may access the site securely

(web)Registering as a new Medical Professional / Confirm Email and Password



New ▾

Description ^

User Story Id: US004

ACCEPTANCE CRITERIA:

1. The website's login page should be easily accessible from the homepage via a clearly labeled "Login" or "Sign In" link.
2. The login page should provide input fields for entering my registered email address and password.
3. After entering my valid email address and password, I should be able to click the "Login" button to log in.
4. If I enter an invalid email address or password, the website should display a clear error message indicating that the credentials provided are incorrect.
5. Upon successful login, I should be redirected to a personalized dashboard, profile page, or another appropriate landing page that provides access to my account information and personalized content.
6. The login session should remain active until I actively log out, or an appropriate inactivity timeout period is reached.
7. The login process should be secure, with measures in place to protect user data, including encryption and protection against brute force attacks.
8. There should be a "Forgot Password" link on the login page that allows users to initiate the password reset process in case they forget their password.

Assignee

kenny ▾

Days

0.3

Sprint

Sprint 1

Tags

Follow

Split User Story

Remove from Development Backlog

# HealthAI – App

(App) Register  
as a new  
patient

(App)Login as  
a registered  
Patient

Enter valid  
information on  
register/login

Confirm email  
and password

Enter valid  
email and  
password

As a new  
patient, I want  
to register on

As a registered  
patient of the  
HealthAI-App, I

As a new patient, I want to register on the HealthAI-App using my email address or my social media accounts so that I can access the app's features and services

(App) Register as a new patient / Enter valid information on register/login page

New

Description ^

User Story Id: US005

ACCEPTANCE CRITERIA:

1. When I open the app, I should see a clear and intuitive option to register.

2. If I choose to register using my email:

3. I should be presented with a registration form that includes fields for my name, email address, password, specialty, and license details.

4. After submitting the form, I should receive a confirmation email with a verification link.

5. I should be able to click the verification link to confirm my email address and set a password.

6. Once I've confirmed my email, I should be automatically logged into the app

Assignee kenny

As a registered patient of the HealthAI-App, I want to log into my account using my information to access the apps features

(App)Login as a registered Patient / Enter valid email and password

Description ^

ACCEPTANCE CRITERIA:

1. The login page must be accessible from the app's home screen.

2. On the login page, I should see input fields for entering my email address and password.

3. After entering my valid email address and password, I should be able to click the "Login" button to log in.

4. If I enter an invalid email address or password, the app should display an error message indicating that the credentials are incorrect.

5. Upon successful login, I should be redirected to my personalized dashboard.

6. The login session should remain active until I log out or close the app.

7. There should be a "Forgot Password" link on the login page that allows me to initiate the password reset process.

8. Security measures such as encryption and protection against brute force attacks should be in place to safeguard user data.

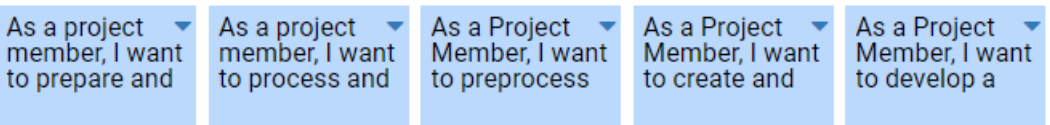
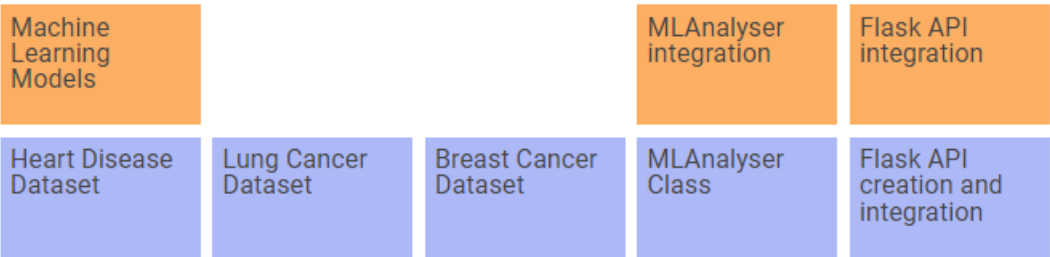
Assignee kenny

