

Advanced Desktop App for Audio Acquisition (ADA3)



BODYTUNE

Examiner: Prof Dr. Michael Friebe
Dr. Axel

Boese

Supervisor: Moritz spiller
Rutuja Salvi

Team : Harshavardhan Bayyapu
Pranay Teja Arikatla

Contents

- ❖ Introduction
- ❖ Motivation
- ❖ Project Goal
 - ADA3
 - Database
 - LED concept
 - Two-way communication
- ❖ Video Demo
- ❖ Failed deliverables
- ❖ Further developments

Introduction

- ❖ Computer Aided Auscultation System(CAAS)
 - Bodytune
 - Desktop application
- ❖ 5 different versions of GUI with various functionalities
 - ADOS
 - Bodytune
 - Bodytune and Acquisition
 - Stream
 - Ortho

Motivation

- ❖ 5 versions of GUI will lead user to install 5 different applications
- ❖ Different GUI's with individual database systems
- ❖ Buttons on Body tune are hard to use during examination

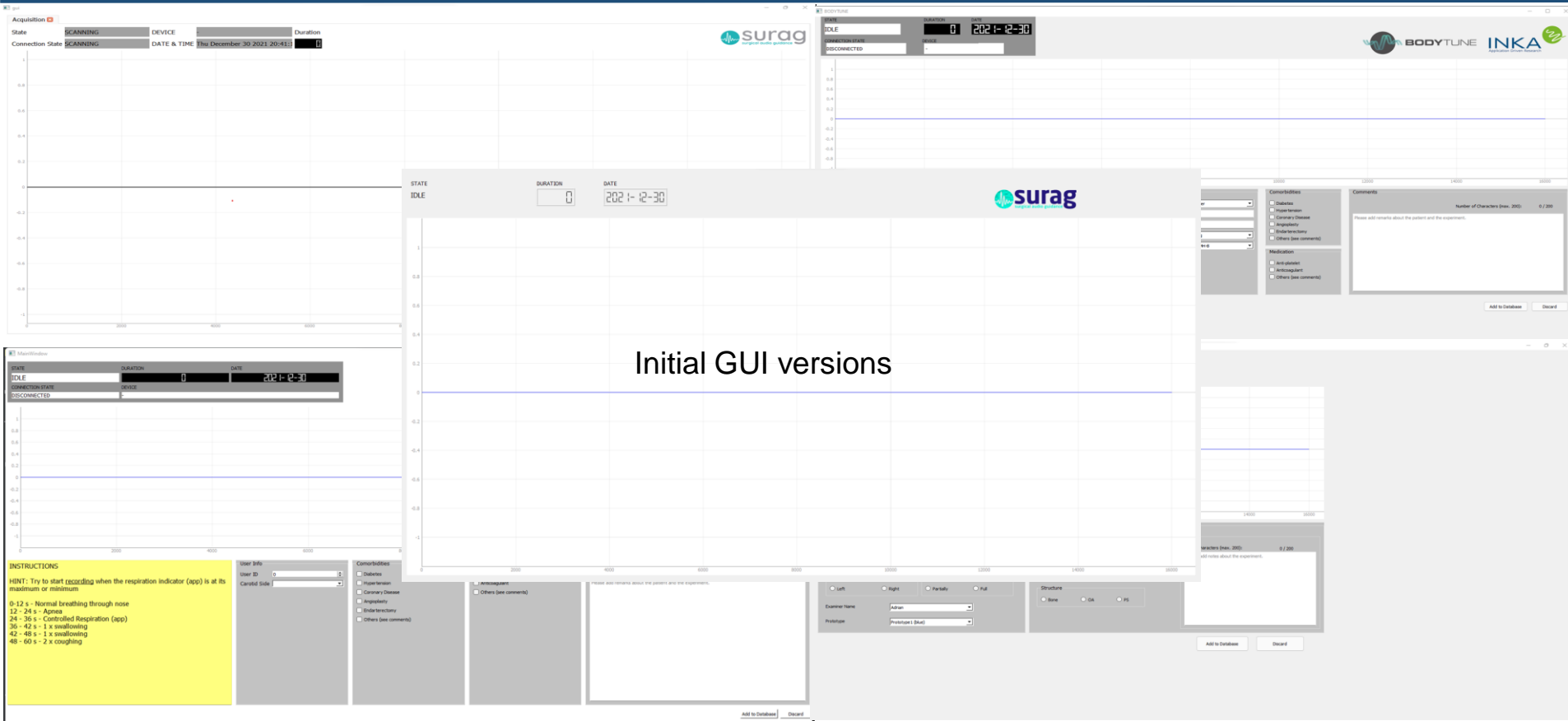
Project Goal

- ❖ An application which provides access to all versions of GUI's
- ❖ Installer for the application for Windows OS
- ❖ Local storage of data in a single location
- ❖ Two-way communication between the application and Bodytune device
- ❖ LED concept in the Body tune

