

# SonicWalk

## User Guide

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The application is designed to be responsive and fully adapt to the size and resizing of the window.

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## Side Menu

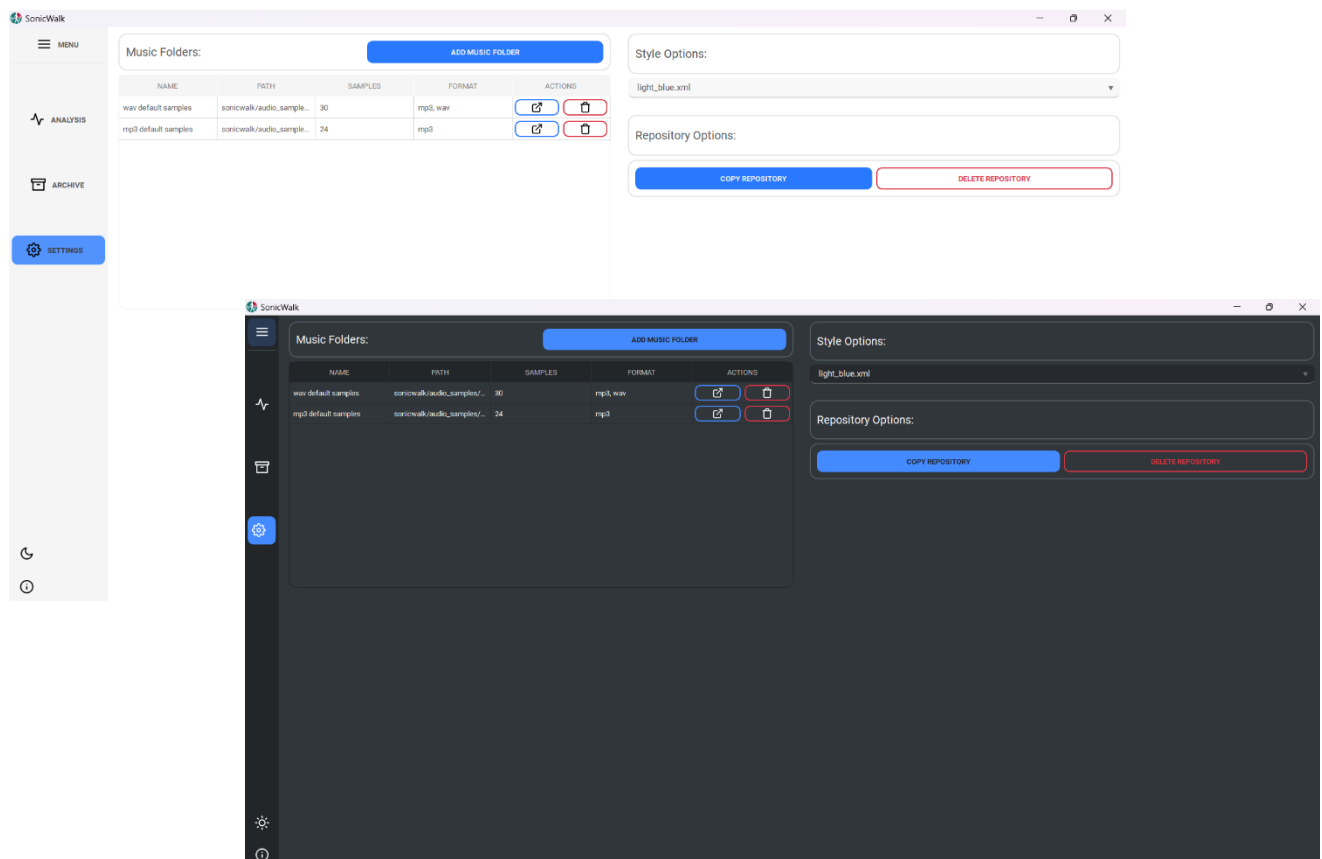
The application includes a side menu located on the left side of the screen. At the top of this menu, there is a "hamburger" icon that allows you to expand or collapse the entire menu. When the menu is expanded, descriptive labels appear next to the icons. The side menu is divided into two groups of icons:

### 1. Pages:

- Each icon in this group represents a different page of the application, such as:
  - Analysis
  - Archive
  - Settings

