Modelling Document

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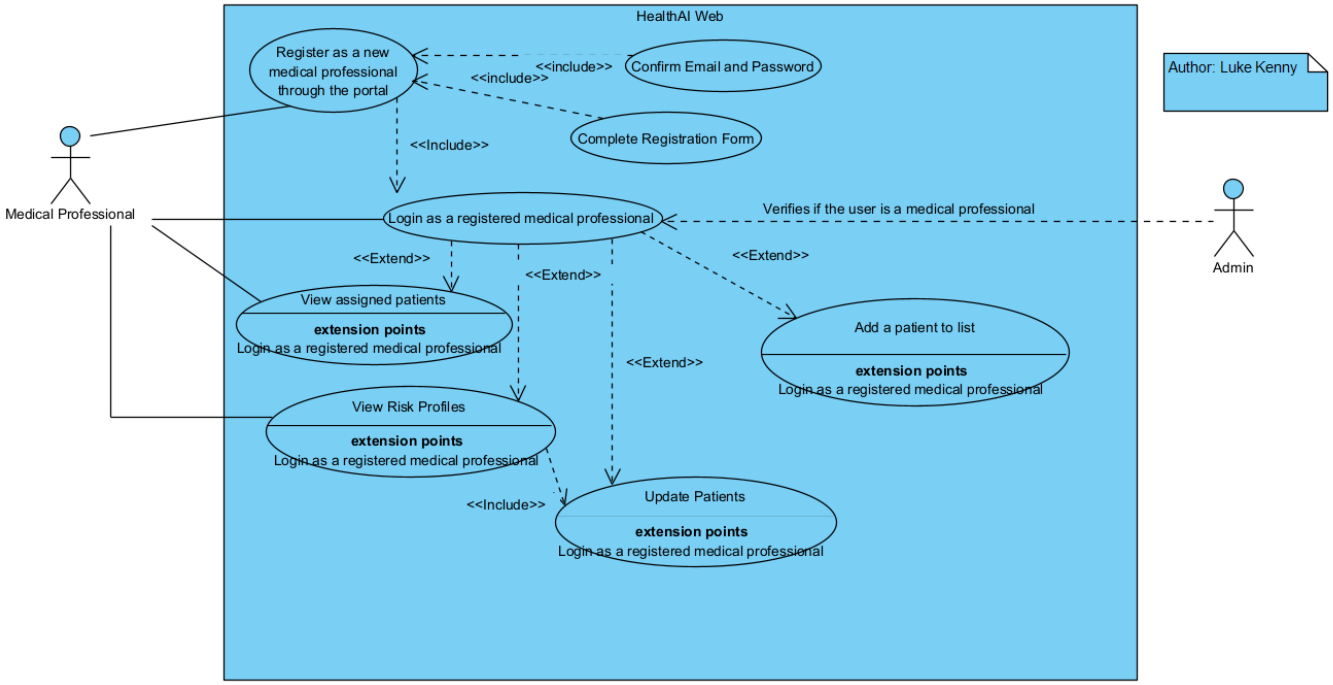
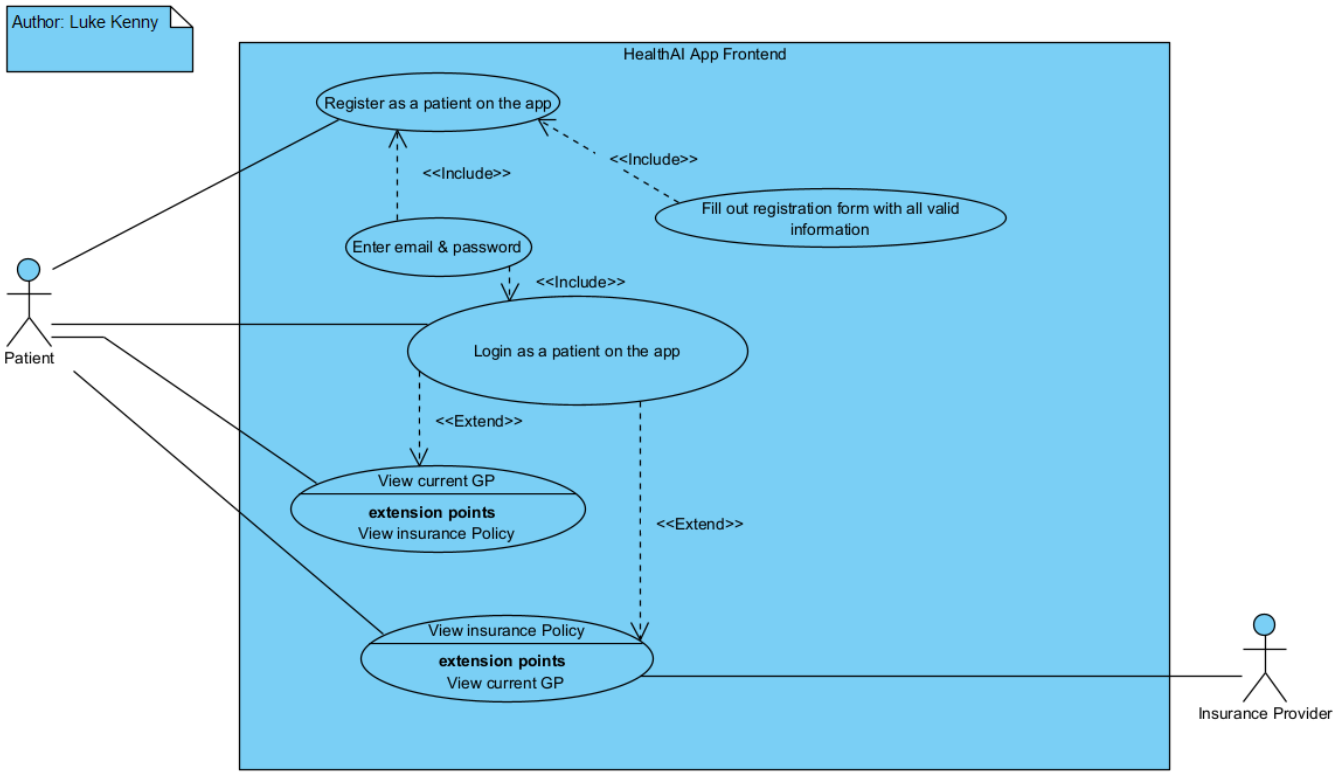
Use case Diagrams for features this sprint:

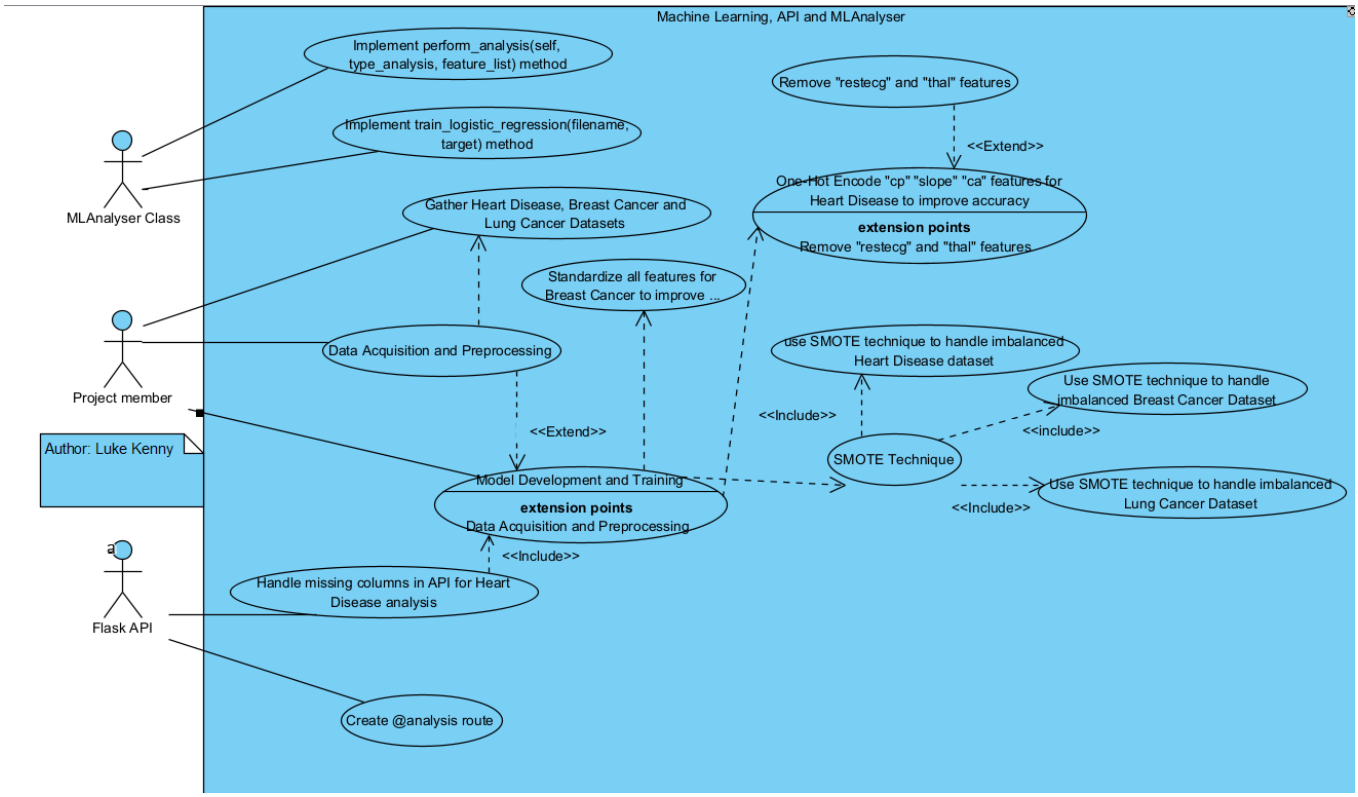
Health AI- Web (Registering and logging in)



HealthAI – App (Registering and logging in)

