CLIENT MANUAL

LungLink client application

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1. INTRODUCTION

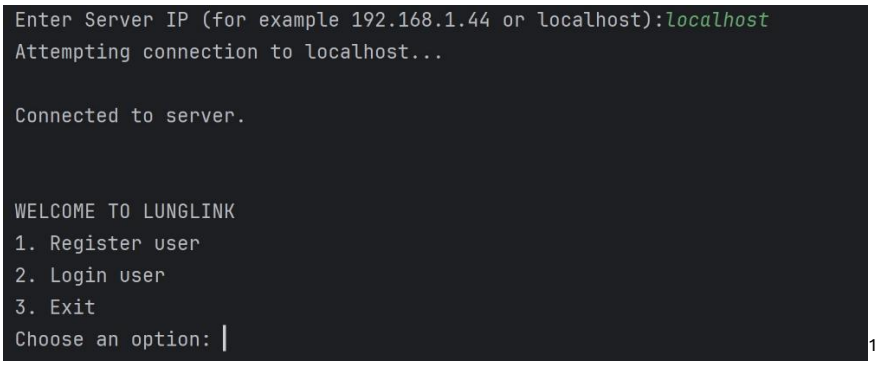
The LungLink patient app enables distant patients that suffer respiratory related problems to connect to the hospital server, report their symptoms, transmit physiological signals such as electrocardiogram (ECG) and electromyogram (EMG) recorded via a BITalino device, and check their medical history, as well as the convenient observations from their specialized doctor.

The client interacts with the server through a structured command-oriented protocol and guarantees that each update is safely recorded in the hospital database.

2. STARTING THE APPLICATION

2.1. How to initialize the application

To initiate the patient platform, launch the client application and provide the server's IP address. If both applications have the same port and a valid IP address is provided, a successful connection will be established between the client and the server and the system will present a welcome menu where the user can choose to either register or login if he/she already has an account.



[1]

2.2. Sign up / Register

The first time the user uses the system, they must create an account. This process requires the client to set a username and a password.

```
REGISTER USER
New username: JuanLopez
New password: 12345
User created. ID = 12

Checking if you already have a patient profile...
No patient profile found. Let's create one.
```

When submitted, the data is sent to the server, which creates the new account, stores the user data in the database (password is stored with encryption) and returns the associated user ID.

As the server recognizes the user as a new user, it checks if he already has a patient profile, and if not, it automatically asks for the mandatory parameters to correctly create a patient account.

2.3. Log in

Existing users can log into the system by providing their username and password. If the credentials are valid, the patient receives permission to proceed to the next phase of the application.

If wrong, the system prompts the user to retry.

```
WELCOME TO LUNGLINK
1. Register user
2. Login user
3. Exit
Choose an option: 2

LOGIN USER
Username: JuanLopez
Password: 12345

Checking if you already have a patient profile...
Loaded patient profile for: Juan Lopez
```

2.4. Patient profile configuration

The required patient information includes name, surname, gender, birth date and email.

Once confirmed, the server creates the patient record in the database and the application proceeds with the patient menu.
If the profile already exists, the stored information is retrieved immediately, and the patient is taken to the main menu.

```
Checking if you already have a patient profile...
No patient profile found. Let's create one.

CREATE CLIENT PROFILE
Name: Juan
Surname: Lopez
Birth day: 14
Birth month: 08
Birth year: 2002
Gender:
1. MALE
2. FEMALE
Choose (1-2): 1
Email: juanlopez@gmail.com
Client profile created. ID = 6
```

2.5. Exit

If the user realizes he does not want to enter the application, he can exit and the application will immediately disconnect from the server.

Selecting this option closes the session currently going on: the user sends a disconnect command to the server, all resources are released, and the program ends safely.

Furthermore, if the server shuts down unexpectedly, the patient is notified, and the client closes automatically.

```
WELCOME TO LUNGLINK
1. Register user
2. Login user
3. Exit
Choose an option: 3
Disconnected from server.
```

3. MAIN PATIENT FUNCTIONALITIES

Once the profile is loaded, the patient can utilize the complete features of the client system. The menu enables the patient to report symptoms, upload physiological signals such as ECG or EMG, review their medical history, modify personal clinical information, or log out of the system.

```
 PATIENT MENU
1. Register symptoms
2. Send ECG signal
3. Send EMG signal
4. View medical history
5. Add extra information
6. Disconnect
```

3.1. Register symptoms

This functionality enables patients to outline their present health condition.