### 2. Actions:

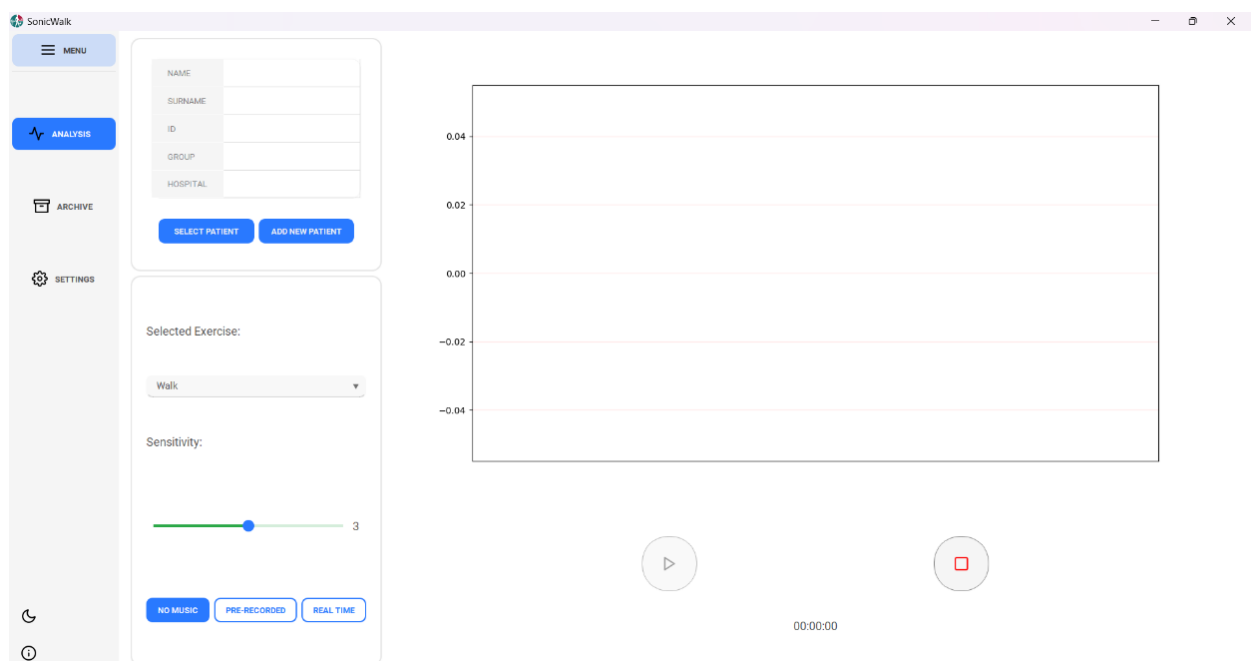
- The icons in this group represent specific actions, such as:
  - Toggle Theme: to change the interface theme.
  - Documentation (Info): to view information about the application's documentation.



## Analysis

The analysis page offers a range of features for managing and performing exercises, allowing you to:

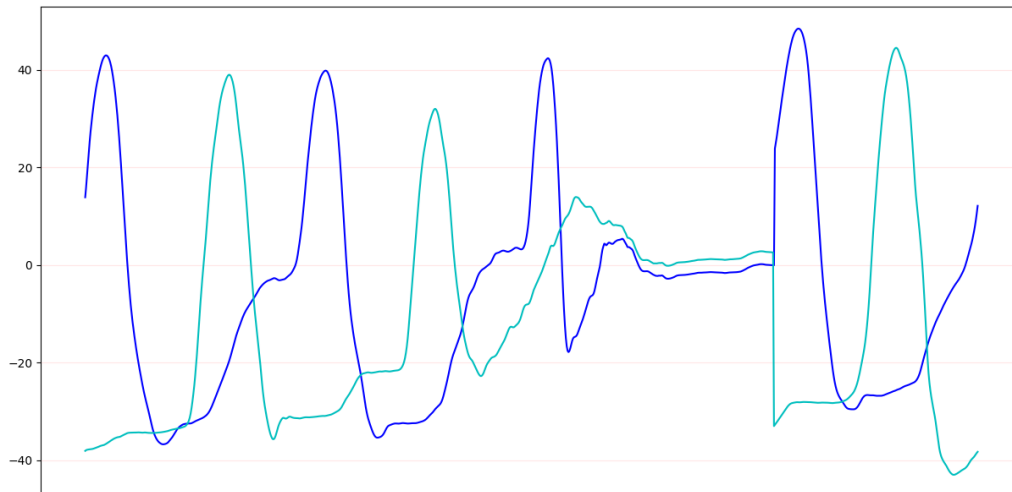
- Add and select patients
- Choose the type of exercise and configure all related parameters
- Select the music folder to play
- View and record the selected exercise
- Stop the exercise
- Select the session number
- Save and comment on the exercise



## Real-Time Visualization and Controls

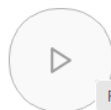
In the top right quadrant, you can monitor the real-time progress of the signals from both legs during the exercise. Directly below the graph, there are the play button, the stop button, and a timer.