ADA3(Advanced Desktop App for Audio Acquisition)

❖ ADA3 desktop application features

- Provides access to different GUI versions
- Common database
- Visualization of the audio from the Bodytune
- Add patient, measurement, examiner information
- Add additional files
- Control Bodytune operations (visualization, record, stop) from GUI



Initial GUI versions

Integrated GUI

A: Control center B: Tab widget C: Control buttons D: Annotation widget E: save and clear button F: Visualization widget

ADA3

Device	00000004ced8fbd	Connection State	CONNECTED
State	SCANNING	Date & Time	Sun October 2 2022 22:15:33
Duration			

Acquisition

Body Tune

Body Tune & Acquisition

Ortho

Stream

PREVIS

RECORD

STOP

0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1

0 10000 20000 30000 40000 50000 60000 70000 80000 90000 100000 110000 120000 130000 140000 150000

Patient info

Patient Id: 0

Gender: ☒ Male ☐ Female

Date of Birth: 01/01/2000

Measured Carotid: left

BPM BoM /EoM: 40

ECST / NASCET: 0

Select pdf/dicom files

Browse

Experiment info

Existent Examiners: 0 - New Examiner

Examiner Firstname:

Examiner Lastname:

Experiment Type: 1 - normal breathing

Microphone Type: 1 - SPH064SLM4H-B

Comorbidities

☐ Diabetes

☐ Hypertension

☐ Coronary Disease

☐ Angioplasty

☐ Endarterectomy

☐ Others (see comments)

Medication

☐ Anti-platelet

☐ Anticoagulant

☐ Others (see comments)

Comments

Number of Characters (max. 200): 0 / 200

Please add remarks about the patient and the experiment.

Add to Database

Discard

GUI versions and functionality

- ❖ Visualization widget
- ❖ Annotation widget
- ❖ Different versions of the GUI:
 - BODYTUNE GUI
 - All experiments for a total of 60 sec
 - Developed for doctor's
 - BODYTUNE ACQUISITION GUI
 - Each experiment carried out for a particular time
 - Developed for researchers
 - ORTHO GUI
 - Acquiring audio data in an orthopedic setting
 - Acquisition
 - post-processing of audio data and display of the results
 - Stream
 - real-time visualization of audio data

Database

- ❖ Files are saved locally in a file format
- ❖ Patient information, Examiner information, Experiment information saved in a text document (.txt)
- ❖ Audio file received is saved in a wave file format(.wav)
- ❖ Additional files of format(pdf, dicom) can be saved