Days0.4

SprintSprint 1

Tags

# Machine Learning Models, Flask API and MLAnalyser:



As a project member, I want to prepare and analyse the Heart Disease Dataset to build an accurate predictive model for detecting Heart Disease

Machine Learning Models / Heart Disease Dataset

Description ^

**Acceptance Criteria:**

**Data Collection:** I should be able to gather the Heart Disease dataset from a reliable source, ensuring it contains relevant information for building a heart disease prediction model.

**Data Preprocessing:** I want to clean and preprocess the dataset, handling missing values and ensuring data quality.

**Feature Encoding:** I need to one-hot encode specific features like "cp," "slope," and "ca" to improve the accuracy of the predictive model.

**Handling Imbalanced Dataset:** If the dataset is imbalanced, I should be able to apply the Synthetic Minority Over-sampling Technique (SMOTE) to create synthetic negative samples and balance the classes.

**Parameter Adjustment:** I want the flexibility to adjust encoding parameters to fine-tune the model's performance.

**Feature Encoding Issues:** If one-hot encoding negatively affects model accuracy, I should be able to address this issue and find an appropriate solution, which might include removing certain features.

**Threshold Setting:** I need to set an appropriate threshold for predictions to optimize the model for healthcare scenarios. It should favor higher recall, even if it means accepting more false-positives.

**Model Training:** I should be able to train a machine learning model, like logistic regression, using the prepared dataset to predict heart disease.

Assignee

kenny

As a project member, I want to process and analyse the Lung Cancer Dataset so that I can develop an effective predictive model for lung cancer detection

Machine Learning Models / Lung Cancer Dataset

New

Description ^

User Story Id: US011

**Acceptance Criteria:**

**Data Collection:** I want the ability to acquire the Lung Cancer dataset from a reputable source, ensuring it contains relevant data for constructing a lung cancer prediction model.

**Data Preprocessing:** I need to clean and preprocess the dataset, addressing missing values and ensuring data quality.

**Feature Engineering:** I should be able to perform feature engineering tasks, such as removing trailing spaces from header names like 'FATIGUE' and 'ALLERGY'.

**Feature Selection:** I want to exclude fields like 'ANXIETY' and 'PEER\_PRESSURE' if they are determined to be irrelevant to lung cancer prediction.

**Handling Imbalanced Dataset:** If the dataset exhibits class imbalance, I should be able to apply the Synthetic Minority Over-sampling Technique (SMOTE) to generate synthetic negative samples and balance the classes.

**Standardization:** If standardization of features doesn't improve model accuracy, I should be able to remove standardization steps to save time and resources.

**Threshold Setting:** I need the flexibility to set an appropriate threshold for predictions, favoring higher recall for healthcare scenarios, even if it results in some false positives.

**Model Training:** I should be able to train a machine learning model using the preprocessed dataset to predict lung cancer accurately.

Assignee

kenny

As a Project Member, I want to preprocess and analyse the Breast Cancer Dataset so that I can develop an accurate predictive model for Breast Cancer detection

Machine Learning Models / Breast Cancer Dataset

Description ^

User Sto

**Acceptance Criteria:**

**Data Collection:** I should have the capability to obtain the Breast Cancer dataset from a reliable source, ensuring it contains relevant information for constructing a breast cancer prediction model.

**Data Preprocessing:** I want to clean and preprocess the dataset, addressing missing values and ensuring data quality.

**Feature Standardization:** I should be able to standardize all the features within the dataset to enhance the model's accuracy.