- The timer shows the time elapsed since the start of the exercise and will turn red when there are 10 seconds remaining.



00:22.13

- The **play** button is initially disabled until a patient is selected. When it is disabled, a tooltip informs the user to select a patient before starting the recording.



Please select a patient before recording.



00:00:00

- There is no pause button; the **stop** button directly ends the recording. If the exercise is stopped manually, it will not be saved.

## Patient Management

In the top left, a table (initially empty) displays the main information of the selected patient. This section also includes buttons to select and add a new patient, which open the respective modals.

NAME	
SURNAME	
ID	
GROUP	
HOSPITAL	

SELECT PATIENT
ADD NEW PATIENT

### Patient Selection Modal

- Contains a list of all patients and a search bar to facilitate searching.
- Includes filters to select patients based on: hospital, group (pathology), gender, and age range.

Select Patient
?
×

Hospitals
Groups
Genders
Ages

Testing Developer
ID: (00001)

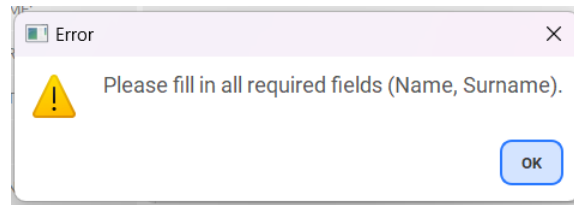
- Once a patient is selected, the modal automatically closes, the table is populated with the patient's data, and the play button is enabled.

NAME	Testing
SURNAME	Developer
ID	00001
GROUP	Healthy
HOSPITAL	UNIMI

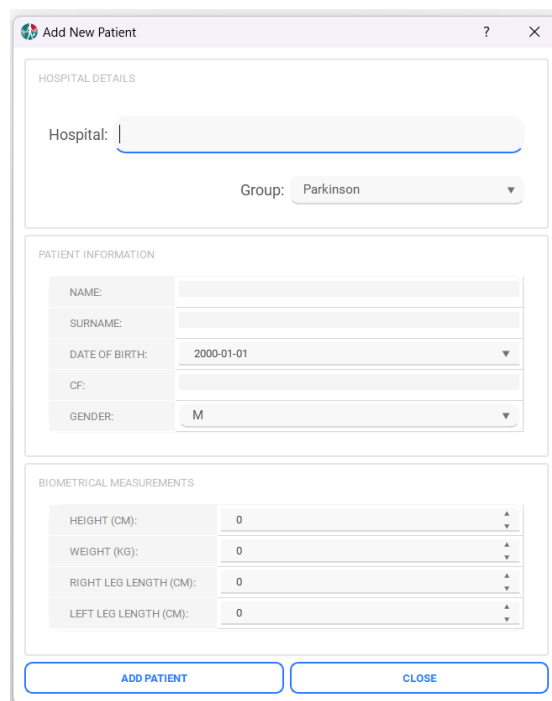
SELECT PATIENT
ADD NEW PATIENT

## New Patient Addition Modal

- Presents all the necessary fields to enter the data of a new patient.
- At least the First Name and Last Name are required.



- After confirmation, the new patient is added to the list, the modal closes, the patient is automatically selected, the table is populated with the patient's data, and the play button is enabled.

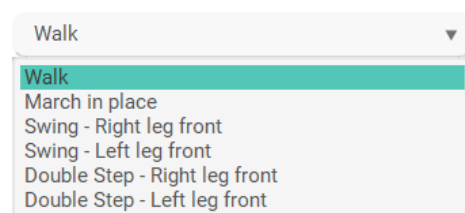
A form titled "Add New Patient" with three sections: "HOSPITAL DETAILS", "PATIENT INFORMATION", and "BIOMETRICAL MEASUREMENTS".  
- "HOSPITAL DETAILS": A text input for "Hospital:" and a dropdown for "Group:" with "Parkinson" selected.  
- "PATIENT INFORMATION": Fields for "NAME:", "SURNAME:", "DATE OF BIRTH:" (with a date picker showing "2000-01-01"), "CF:", and "GENDER:" (with a dropdown showing "M").  
- "BIOMETRICAL MEASUREMENTS": Four rows with labels and numeric inputs with up/down arrows: "HEIGHT (CM):", "WEIGHT (KG):", "RIGHT LEG LENGTH (CM):", and "LEFT LEG LENGTH (CM)".  
At the bottom are two buttons: "ADD PATIENT" and "CLOSE".