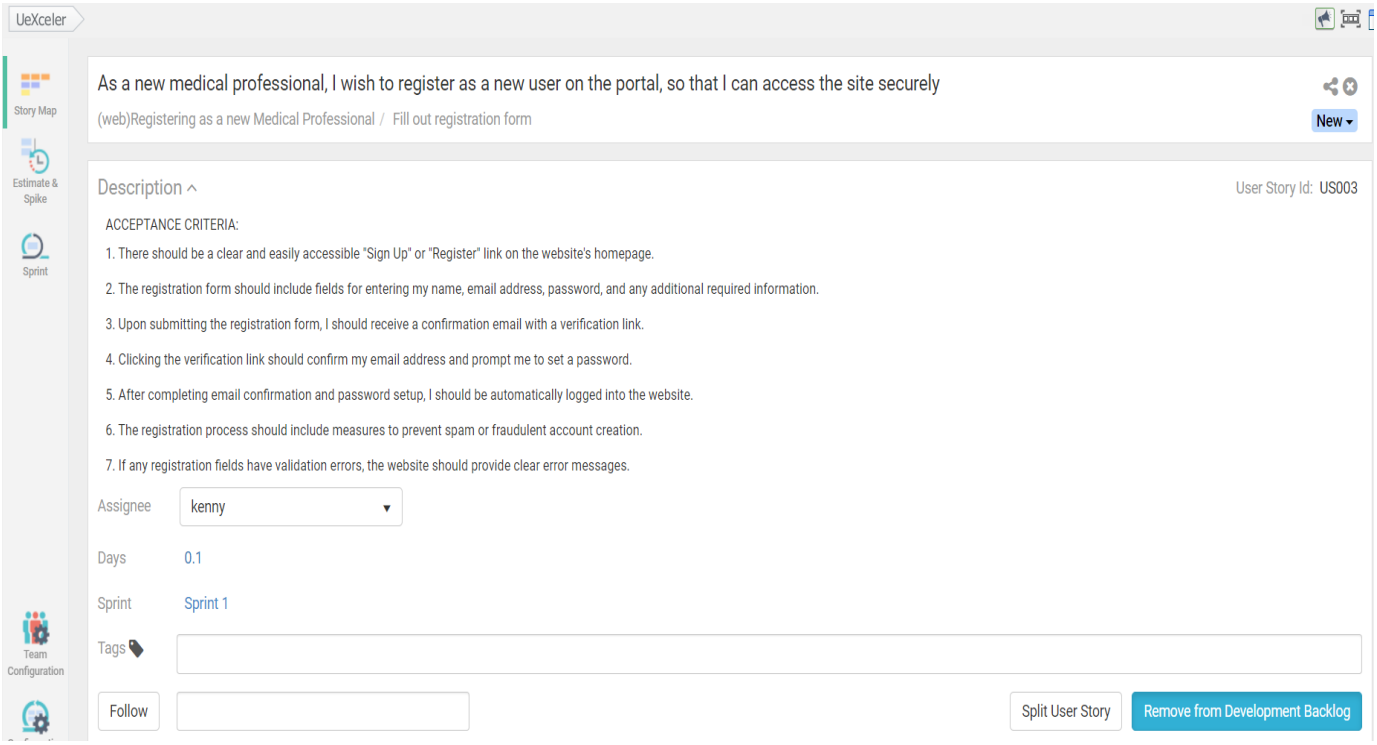


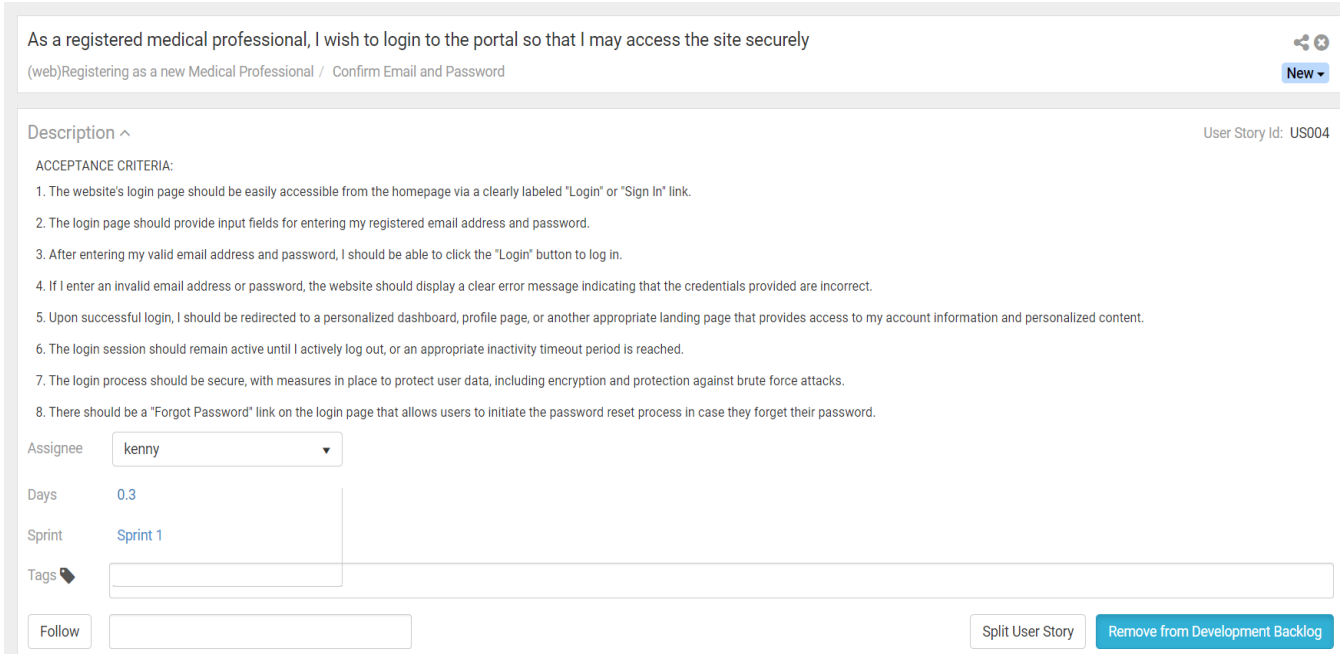
Machine Learning Models, Flask API and MLAnalyser Class:



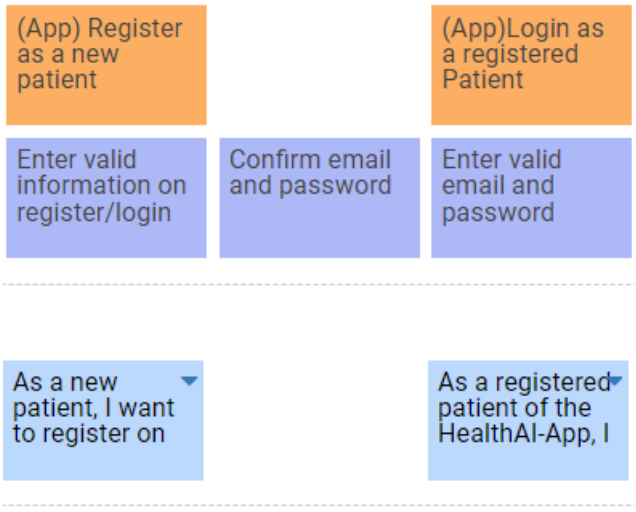
User Stories:

Health AI – Web





HealthAI – App



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.

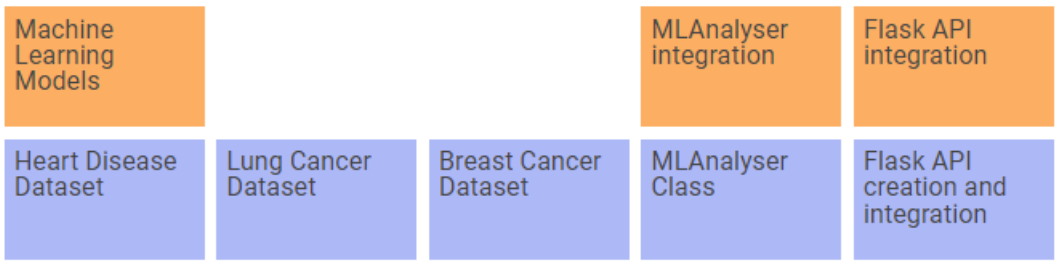
Assignee kenny

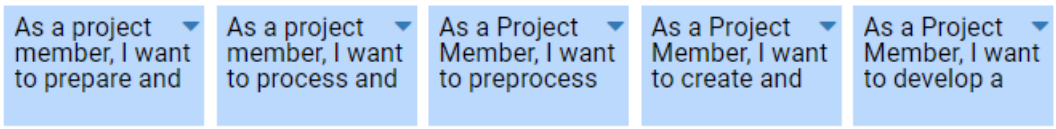
Days 0.4

Sprint Sprint 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.

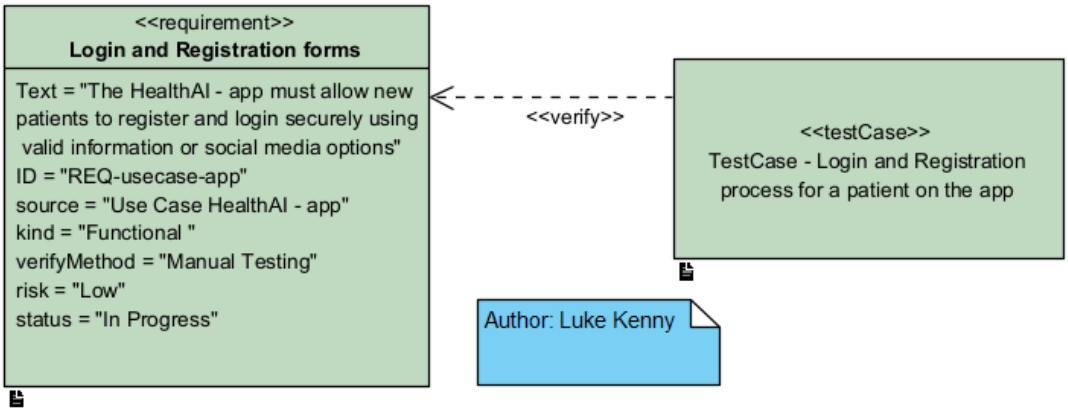
Solution Implementation: To resolve the missing columns issue, I must implement a one-hot encoder method that fills in any missing columns if they are no longer present and sets them to '0.'

