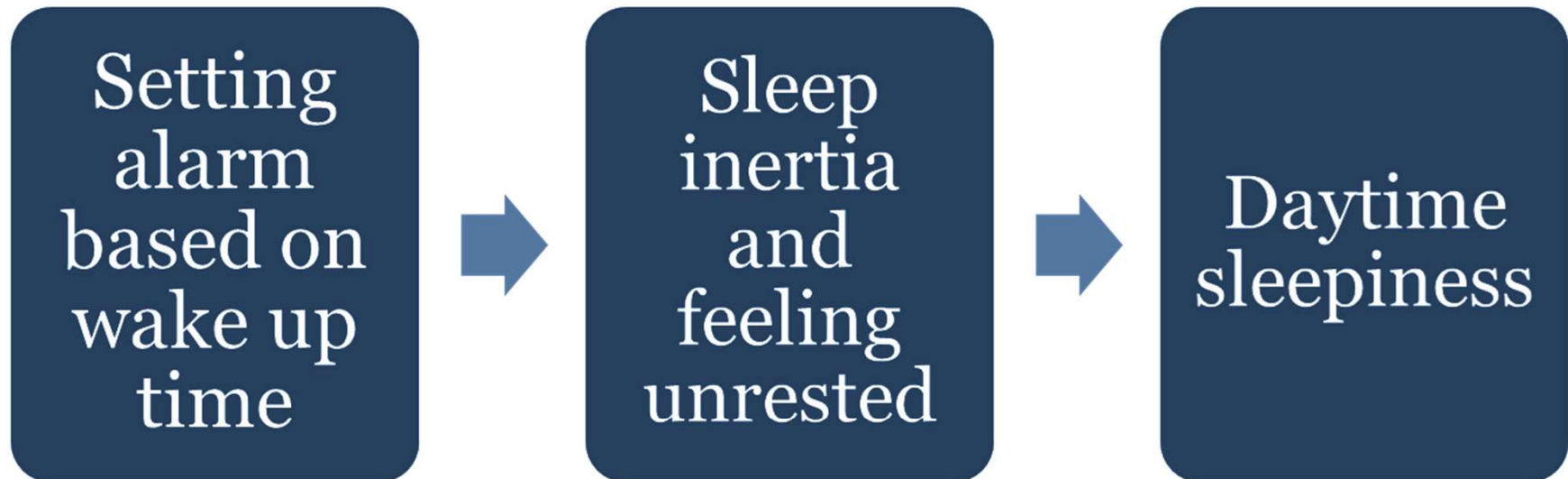


EEG Alarm

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Identified Problem



Proposed Solution

- Track sleep stages throughout the night
- Electroencephalogram (EEG)
- Fewer electrodes, limit device size
- Send sleep data to user's phone
- Phone and EEG record sleep stages to set off alarm in lightest sleep

Intended Demonstrated Features

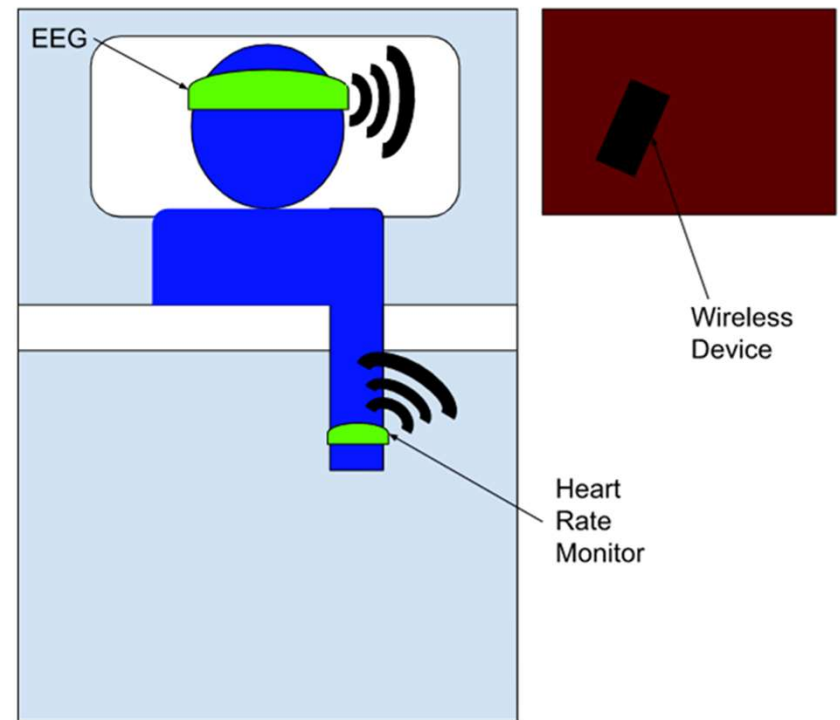
1. EEG and ECG Sensitivity -measure electrical activity from the heart + brain
2. Wireless communication - sensors and microcontroller communicate with app/website through WIFI
3. Health Metrics - display information to the user in both live-feed and 'night's sleep' summary form. Heart Rate, time asleep etc.
4. Easy Fit - package sensors and controller in comfortable, lightweight manor to allow for seamless integration into comfortable sleeping.
5. Alarm Feature - allow user to set desired wake up range and wake up the user during the correct sleep cycle stage.

Available Technologies

- EEG technology has existed since the 1920s
- Integrated circuits for biopotential data acquisition, amplification, filtering
- ESP32 bluetooth capabilities for sending data

Engineering Content

1. EEG Sensing
2. Heart Rate Sensing
3. IoT and Wireless System



Closing Thoughts

Benefits

- Still waking up on time, but feeling better rested
- Easier time waking up
- Recorded sleep data (heart rate, sleep stages)
- Comfortable to wear