## Exercise Selection Section

In the bottom left, there is a section dedicated to the selection of the exercise, its parameters, and the music. This section includes:

**Exercise Selection:** A dropdown menu that allows you to choose from 6 different exercise modes:

- Walk
- March in Place
- Swing (right leg forward)
- Swing (left leg forward)
- Double Step (right leg forward)
- Double Step (left leg forward)



**Music Mode:** A group of 3 buttons to select the music mode:

- No Music
- Pre-Recorded
- Real Time

Each mode offers specific parameters for the exercise and allows real-time analysis of leg signals and average bpm analysis.

Three panels illustrating the Music Mode interface. Each panel shows a 'Selected Exercise' dropdown menu (set to 'Walk'), a 'Sensitivity' slider (set to 3), and three buttons: 'NO MUSIC', 'PRE-RECORDED', and 'REAL TIME'. The middle panel also includes a 'Selected Music' dropdown menu (set to 'wav default samples') and a 'Velocity' slider (set to 60 bpm).

### "No Music" Mode

This mode is a training mode with a fixed exercise duration of only 25 seconds. It is used to approximate the average bpm of a patient's steps during the exercise without using music. It includes:

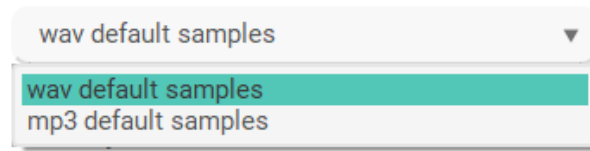
- **Sensitivity Slider:** Adjustable from 1 to 5, where higher sensitivity detects smaller movements with less precision. The recommended sensitivity level is 3. The sensitivity level is stored for each patient and exercise, and it is reused in subsequent executions.

Three examples of the Sensitivity slider. The top slider is green and set to 3, with a tooltip "Suggested Level: 3". The bottom-left slider is yellow and set to 4, with a tooltip "Sensitivity is inversely proportional to detection accuracy". The bottom-right slider is red and set to 5.

### "Pre-Recorded" Mode

This is a comprehensive exercise mode lasting 90 seconds and includes:

- **Selection of Music Folder:** From those added in the settings.



- **BPM Slider:** To set the BPM value. If the "No Music" mode was used, the approximate value is automatically suggested.



- **Sensitivity Slider:** Same as in "No Music" mode.



During the exercise, background music is played at the preset BPM, and the patient follows its rhythm.

### "Real Time" Mode

This mode does not require a preset BPM, lasts 90 seconds, and includes:

- **Adjustment of Parameters:** All adjustable parameters except the BPM slider remain available.

The selected music is played in real-time, one sample at a time, synchronized with the actual steps detected from the patient.

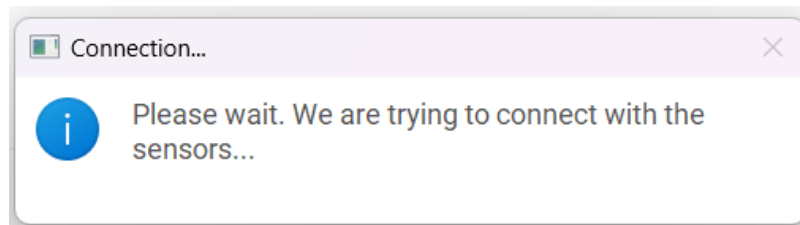
## Recording and Saving

Once the patient is selected and exercise parameters are set, you can start the recording using the Play button. Each exercise, except those in "No Music" mode, lasts for 90 seconds. If the recording is stopped prematurely, the content will not be saved.



## Startup Procedure

- **Sensor Connection:** At the start of recording, a waiting message will appear, blocking execution until the sensors are connected. Any issues will be reported through error messages.



**NB:** If the sensors are powered on but inactive for several minutes, they enter standby mode and are not detected. In this case, you need to move them to wake them up and resume blinking. This allows them to be detected again.

## Wearing the Sensors

Each sensor has a unique ID written on the back, identified with the label SN: "code". The application uses these IDs to determine which leg each sensor should be worn on.

The two sensor IDs must be sorted alphabetically.

- The first sensor (in alphabetical order) should be worn on the right leg.

Example: SN: 00B4014B

- The second sensor should be worn on the left leg.

Example: SN: 00B4115C

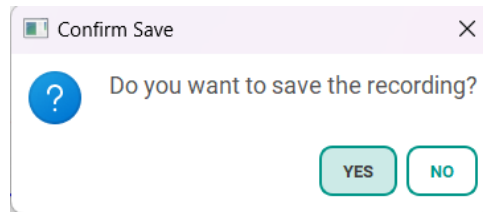


The sensors should be worn using ankle straps. The part of the sensor with the button should face forward (preferably on the outer part of the ankle).

