ElectroCap Pitch Deck

INSOMNIAINT

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1. Team

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1. Team

Coordination:

- Coordinator: Prof. Pedro Vitor
- Scientific Advisor: Prof. João Gaspar
- Mentor: Prof. João Sanches

Other Partners:

- Sleep Clinic: Sleeplabs
- Sleep Clinic: Psicologia do Sono
- Podcast: “O teu mal é sono”

2. Introduction

Insomniaint is a system designed to:

- Reduce the symptoms of Insomnia
- Improve sleep quality
- Educate the user about Sleep, Insomnia’s causes and treatments, such as CBT-I

By bringing together eletronics and medical research, we want to improve the lifes of many people around the world

3. Problem definition

✦ Sleep is necessary for good physical and mental health

Not only the number of hours, but the quality of sleep impact our health. During sleep, our bodies heal and repair cells and balance hormones. Adequate sleep has been shown to improve problem-solving skills and emotion control. Unfortunately, many people suffer from sleep disorders.

✦ Sleep disorders, such as Insomnia, can be caused by internal and external factors

It's usually caused by internal factors, such as stress and anxiety, or external factors. Nocturnal noise pollution significantly impairs sleep, and loud noises can trigger a fight-or-flight response releasing stress hormones. On the other side, exposure to light, especially blue light, suppresses the secretion of melatonin.

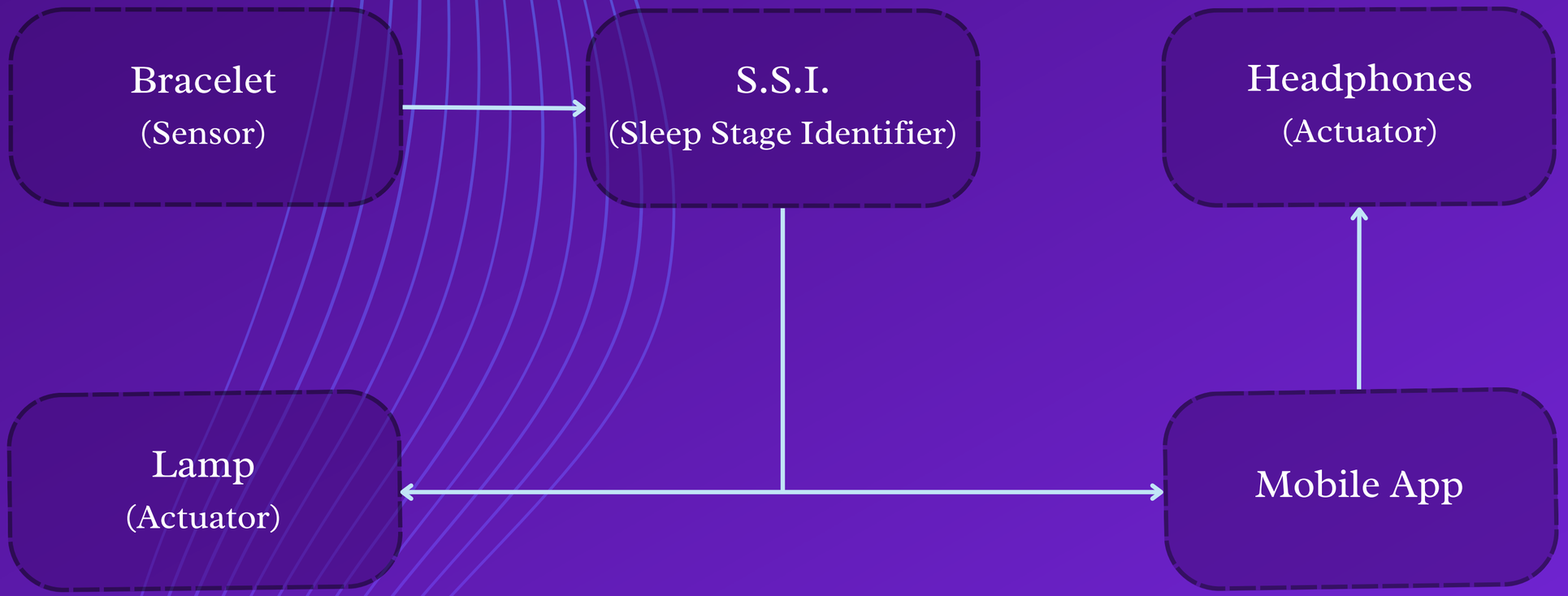
✦ Technology is often cited as one of the causes, but it can also help to solve or minimize this problem

4. Solution beneficiaries

- Night shift workers
- Residents of noisy cities
- Audio sensitive people
- Companies

5. Technological solution

Architecture



5. Technological solution

Main areas

✷ Sensors

Accelerometer and heart rate sensor. Used to determine sleep stages and sleep tracking. Will communicate the data with the S.S.I for further processing

✷ Actuators

Headphones and Lamp.
Controlled by the Brain. Headphones will be used in the falling asleep stage and the Lamp both in the waking and falling asleep stage

✷ S.S.I.