The system directs the user to input symptoms individually:

- The patient enters each symptom one at a time.
- Hitting Enter on a blank line completes the list and finishes the process.
- The symptoms are collected and transmitted to the server.
- The server saves them as a fresh medical history entry and automatically designates a physician, it then sends a message to the client to inform about the associated doctor they get.

```
 PATIENT MENU
1. Register symptoms
2. Send ECG signal
3. Send EMG signal
4. View medical history
5. Add extra information
6. Disconnect
Choose an option: 1
REGISTER SYMPTOMS
Please enter your symptoms one by one.
Press Enter on an empty line to finish:

Symptom: chronic cough
Symptom: chest pain
Symptom:
SERVER: OK|Symptoms are saved, your assigned doctor is claudia specialized in GENERAL_MEDICINE
```

3.2. Send ECG signal

This function records heart activity using a BITalino device, it asks the client to introduce the MAC address of their BITalino device and thanks to a Bluetooth connection protocol, once the server has allowed the upload, it records and sends the signal, which after being received by the server, it gets saved in the database in a .csv file format linked with the corresponding medical history of the client.

Depending on the type of signal recorded, a specialized doctor is assigned, in this case, ECG are controlled by cardiologists.

```
 PATIENT MENU
1. Register symptoms
2. Send ECG signal
3. Send EMG signal
4. View medical history
5. Add extra information
6. Disconnect
Choose an option: 2
BITalino Connection
Enter BITalino MAC (Example: 84:BA:20:5E:FD:7B): 84:BA:20:5E:FD:7B
Connecting to BITalino at MAC: 84:BA:20:5E:FD:7B
BlueCove version 2.1.1-SNAPSHOT on winsock
Server final response: OK|Signal saved with doctor assigned pablo;CARDIOLOGIST
Signal sent successfully (BITalino).
ECG sent to server (600 samples)
```

3.3. Send EMG signal

Same as the ECG workflow but capturing muscle activity instead of cardiac signals.

In this case, the assigned doctor will be a neurophysiologist.

```
 PATIENT MENU
1. Register symptoms
2. Send ECG signal
3. Send EMG signal
4. View medical history
5. Add extra information
6. Disconnect
Choose an option: 3
BITalino Connection
Enter BITalino MAC (Example: 84:BA:20:5E:FD:7B): 84:BA:20:5E:FD:7B
Connecting to BITalino at MAC: 84:BA:20:5E:FD:7B
Server final response: OK|Signal saved with doctor assigned ana;NEUROPHYSIOLOGIST
Signal sent successfully (BITalino).
EMG sent to server (600 samples)
```

3.4. View medical history

The patient can request all clinical entries stored.

The server returns each medical record the client has, including date of visits, recorded symptoms, ECG/EMG files and any doctor observations for each medical history.

```
 PATIENT MENU
1. Register symptoms
2. Send ECG signal
3. Send EMG signal
4. View medical history
5. Add extra information
6. Disconnect
Choose an option: 4
VIEW MEDICAL HISTORY

Medical History
RECORD ID: 10
DATE: 2025-11-29
TYPE: SYMPTOMS
SYMPTOMS: chronic cough,chest pain

RECORD ID: 11
DATE: 2025-11-29
TYPE: ECG
FILE: ECG_record11.csv

RECORD ID: 12
DATE: 2025-11-29
TYPE: EMG
FILE: EMG_record12.csv
```

3.5. Add extra information

This functionality gives the patient the opportunity to upload some extra information such as their height and their weight, which can be interesting for the doctor when studying each patient.

This information is sent to the server, which will store this data in the database, completing the client profile.

```
 PATIENT MENU
1. Register symptoms
2. Send ECG signal
3. Send EMG signal
4. View medical history
5. Add extra information
6. Disconnect
Choose an option: 5
ADD EXTRA INFORMATION
Enter your height (in cm): 190
Enter your weight (in kg): 87
SERVER: OK|Extra info saved
```

3.6. Disconnect

When the patient decides to leave the application he can easily disconnect.

Selecting this option closes the session currently going on: the client sends a disconnect command to the server, all resources are released, and the program ends safely.

If the server shuts down unexpectedly, the patient is notified, and the client closes automatically.

```
 PATIENT MENU
1. Register symptoms
2. Send ECG signal
3. Send EMG signal
4. View medical history
5. Add extra information
6. Disconnect
Choose an option: 6
Disconnected from server.
BlueCove stack shutdown completed
```