**Handling Imbalanced Dataset:** If the dataset exhibits class imbalance, I need to be able to apply the Synthetic Minority Over-sampling Technique (SMOTE) to generate synthetic negative samples, balancing the classes.

**Threshold Setting:** I require the flexibility to set an appropriate threshold for predictions, favoring higher recall for healthcare scenarios, even if it results in some false positives.

**Model Training:** I should be able to train a machine learning model using the preprocessed dataset to accurately predict breast cancer.

Assignee

kenny

As a Project Member, I want to create and implement the MLAnalyser class with specific methods for training machine learning models so that I can perform analysis ...  

MLAnalyser integration / MLAnalyser Class

New ▾

Description ^

User Story Id: US013

**Acceptance Criteria:**

**train\_logistic\_regression** Method Implementation: I should be able to implement the train\_logistic\_regression method, which accepts the filename of a CSV dataset and the target feature for logistic regression model training.

**perform\_analysis** Method Implementation: I want to implement the perform\_analysis method within the MLAnalyser class. This method should accept the type of analysis (e.g., heart, lung, or breast) and a list of features passed from the Flask API.

Assignee

kenny

As a Project Member, I want to develop a Flask API that serves machine learning models so that I can accept analysis requests from users through the API

Flask API integration / Flask API creation and integration

New ▾

Description ^

User Story Id: US014

**Acceptance Criteria:**

**Flask API Creation:** I should create a Flask API with an @analysis route that handles incoming analysis requests.

**Handling Missing Columns:** I need to address an issue where, when receiving an analysis request for heart disease, the one-hot encoding in the originally trained model causes a 'missing columns' problem for the API when users send in the original columns.

**Solution Implementation:** To resolve the missing columns issue, I must implement a one-hot encoder method that fills in any missing columns if they are no longer present and sets them to '0.'