Assignee kenny

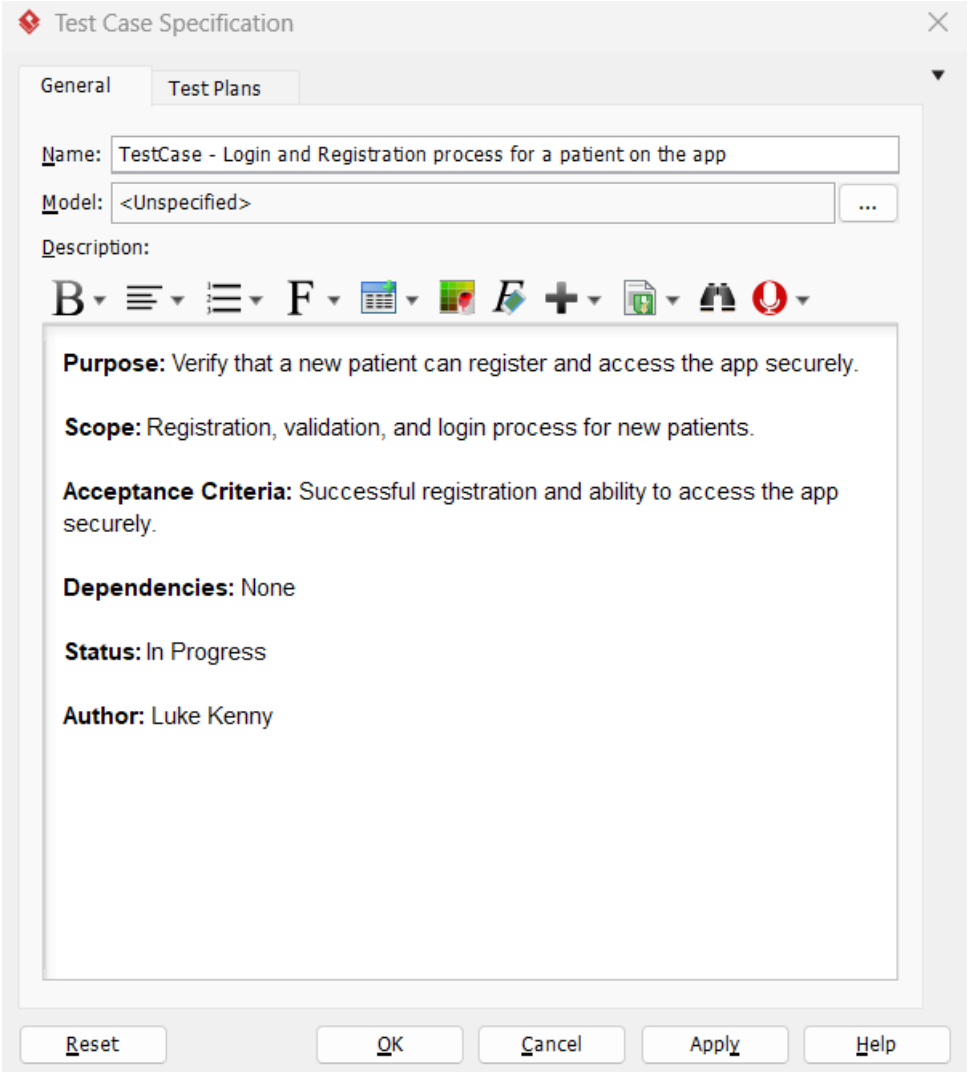
Days 0

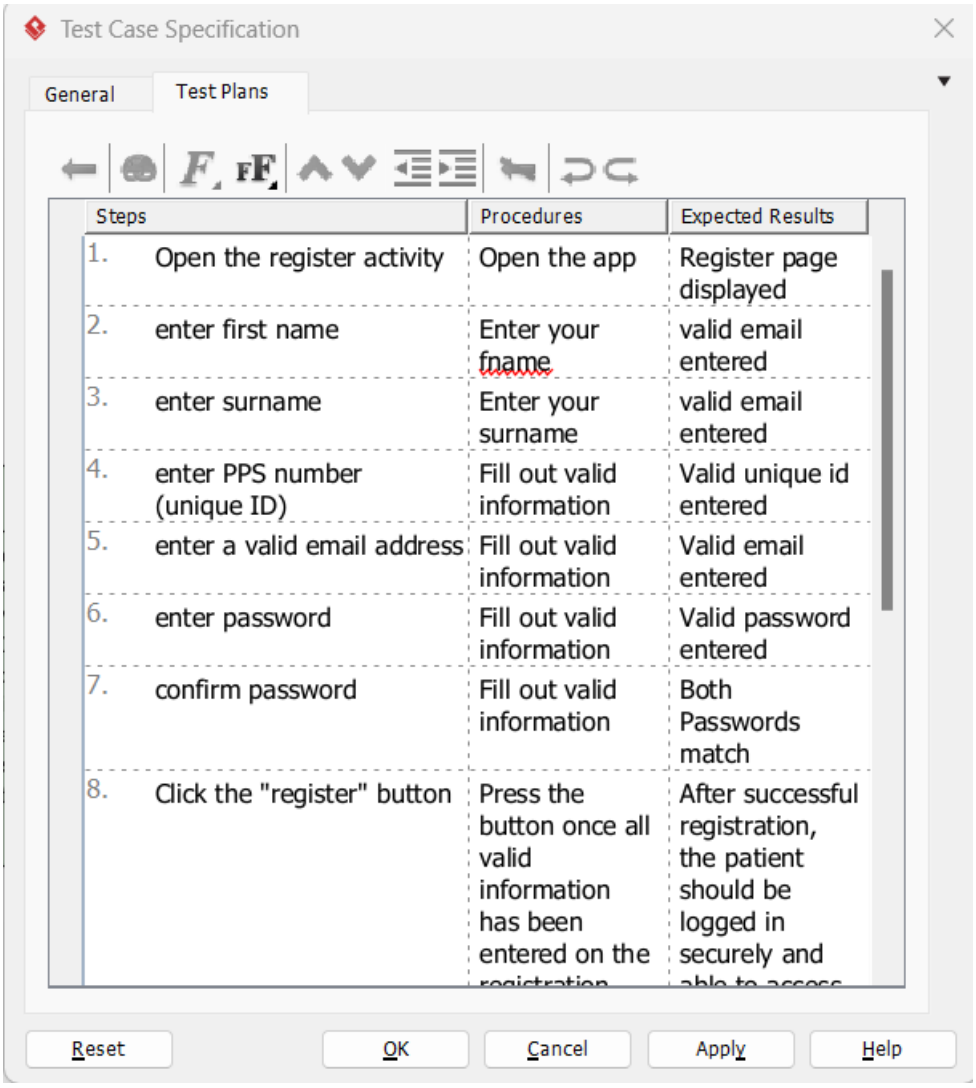
Test Cases:

HealthAI – APP



Test case steps:

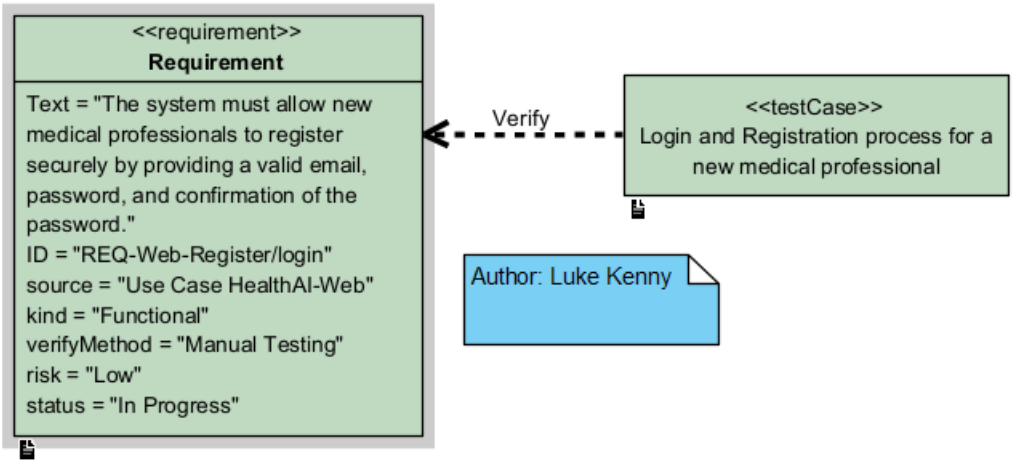



Test Case Specification
General
Test Plans
Steps
Procedures
Expected Results
1. Open the register activity
Open the app
Register page displayed
2. enter first name
Enter your fname
valid email entered
3. enter surname
Enter your surname
valid email entered
4. enter PPS number (unique ID)
Fill out valid information
Valid unique id entered
5. enter a valid email address
Fill out valid information
Valid email entered
6. enter password
Fill out valid information
Valid password entered
7. confirm password
Fill out valid information
Both Passwords match
8. Click the "register" button
Press the button once all valid information has been entered on the
After successful registration, the patient should be logged in securely and
Reset
OK
Cancel
Apply
Help

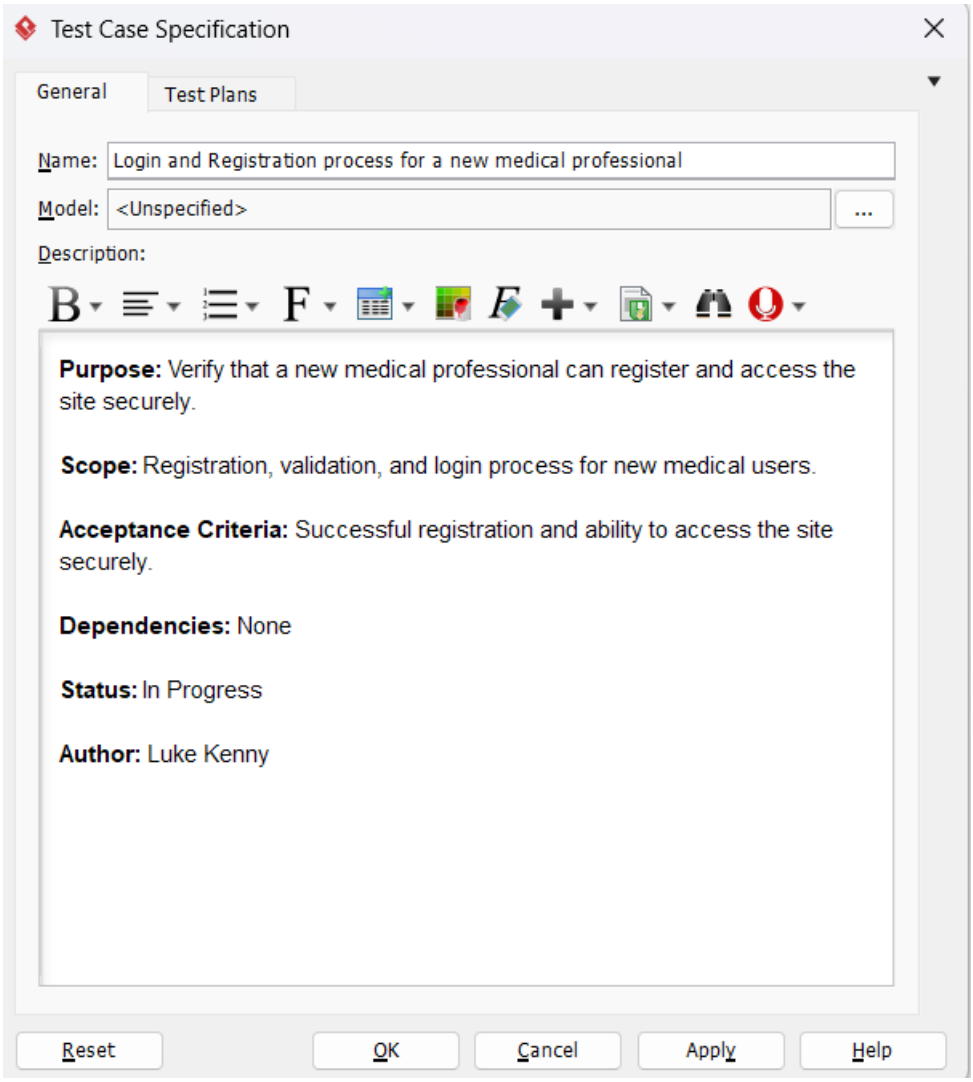
General | Test Plans

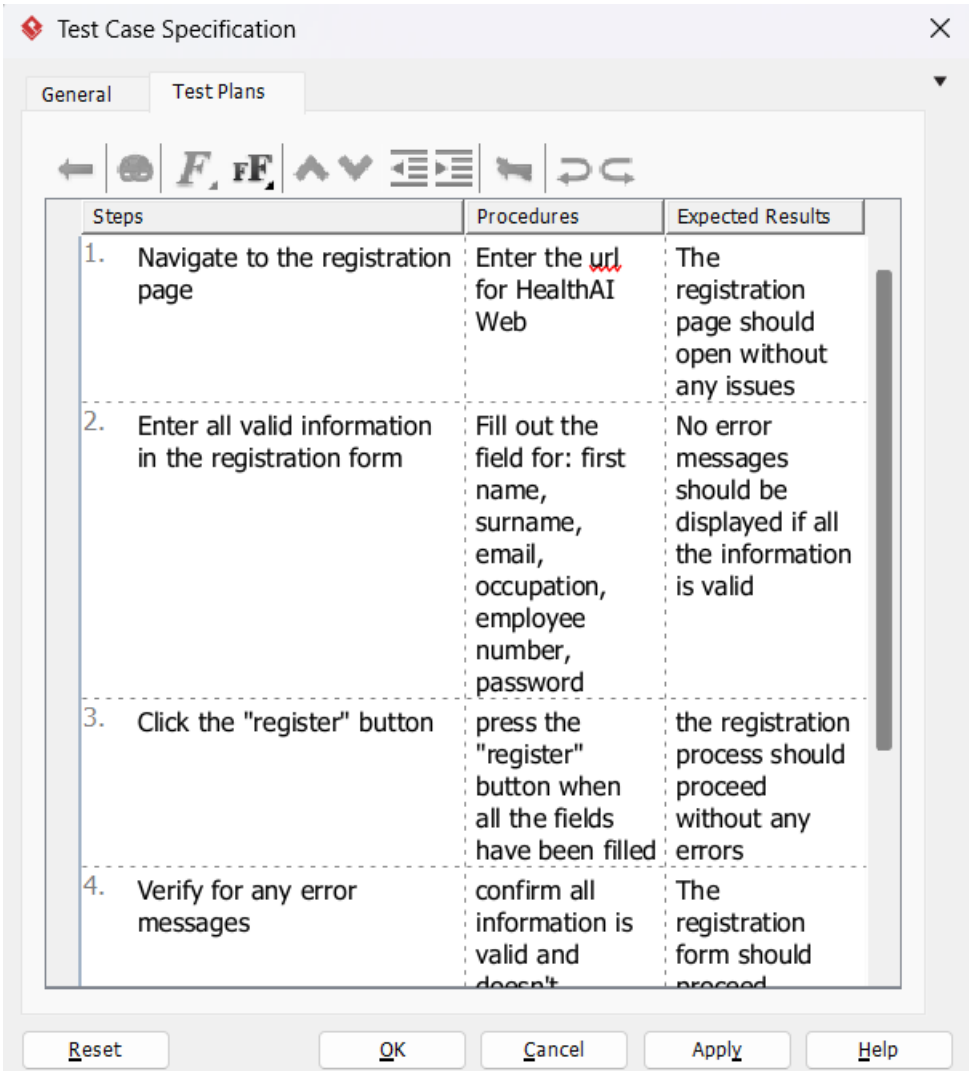
	Steps	Procedures	Expected Results
		registration form	able to access the app's features
9.	Verify registration proceeds without any error messages	Ensure all information entered is valid	No error messages should be displayed if all fields are filled with valid information
10.	Enter valid email and password 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