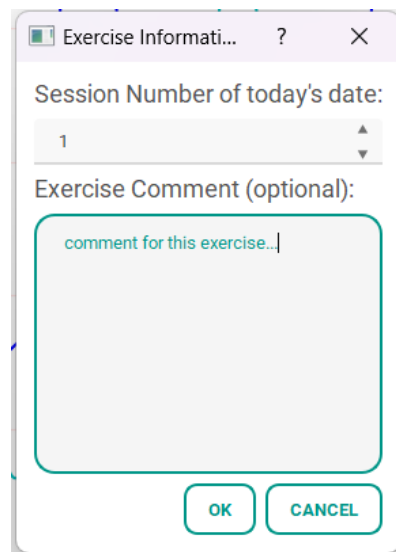


## *Saving the Recording*

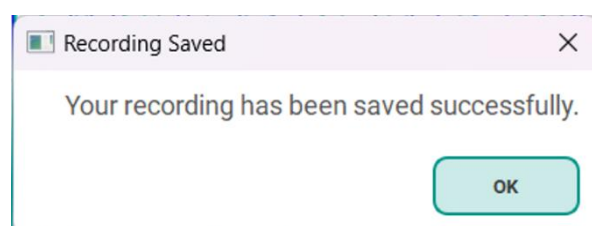
- **Automatic Interruption:** When the exercise time is up, the recording automatically stops, and a popup appears asking if you want to save the session.
  - **Technical Issues:** In rare cases, saving and/or interruption of the recording due to an unidentified technical problem may occur. This exception is not handled or notified by the application. In such cases, it is **STRONGLY ADVISED TO RESTART THE APPLICATION** to prevent subsequent data loss and to ensure sensors are brought back to listening mode.



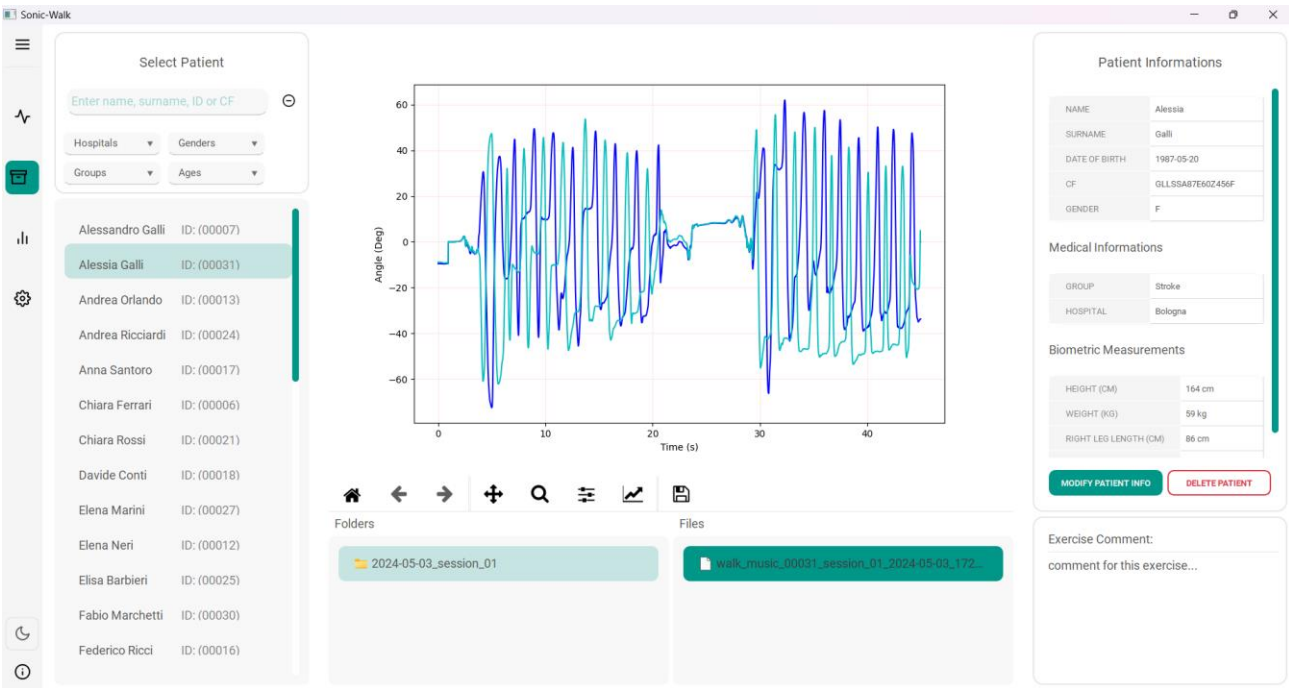
- **Save Confirmation:**
  - If the response is "YES," the application will prompt for the session number of the current date to save the recording and any comments.