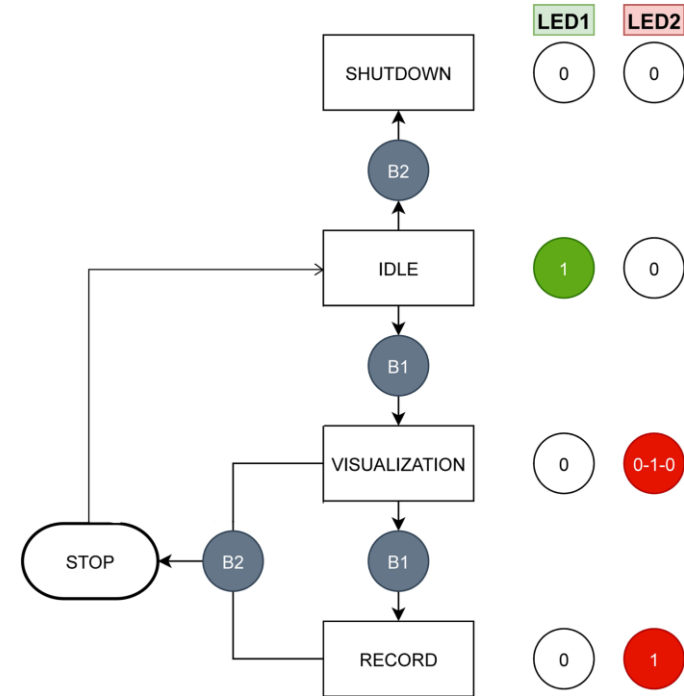
Folder structure

- ❖ A folder named “Database” is created in the application installation directory
- ❖ Files with respect to each GUI is saved under
 - Bodytune
 - BodytuneAcquisition
 - Ortho
- ❖ Patient details are saved in a folder with his ID/name
 - Every text document,wave files are created with a unique name

```
C:\Users\harsh\Desktop\ADA3\Database>tree /f
Folder PATH listing for volume OS
Volume serial number is 86C4-1288
C:
├── Bodytune
│   ├── BT-196
│   │   ├── ADA3 Project abstract.pdf
│   │   ├── BT-196-2022-10-02_22-32-13.txt
│   │   └── TMP-196-2022-10-02_22-32-13.wav
├── BodytuneAcquisition
│   ├── harsha
│   │   ├── BA-198
│   │   │   ├── ADA3 Project abstract.pdf
│   │   │   ├── BA-198-2022-10-02_22-35-23.txt
│   │   │   └── TMP-198-2022-10-02_22-35-23.wav
└── Ortho
    ├── OR-harshavardhan
    │   ├── ADA3 Project abstract.pdf
    │   ├── OR-harshavardhan-2022-10-02_22-37-15.txt
    │   └── TMP-harshavardhan-2022-10-02_22-37-15.wav
```

LED Concept

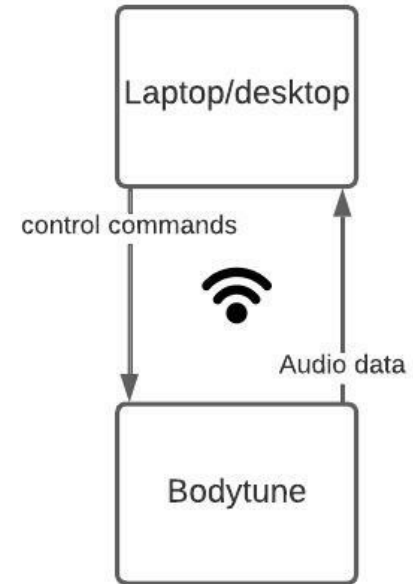
State	Button activity
Visualization	Button-1 press once
Record	Button-1 press second time
Stop	Button 2 press
Idle	-
Shutdown	Button 2 pressed twice



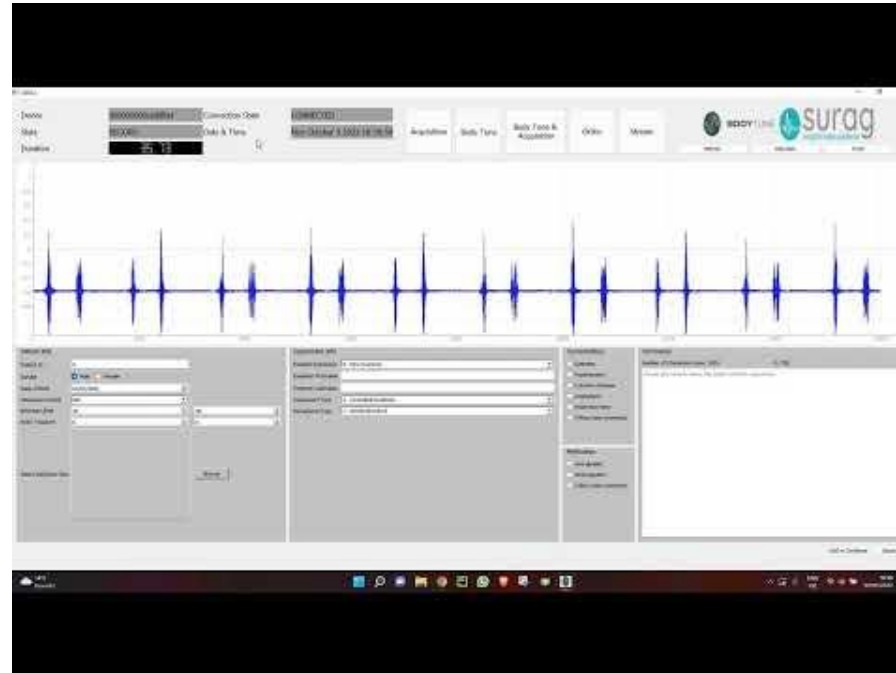
Two-way communication



- ❖ Wireless communication
- ❖ Laptop hosts the mobile hotspot
- ❖ Audio data is streamed from Bodytune to the laptop
- ❖ Control command (Visualization, record, stop) are sent from laptop to Bodytune



Video Demo



Failed deliverables

❖ Application for Linux and macOS

- macOS: Cannot create hotspot simultaneously with Wi-Fi
- Linux (Ubuntu 20.04): Body tune unable to connect to hotspot

❖ Adapt the version to Bluetooth

- The bit size in the RPI is very less, so data transferred through Bluetooth functionality is delayed

Further Developments

❖ Timer for experiments

- Countdown timer where we can enter the amount of seconds we want to carry out each experiment

❖ Visualization of pre-recorded audio clips

- Able to visualize already recorded audio clips



