

User Interface Instructions:

Welcome Page:

After entering the URL to the web application into a browser (such as Google Chrome, Microsoft Edge, or Firefox), the clinician is presented with the welcome page. This consists of a header reading “Welcome to the Cardiovascular Disease Predictor!” and two buttons labeled “Login” and “Signup”. If the clinician clicks on the login button, they will be redirected to the login page; likewise, if the clinician clicks on the signup button, they will be redirected to the signup page.

In order to illustrate that the buttons are interactable, the mouse cursor will transform into a pointer when hovered over a button. Additionally, the background color of the button will lighten slightly. When clicked, the background color of the button will lighten further to signify that the click has been successfully received. These indicators will be consistent across the buttons on every page of the web application.

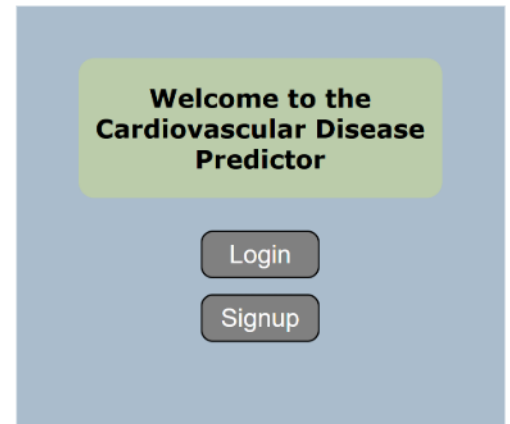


Figure 1: Welcome Page

Signup Page:

The signup page is accessed through clicking the “Signup” button on the welcome page. Alternatively, the clinician could enter the URL to the web application followed by “/signup” into a browser. The signup page consists of a header reading “Signup” and a form asking for several fields: “First Name”, “Last Name”, “Company”, “Username”, “Password”, and “Confirm Password”.

To begin filling out a field, the clinician can either click on the input box directly, or can click on the label above the input box. The characters which can be entered into the boxes are limited to lowercase and uppercase letters, numbers, and the special characters on the keyboard. Any attempts to enter an invalid character, such as an emoticon, will have no effect on the current state of the box. The same is true for any attempt to paste an invalid character from the clipboard.

For the first four fields, the input is limited to 64 characters. Additional restrictions are placed on the “Password” and “Confirm Password” fields. The input for the “Password” must be at least eight characters in length, and must include at least one lowercase letter, at least one uppercase letter, at least one number, and at least one special character. If the input does not meet any of these requirements, a warning message will be depicted below the box, and the border of the box will change to red. The warning will describe the requirement which has not been met. In the case that the input does not meet several of the requirements, the warning message will describe each requirement which has not been met. The warning message will remain until the clinician types a proper input into the box, and then either hits enter or clicks out of the box.

The input for the “Confirm Password” field must exactly match the input for the “Password” field. Otherwise, a warning message will be displayed in the same manner as above, with the message “Passwords must match.”

After entering a valid entry into every box, the clinician can hit the signup button to submit the form. The clinician will then be redirected to the welcome page. In the case that a box has been left empty and the signup button has been clicked, a HTML popup will appear below the box, reading “Please fill out this field.” In the case that the “Password” or “Confirm Password” fields have been filled out incorrectly, the signup button will have no effect. The clinician must edit these fields until all warning messages disappear, and then must click the signup button again.

The image shows a web form titled "Signup" in a green header. Below the header is a pinkish-purple box containing the form fields. The fields are labeled "First Name:", "Last Name:", "Company:", "Username:", "Password:", and "Confirm Password:". Each label is followed by a white input box. At the bottom of the pinkish-purple box is a white "Signup" button.

Figure 2: Signup Page

The image shows the same "Signup" form as Figure 2, but with error messages. The "Password:" input box has a red border and a red error message below it: "Password requires 1 number. Password requires 1 special character." The "Confirm Password:" input box also has a red border and a red error message below it: "Passwords must match." The "Signup" button is still at the bottom.