- The application automatically determines a unique name and the storage path in the local archive.



# Archive



The archive page allows for managing and consulting patient data and their exercise recordings. Here's a detailed description of the functionalities:

## Patient Search Section

On the left side of the page, there is a detailed list of all registered patients. To facilitate searching, there is a search bar and various filters that allow finding specific patients based on hospital, group (pathology), gender, and age range.

Select Patient

Enter name, surname, ID or CF

Hospitals

Genders

Groups

Ages

Alessandro Galli

ID: (00007)

Alessia Galli

ID: (00031)

Andrea Orlando

ID: (00013)

Andrea Ricciardi

ID: (00024)

Anna Santoro

ID: (00017)

Chiara Ferrari

ID: (00006)

Chiara Rossi

ID: (00021)

# Viewing and Editing Patient Information

By clicking on a patient in the list, all detailed information related to the patient appears immediately in the table on the right.

Directly below the table, you can find buttons for editing and deleting the selected patient.

The edit button allows you to open a modal and modify the patient's data, excluding the ID.

Patient Informations

NAME	Testing
SURNAME	Developer
DATE OF BIRTH	2000-01-01
CF	DEVCF
GENDER	M

Medical Informations

GROUP	Healthy
HOSPITAL	UNIMI

Biometric Measurements

HEIGHT (CM)	0 cm
WEIGHT (KG)	0 kg
RIGHT LEG LENGTH (CM)	0 cm

MODIFY PATIENT INFO

DELETE PATIENT

# Viewing Recordings

Once a patient is selected, at the center-bottom of the page, in the section dedicated to the patient's folders, various recorded exercise sessions are listed. Each folder is identified by its date and corresponding session number.

Folders

2024-05-12\_session\_01

Files

Clicking on a folder opens details of the contained files, which include recordings of the exercises performed.

Folders

2024-05-12\_session\_01

Files

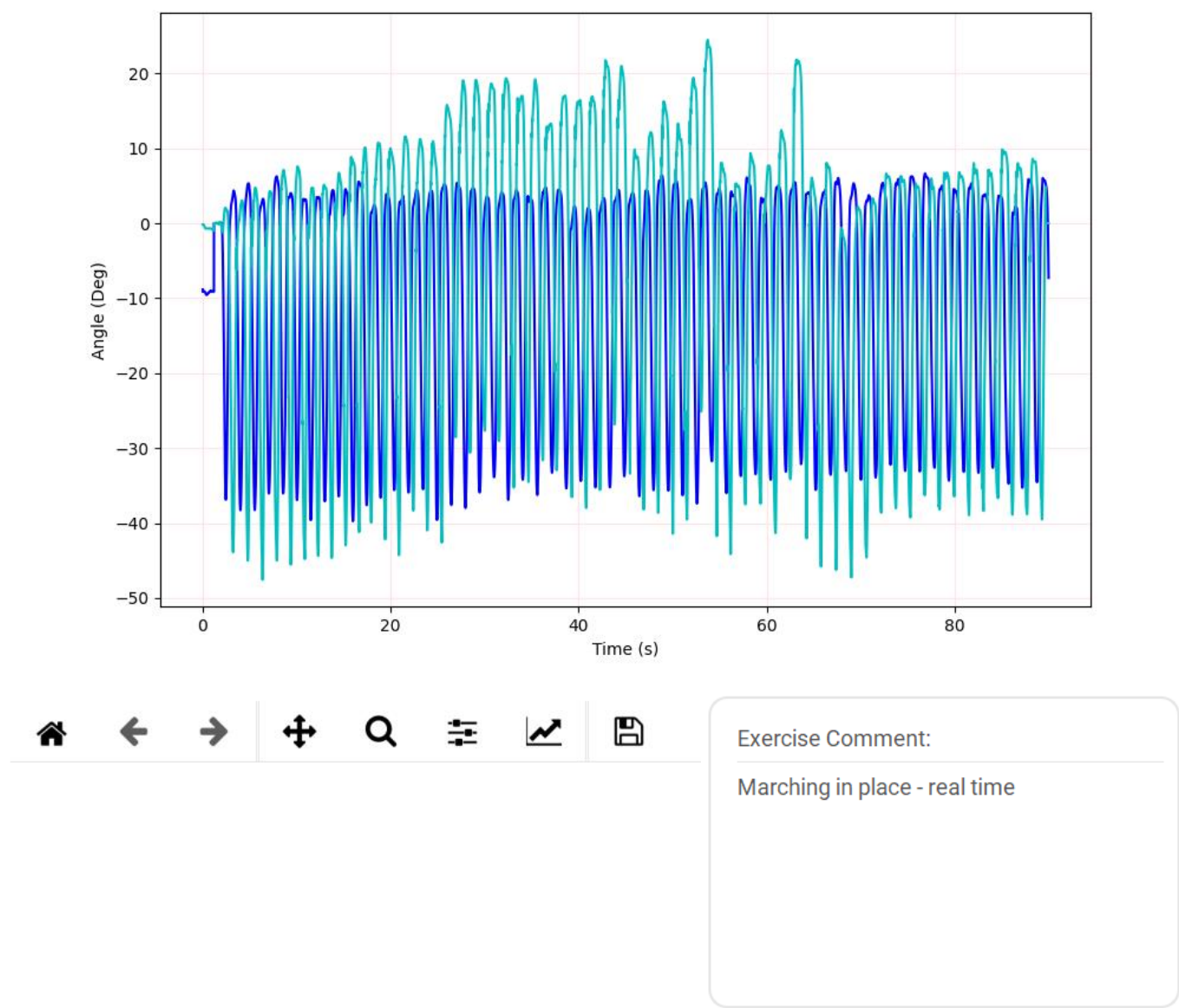
doubleStep\_realTime\_00001\_session\_01\_2024-05...