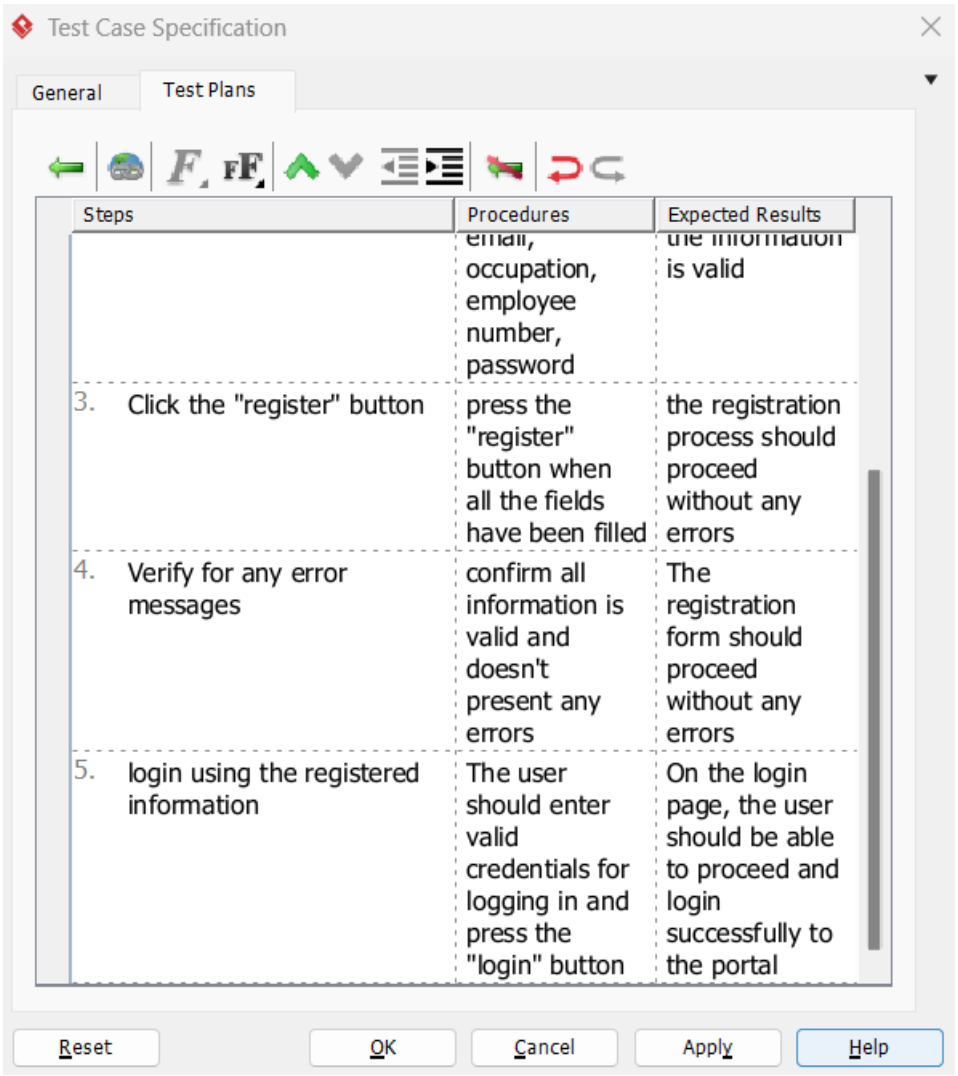
HealthAI – Web:



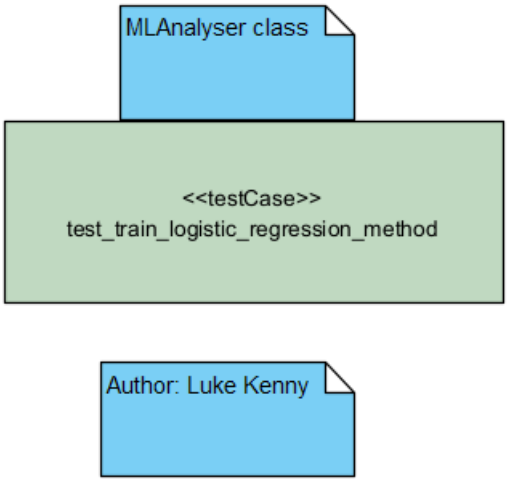
Test case steps:




Test Case Specification
General
Test Plans
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
The registration form should
Reset
OK
Cancel
Apply
Help



TEST CASE: MLAnalyser Class + methods:

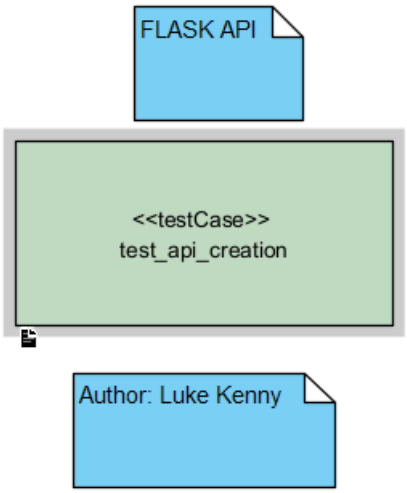


General | Test Plans

Steps	Procedures	Expected Results
1. Implement the method: train_logistic_regression(filename, target)	train_logistic_regression(filename, target) -> filename of csv, target feature of csv	The logistic regression model should be trained without errors
2. Implement the method: perform_analysis(self, type_analysis, feature_list)	perform_analysis(self, type_analysis, feature_list) -> type of analysis(heart/lung/breast), feature list is then passed by the API	The method should perform the analysis accurately and the results should be consistent with the outcome