Figure 3: Signup Error Messages

Login Page:

The signup page is accessed through clicking the “Login” button on the welcome page. Alternatively, the clinician could enter the URL to the web application followed by “/login” into a browser. The signup page consists of a header reading “Login” and a form containing a “Username” field and a “Password” field.

To begin filling out a field, the clinician can either click on the input box directly, or can click on the label above the input box. As on the signup page, the characters which can be entered into the boxes are limited to lowercase and uppercase letters, numbers, and the special characters on the keyboard. Any attempts to enter or paste in an invalid character will have no effect. The input is limited to 64 characters. The clinician can hit the login button to submit the form. In the case that a box has been left empty and the login button has been clicked, a HTML popup will appear below the box, reading “Please fill out this field.”

The credentials input by the clinician will be compared to the accounts stored in the database. If the credentials belong to an existing account, then the clinician will be redirected to the user home page associated with that account. If the credentials do not belong to an existing account, the clinician will be redirected to the login page, now with the warning message “Invalid Credentials.” The “Username” and “Password” fields will be cleared, allowing the clinician to attempt the login process again.

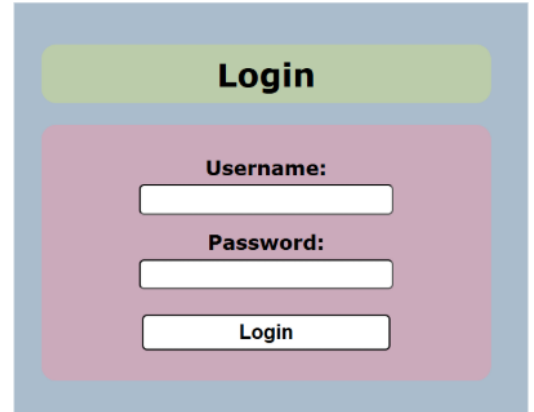
A screenshot of the login page. It features a light blue background. At the top, there is a green rounded rectangle with the word "Login" in bold black text. Below this, there is a pink rounded rectangle containing the login form. The form has two labels, "Username:" and "Password:", each followed by a white input box. At the bottom of the pink rectangle is a white "Login" button.

Figure 4: Login Page

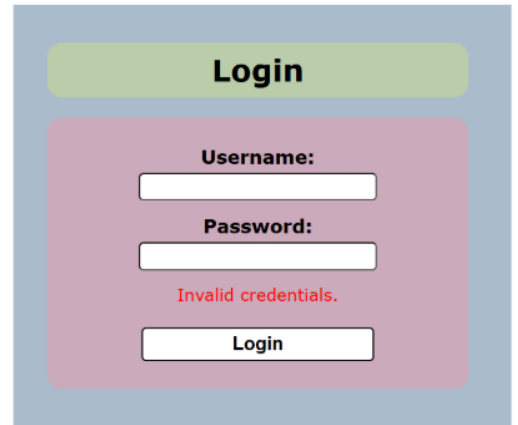
A screenshot of the login page showing an error message. It has the same layout as Figure 4, but with an additional red text message "Invalid credentials." displayed below the password input box. The "Login" button remains at the bottom.

Figure 5: Login Error Message

User Home Page:

The user home page is accessed through inputting valid credentials to the login page, as described above. After having logged in, the clinician can return to the user home page at any time by entering the URL to the web application followed by “/user_home” into a browser. Any attempt to enter this modified URL before logging in will redirect the clinician to the welcome page.

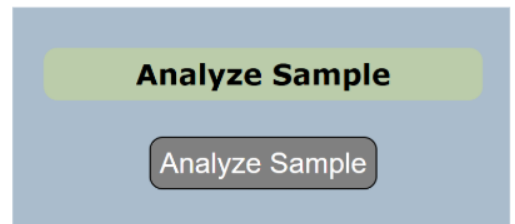


Figure 6: User Home Page

The user home page consists of a header and a button, both reading “Analyze Sample”. Clicking on the button will redirect the clinician to the sample form page.