marchHight\_realTime\_00001\_session\_01\_2024-...

swing\_realTime\_00001\_session\_01\_2024-05-12\_1...

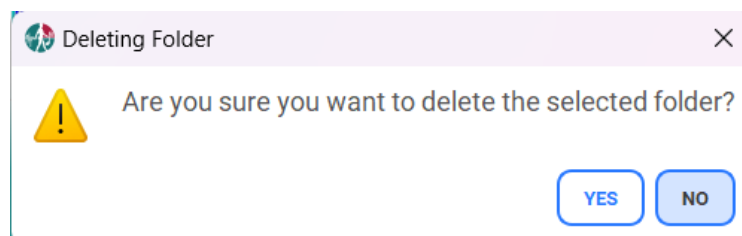
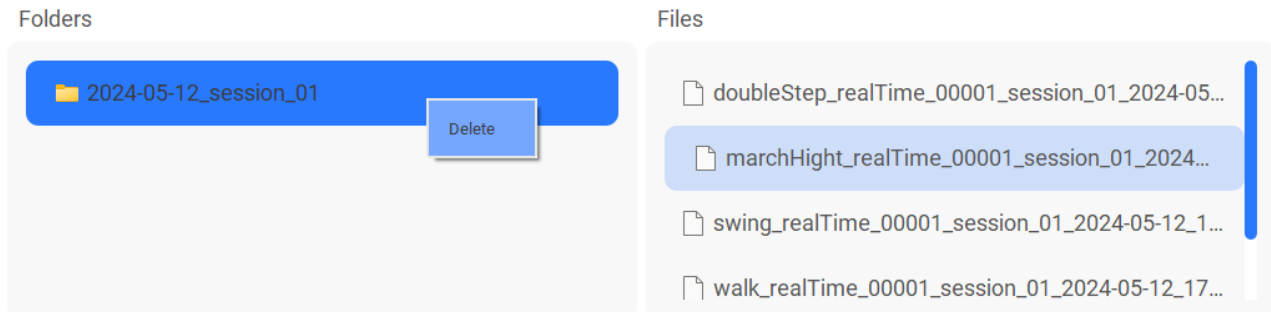
walk\_realTime\_00001\_session\_01\_2024-05-12\_17...

Selecting one of these files automatically displays associated comments for the exercise and plots a graph of the signals from both legs. This graph is interactive, allowing users to explore the data, analyze results, and zoom in for a more detailed view. Additionally, users can extract numerical data or export the graph image for further analysis.