Assignee

kenny

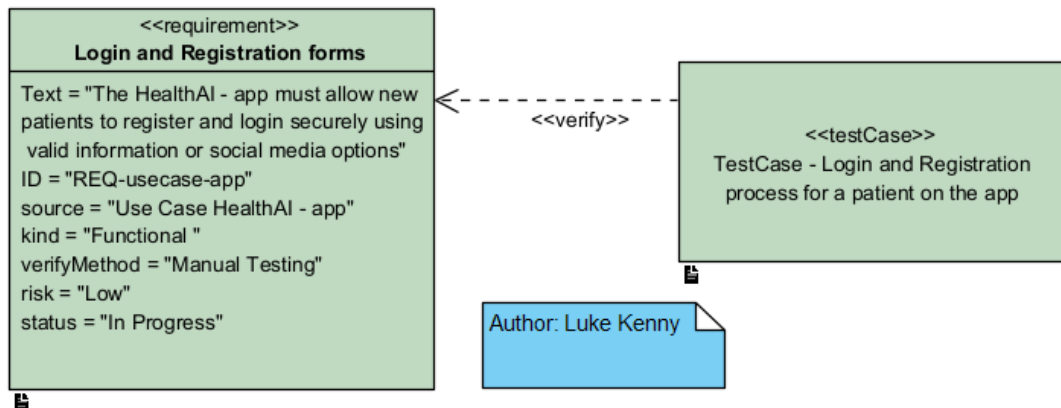
Days

0

## Test Cases:

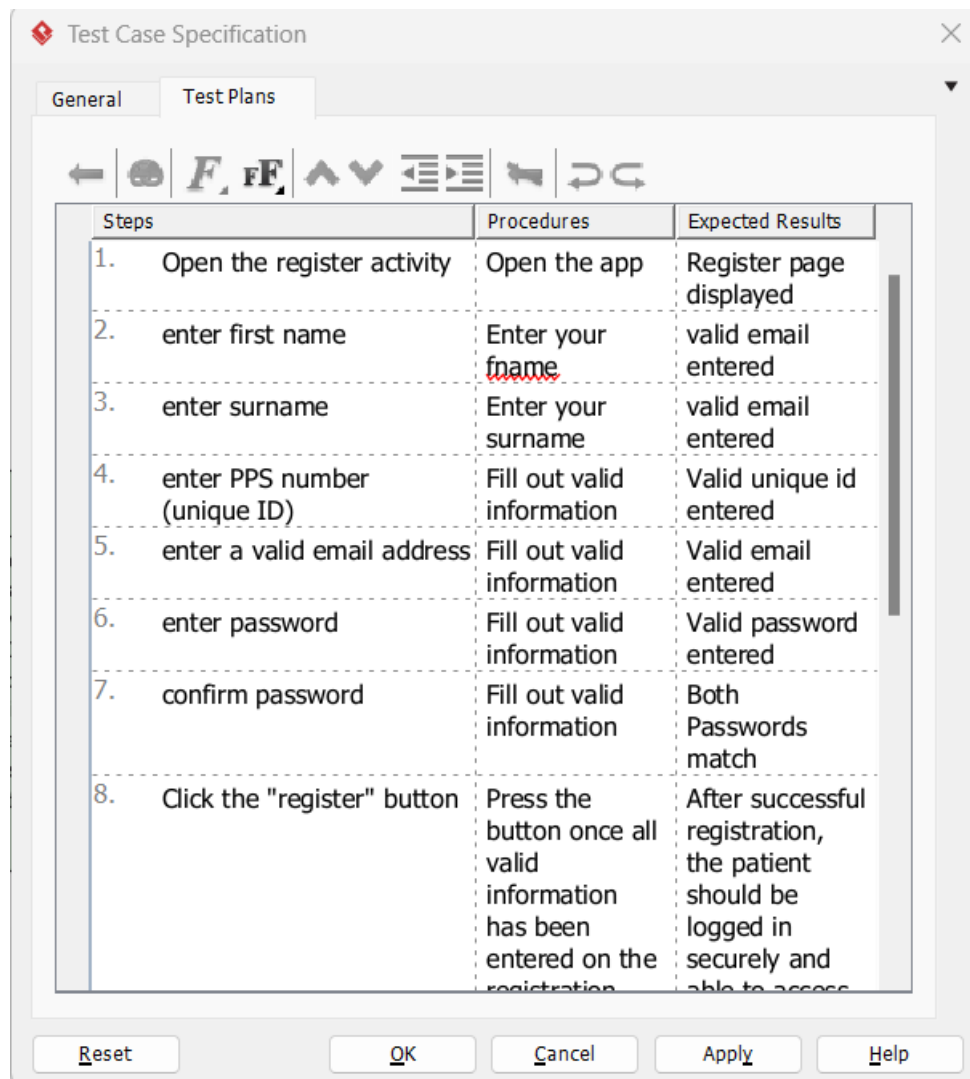
## HealthAI – APP





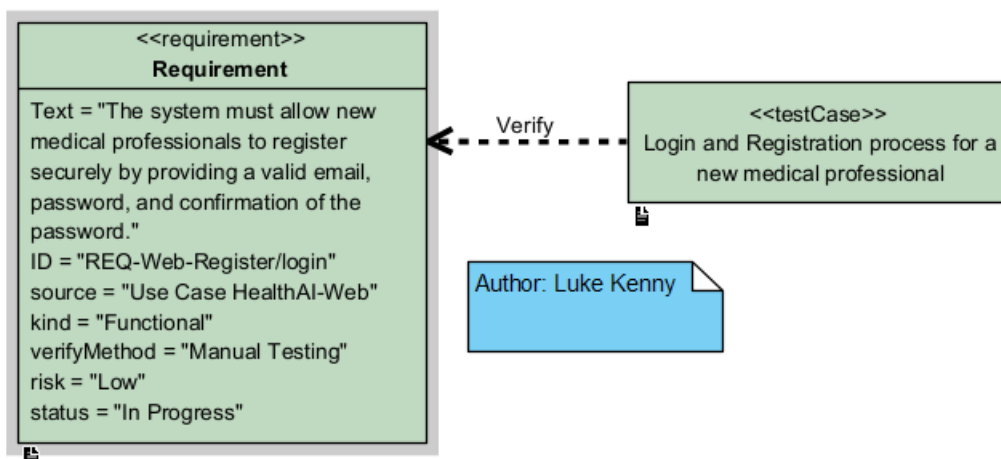
## Test case steps:

The screenshot shows the "Test Case Specification" dialog box with the "General" tab selected. The "Name" field contains "TestCase - Login and Registration process for a patient on the app". The "Model" field is set to "<Unspecified>". The "Description" field contains the following text: "Purpose: Verify that a new patient can register and access the app securely.", "Scope: Registration, validation, and login process for new patients.", "Acceptance Criteria: Successful registration and ability to access the app securely.", "Dependencies: None", "Status: In Progress", and "Author: Luke Kenny". The dialog box has buttons for "Reset", "OK", "Cancel", "Apply", and "Help".



General    Test Plans		
Steps	Procedures	Expected Results
	registration form	able to access the app's features
9. Verify registration proceeds without any error messages	Ensure all information entered is valid	No error messages should be displayed if all fields are filled with valid information
10. Enter valid email and password credentials to proceed from the login page	Enter registered email and password information	No error messages should be displayed and the fields should contain valid information
11. press "login" button to proceed to the app	Press "login" button once valid information is filled out	The Patient will be logged in and able to access the app and its features

## HealthAI – Web:



## Test case steps:

**Test Case Specification**

**General** | Test Plans

**Name:** Login and Registration process for a new medical professional

**Model:** <Unspecified> ...

**Description:**

**B** **F** **E** **+**

**Purpose:** Verify that a new medical professional can register and access the site securely.

**Scope:** Registration, validation, and login process for new medical users.

**Acceptance Criteria:** Successful registration and ability to access the site securely.

**Dependencies:** None

**Status:** In Progress

**Author:** Luke Kenny

**Reset** **OK** **Cancel** **Apply** **Help**

Test Case Specification

General

Test Plans

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**F**

**fF**

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v

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Steps	Procedures	Expected Results
1. Navigate to the registration page	Enter the url for HealthAI Web	The registration page should open without any issues
2. Enter all valid information in the registration form	Fill out the field for: first name, surname, email, occupation, employee number, password	No error messages should be displayed if all the information is valid
3. Click the "register" button	press the "register" button when all the fields have been filled	the registration process should proceed without any errors
4. Verify for any error messages	confirm all information is valid and doesn't	The registration form should proceed