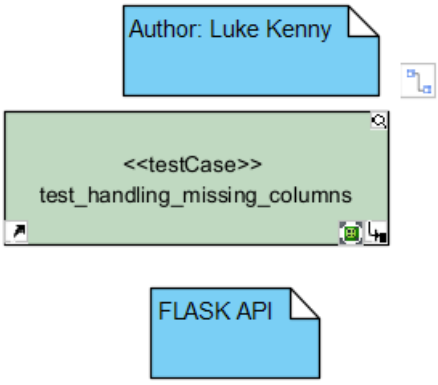
Reset | OK | Cancel | Apply | Help

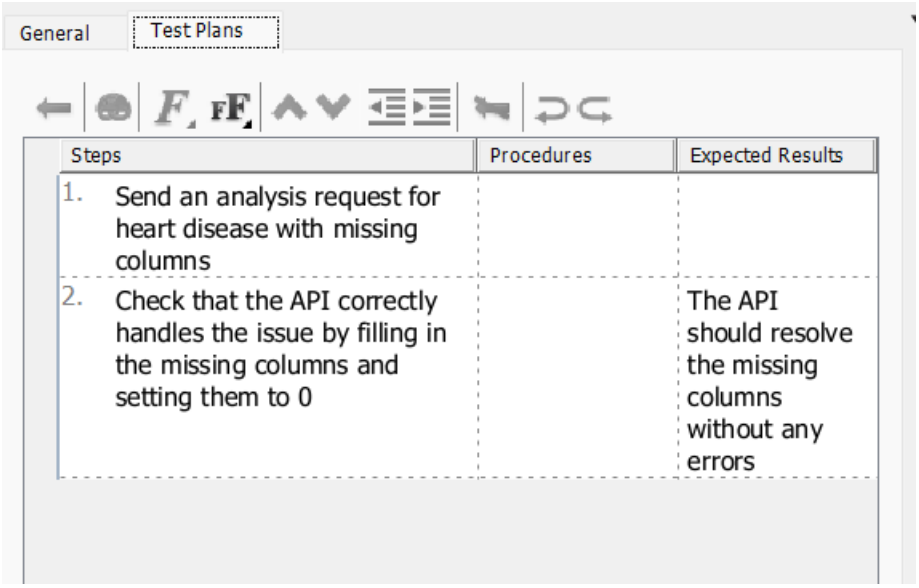
TEST CASE: Flask API:



General | Test Plans

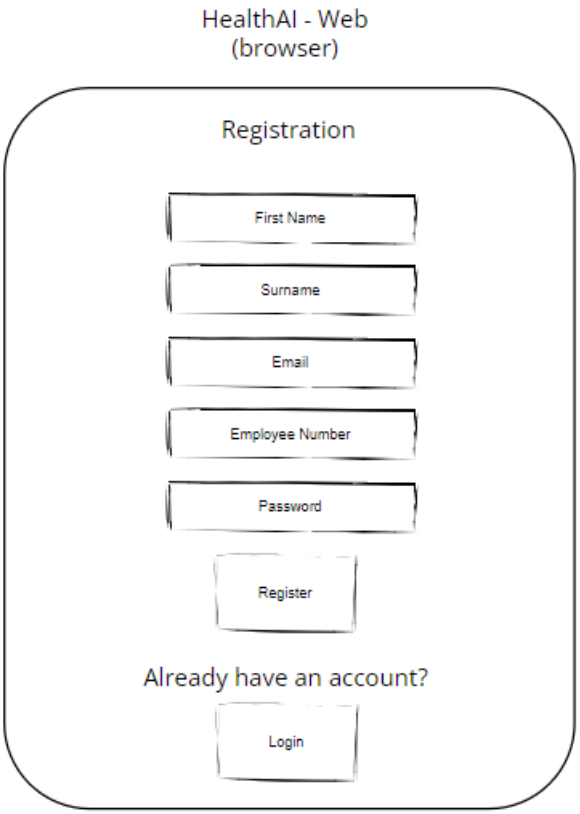
Steps	Procedures	Expected Results
1. Send a request to the @analysis route		The API should receive this request without any errors
2. Check that the API responds with the expected response or status code.		The API should respond without any errors, indicating its creation and the @analysis route will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



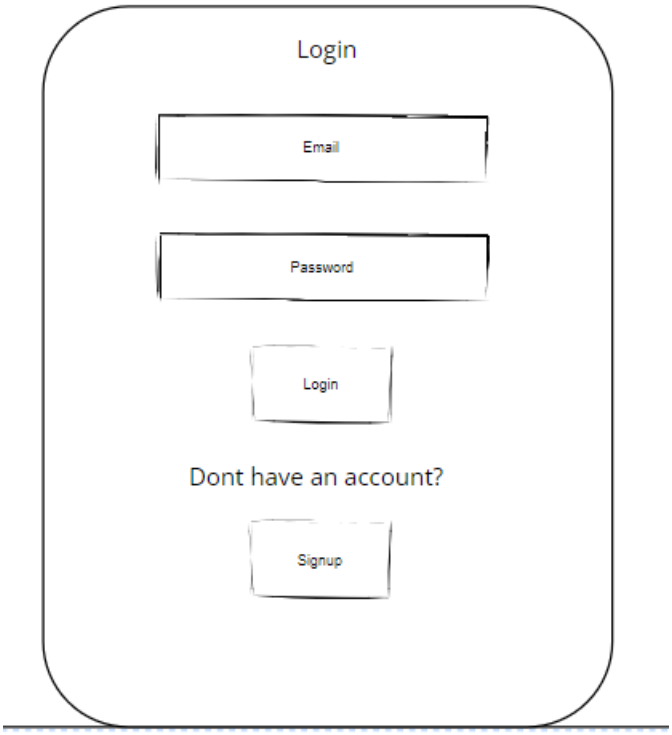


Wireframes:

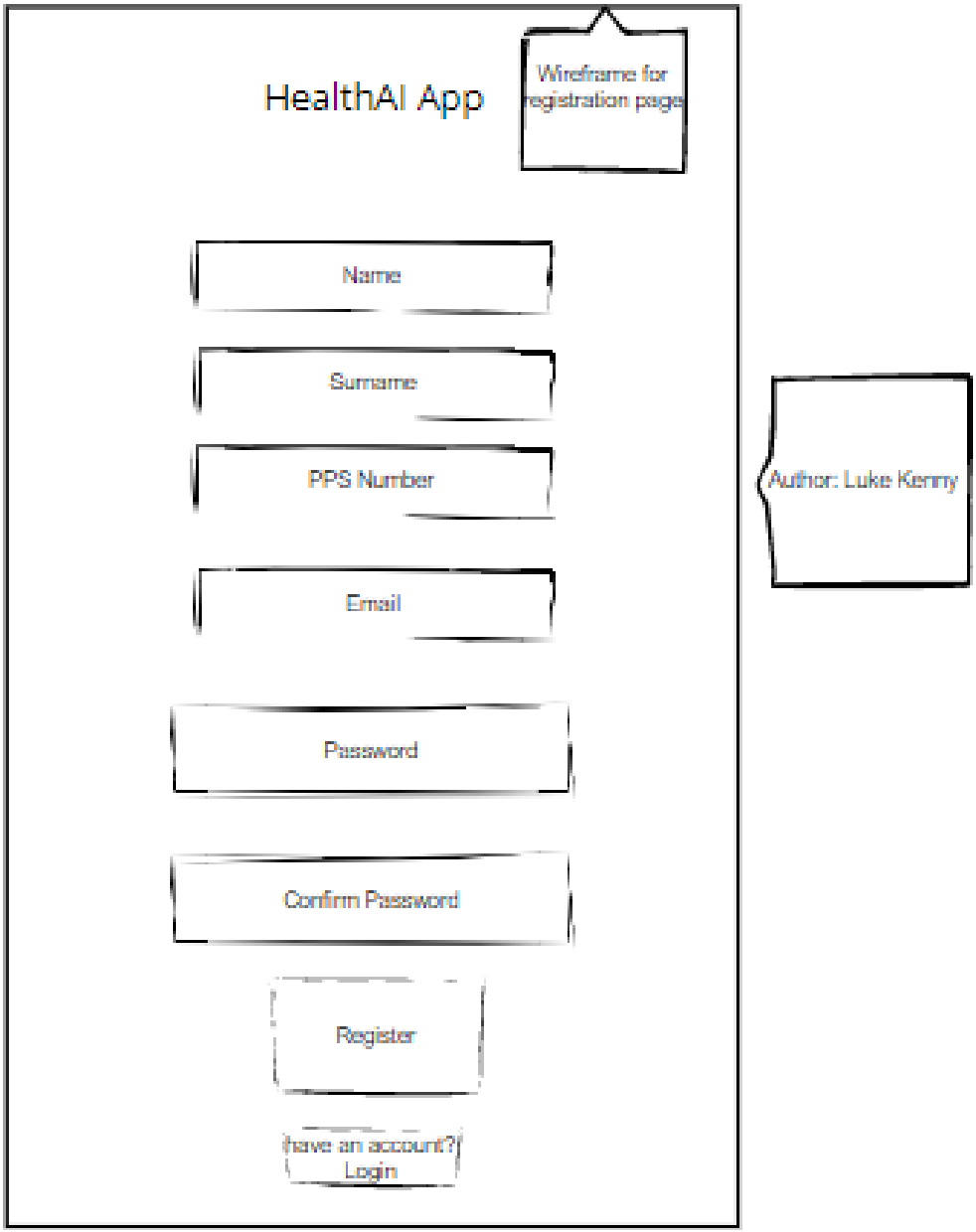
Health AI – Web (Registration Page)



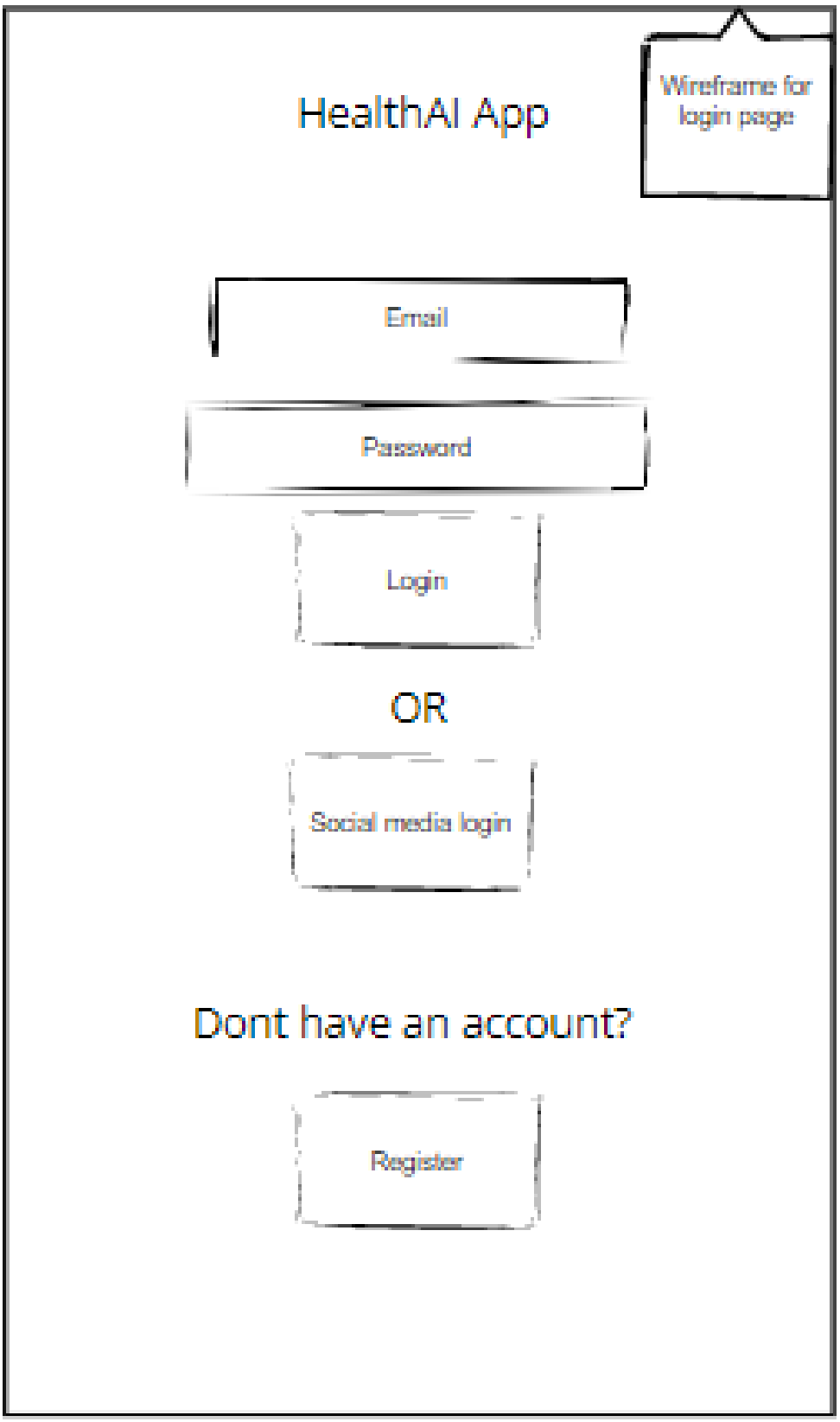
HealthAI – Web (login page)



Health AI – App (registration activity)



HealthAI – App (login page)


HealthAI App
Wireframe for login page
Email
Password
Login
OR
Social media login
Dont have an account?
Register