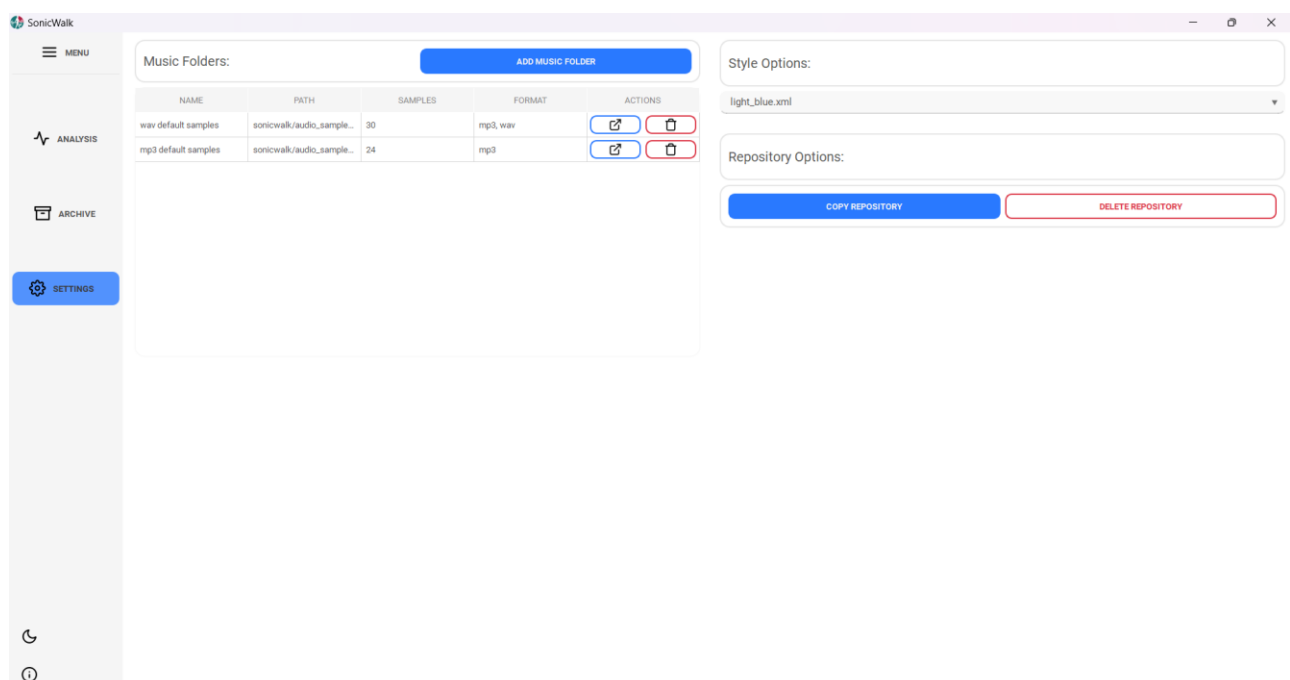
## Deletion of Files and Folders

Each file and folder can be managed directly from the page. Right-clicking on a file or folder opens a contextual menu that allows deletion. Deleting a folder automatically deletes all files contained within it, ensuring efficient data management without unwanted duplications.



Clicking again on the selected patient clears all auto-filled fields.

## Settings



The settings page provides users with the ability to customize and configure various aspects of the application. Here's a detailed overview of the main sections and their functionalities:

### Application Theme Selection

On the right side of the page, there is a section dedicated to changing the application theme. Users can choose from various available themes, some of which are only available in light or dark mode. When one of this specific theme is selected, the toggle theme button is automatically disabled to maintain consistency and uniformity in the interface design.

Style Options:

light\_blue.xml

light\_orange.xml

light\_pink.xml

light\_pink\_500.xml

light\_purple.xml

light\_purple\_500.xml

light\_red.xml

light\_red\_500.xml

light\_teal.xml

light\_teal\_500.xml

light\_yellow.xml

### Archive Management

Immediately below the theme selection section, there are two important buttons:

- **Copy Repository:** This button allows you to copy the entire contents of the archive, including patient data, recordings, and indexing files in JSON format. Additionally, it includes an additional Python script to facilitate reading the copied files.
- **Delete Repository:** This button completely empties the application's archive, deleting all patient data and related recordings. It is irreversible and will permanently erase all data from the application.

Repository Options:

COPY REPOSITORY

DELETE REPOSITORY

### Music Folder Management

Music Folders:

ADD MUSIC FOLDER

NAME	PATH	SAMPLES	FORMAT	ACTIONS
wav default samples	sonicwalk/audio_samples/...	30	mp3, wav	<div><div></div><div></div></div>
mp3 default samples	sonicwalk/audio_samples/...	24	mp3	<div><div></div><div></div></div>

On the left side of the page, there is a section dedicated to managing music folders:

- **Register New Folders:** From here, you can register new folders on your computer as audio sources for the application. These sources will then be available on the application's analysis page.
- **Open Direct Link:** You can open a direct link to already registered folders to check or update the available music contents.
- **Remove Folders:** You can remove a folder from the application. This action only deletes the reference within the application, keeping the physical music folder intact on the system.

Each music source registered in this section is accompanied by useful information such as the file path, a user-chosen name, the number of valid files (mp3 or wav) within the folder, and the types of musical files contained.