Reset

OK

Cancel

Apply

Help

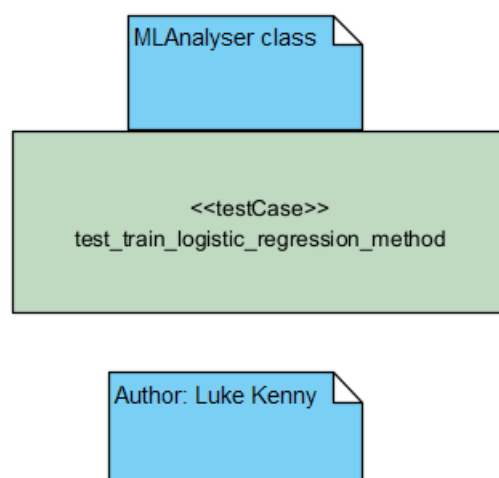
Test Case Specification

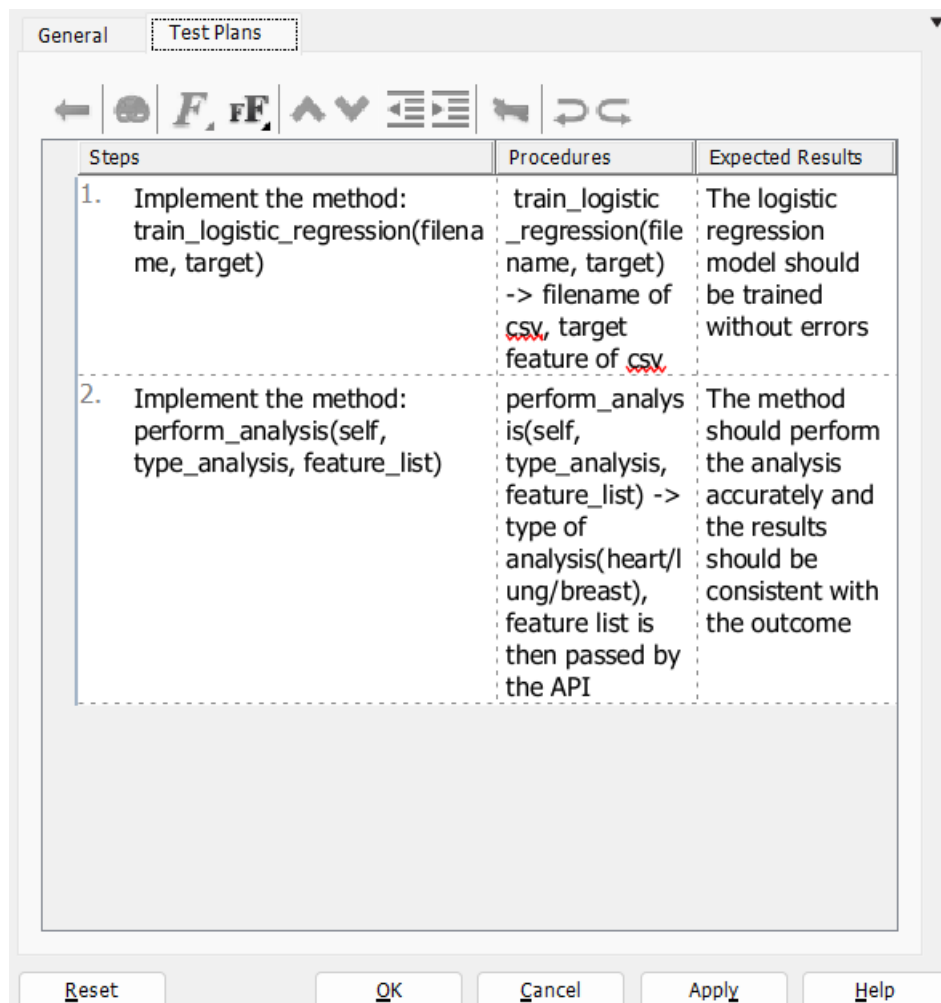
General Test Plans

Steps	Procedures	Expected Results
	email, occupation, employee number, password	the information is valid
3. Click the "register" button	press the "register" button when all the fields have been filled	the registration process should proceed without any errors
4. Verify for any error messages	confirm all information is valid and doesn't present any errors	The registration form should proceed without any errors
5. login using the registered information	The user should enter valid credentials for logging in and press the "login" button	On the login page, the user should be able to proceed and login successfully to the portal