Sample Form Page:

The sample form page is accessed through clicking the “Analyze Sample” button on the user home page, as described above. After having logged in, the clinician can return to the sample form page at any time by entering the URL to the web application followed by “/sample_form” into a browser. Any attempt to enter this modified URL before logging in will redirect the clinician to the welcome page.

Figure 7: Sample Form Page

The sample form page consists of a header reading “Please Enter Sample Data: ”. The following form contains requests for a CSV file and a “Prediction Type”. To upload a CSV file, the user must click on the button labeled “Select file”. They will then be presented with the standard interface for selecting a file from their computer. After they select a file through this interface, the text on the button will update to the uploaded filename. In the case that the filename is longer than ten characters, it will be abbreviated to a string consisting of the first four characters joined with “....csv”. In this form, the button can still be clicked to re-open the file selection interface. If the clinician were to select the wrong file, they could use this feature to browse their computer again and select the correct file.

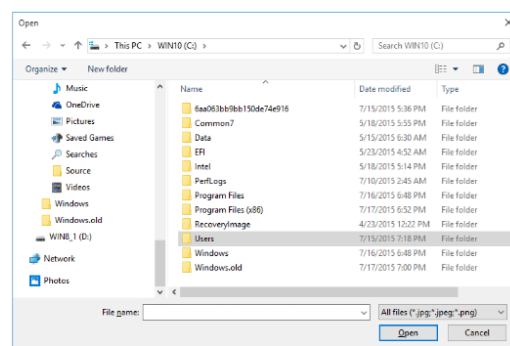


Figure 8: Standard File Selection Interface

The inputs to the “Prediction Type” field are limited to 1 or 2. An input of 1 signifies that the sample data will be processed using a ML model which identifies the likely presence of any cardiovascular disease. An input of 2 signifies that the sample data will be processed using a ML model which identifies whether a particular cardiovascular disease is most likely present. This model can identify the likely presence of hypertension, coronary artery disease, cardiomyopathy, heart failure, or congenital heart disease.

After a file has been selected and a prediction type has been entered, the clinician can click on the “Submit” button to process the data. After this is complete, the clinician will be redirected to the results page. In the case that the “Submit” button is clicked before a file is selected, the clinician will be redirected to the sample form page, now with a warning message “A file must be selected” above the button. The clinician must upload a file, select a prediction type, and click on the submit button again to proceed.

Figure 9: Sample Form Error Message

Results Page:

The results page is accessed through submitting the form on the sample form page, as described above. After having logged in, the clinician can return to the results page at any time by entering the URL to the web application followed by “/results” into a browser. Any attempt to enter this modified URL before logging in will redirect the clinician to the welcome page.

The results page displays the output of the ML model. If the model associated with prediction type 1 was run, and the presence of cardiovascular disease was detected, then the results page would be identical to that in Figure 10. If this model was run and the presence of disease was not detected, the message would be modified to “The sample was found to have a low risk of cardiovascular disease.”

If the model associated with prediction type 2 was run, and a disease was found, then the results page would display the message, “The presence of {DISEASE} was detected in the sample.” The block {DISEASE} would be replaced with HYPERTENSION, CORONARY ARTERY DISEASE, CARDIOMYOPATHY, HEART FAILURE, or CONGENITAL HEART DISEASE, depending on the relevant ailment detected. If this model was run and the presence of disease was not detected, the message would be modified to “The sample was found to have a low risk of cardiovascular disease.”

At the base of the results page is a button marked “Analyze Another Sample”, which will redirect the clinician to the sample form page.

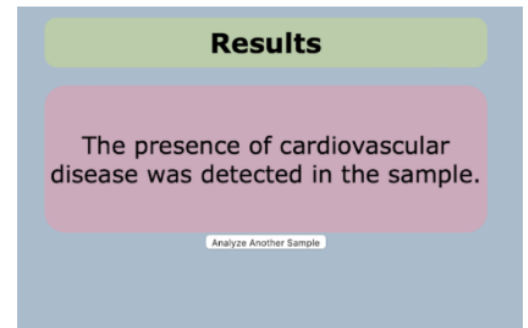


Figure 10: Results Page