Module that will control the actuators according to the data from the sensores

✷ Mobile App

Will allow user costumization, such as a wake up time, and provide important information about the acquired data

6. Competitors and previous work

✦ Philips

Smartsleep:

A lamp that dims at night and brightens before your alarm rings

✦ Apple

Apple Watch:

Monitors your sleep and registers its stages

✦ Hatch

Hatch Restore 3:

A device with customizable audio and light routines for a better sleep

6. Competitors and previous work

Sound of sleep

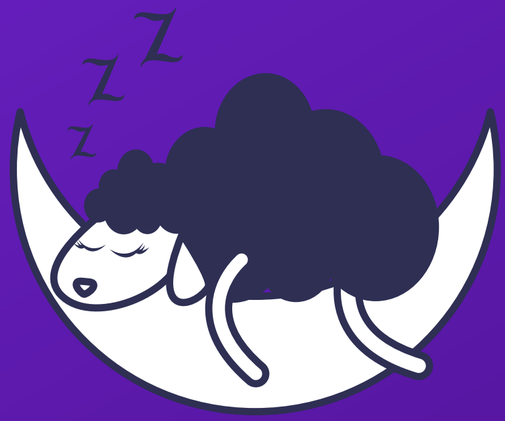
LectroFan:

A sound box that provides non looping white noise

Acoustic Sheep

SleepPhones:

A comfortable headband that allows users to listen to music while sleeping



7. Experimental Results

Mobile App:

- After choosing the Wake Up and Sleep times, that information is correctly passed to the S.S.I
- Receives the Sleep Stage data and draws the corresponding graph
- User feedback: Not being able to see the chosen sleep and wake hours is a downside. Easy to use and the UI looks good and the educational part is simple and not boring.

Actuators:

- Given the identified sleep stages in the S.S.I, the headphone's audio is correctly adjusted
- After choosing the Wake Up and Sleep times in the App, the lamp performs the bright and dim routines at the chosen time, differing a maximum of one minute from that time

7. Experimental Results

Bracelet:

- The heart-rate sensor gives measures outside of a meaningful range. Those measurements are ignored but this contributes to a less accurate information to be used in the Sleep Stage Identification
- User feedback: Good design and looks good. It is not uncomfortable. Should be more resistant, the users were afraid that something would go loose while sleeping

Sleep Stage Identification:

- By comparing our results with the ones obtained with existing devices, we observed some differences. This lead us to believe that our Sleep Stage Identification is not as accurate as in other devices. This difference can derive from the errors in heart-rate measurement or from the algorithm itself

8. Costs and Benefits

Benefits of using the Insomniaint system over its competitors:

- Considerably lower cost
- The full ecosystem is a sole product
- Allow for a better user personalization
- Light and sound are adjusted according to the user’s sleep stages
- Acts in the environment’s light, sound and the user’s habits and behaviors
- Has an educational component

8. Costs and Benefits

Downsides of using the Insomniaint system over its competitors:

- Less accurate Sleep Stage Identification
- Less accurate heart-rate sensor
- Simpler Sleep Stage Classification: Wake, Light Sleep, Deep Sleep
- WiFi dependent

9. Contributions of each team member to the results

✷ Ana

- Development and designing of the website
- Interviews with clinics and medical professionals
- Data processing and Sleep Stage Identification
- Demonstration video

✷ Miguel

- Requirement and equipment list
- Interviews with clinics and medical professionals
- App development
- Communication between modules

✷ Francisco

- Requirement and equipment list
- Interviews with clinics and medical professionals
- Lamp development
- Communication between modules

✷ Catarina

- Networking with clinics and medical professionals
- Bracelet development: Heart rate and acceleration measurements
- Demonstration video

✷ Beatriz

- Development and designing of the website
- Continued update of the blog
- Poster Design

10. Links and additional information

- Website: https://web.tecnico.ulisboa.pt/ist1107225/
- Blog: https://web.tecnico.ulisboa.pt/ist1107225/blog/
- Video: https://youtu.be/3UlGkOm1_1w