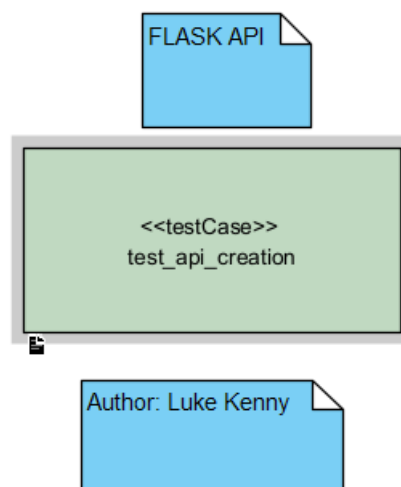
Reset OK Cancel Apply Help

## TEST CASE: MLAnalyser Class + methods:






## TEST CASE: Flask API:

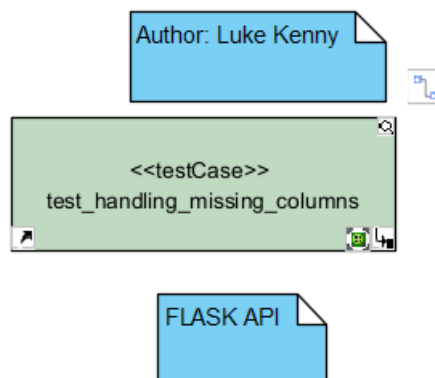


General


Test Plans



Steps	Procedures	Expected Results
1. Send a request to the @analysis route		The API should receive this request without any errors
2. Check that the API responds with the expected response or status code.		The API should respond without any errors, indicating its creation and the @analysis route will be accessible





General		Test Plans
		
Steps	Procedures	Expected Results
1. Send an analysis request for heart disease with missing columns		
2. Check that the API correctly handles the issue by filling in the missing columns and setting them to 0		The API should resolve the missing columns without any errors

## Wireframes:

### Health AI – Web (Registration Page)

HealthAI - Web  
(browser)

Registration

First Name

Surname

Email

Employee Number

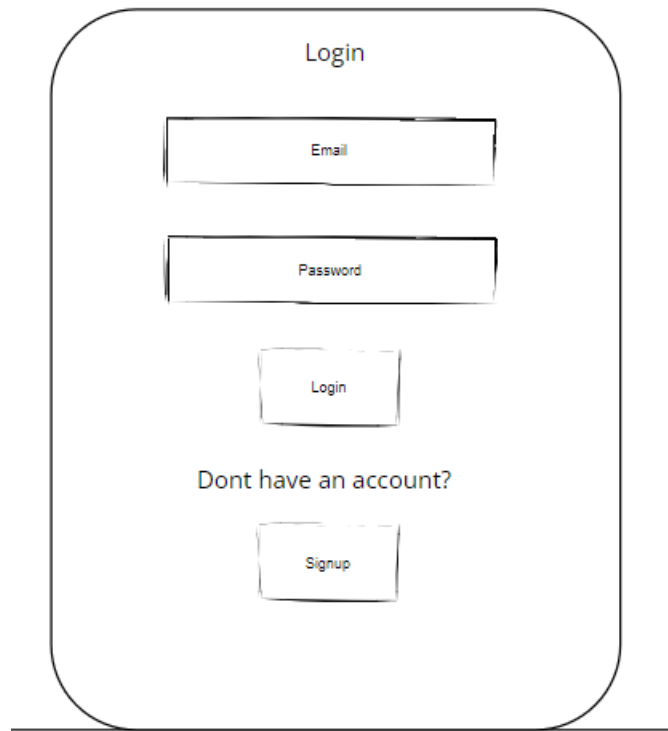
Password

Register

Already have an account?

Login

**HealthAI – Web (login page)**



A login and signup form for the Health AI App. The form is contained within a rounded rectangle with a black border. At the top, the word "Login" is centered. Below it are two input fields: "Email" and "Password". A "Login" button is positioned below the password field. Underneath the button is the text "Dont have an account?". At the bottom is a "Signup" button. The entire form is set against a light gray background, and a horizontal line is visible at the very bottom of the image.

Login

Email

Password

Login

Dont have an account?

Signup

**Health AI – App (registration activity)**

HealthAI App

Wireframe for registration page

Name

Surname

PPS Number

Email

Password

Confirm Password

Register

have an account?  
Login

Author: Luke Kenny

## HealthAI – App (login page)

# HealthAI App

Wireframe for  
login page

Email

Password

Login

OR

Social media login

Dont have an account?

Register