Sleepify

Design Report

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*Abstract*—

# Introduction

# Hypothesis

This project aims to provide a better sleeping experience overall from having the room temperature automatically adjust to sleeping schedules and information from a myriad of sensors from a tracking device. This project also advises the user about the best times to go to bed from calendar integration, reducing the effects of jet-lag where possible. The user will benefit from our project according to the following hypotheses:

1. Better sleep quality can be achieved by sleeping in an ideal sleeping temperature, thereby preventing situations where the user cannot fall asleep because the environment is too cold or hot.
2. The feeling of grogginess can be reduced when waking up by setting the alarm to go off when the user is not in deep sleep.
3. The effects of jet-lag can be minimized by gradually adjusting to the destination time zone by modifying sleeping times, before and during the trip [1].

# Motivation and Background

### Sleep quality and its relation to health

Addstages of sleep

jetlag

### How machine learning helps

# Related Work

There are many sleep trackers on the market that use a variety of ways to track sleep quality. Software implementations such as the highly rated Sleep Cycle app [2] for iOS and Android use the accelerometer found in smartphones to track body movement throughout the sleep cycle. Using this data, Sleep Cycle wakes the user up during the lightest sleep phase, preventing the feeling of tiredness in the morning. In addition to the accelerometer, Sleep as Android [3] records audio through he microphone to detect snoring, speech, and ambient noise. This can be played back to the user the following morning, and can be a good indicator of sleep disturbances and stress [4].

## Background Research

# System Design

## Hardware

### Sensors

## Software

-block diagram-

### Machine Learning

### Web Interface

### Mobile Application

# Evaluation Criteria

# Conclusion

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# References

[1] J. Waterhouse, T. Reilly, G. Atkinson, and B. Edwards, ‘Jet lag: trends and coping strategies’, *The Lancet*, vol. 369, no. 9567, pp. 1117–1129, 2007.

[2] ‘Sleep Cycle alarm clock on the App Store’, *App Store*. [Online]. Available: https://itunes.apple.com/gb/app/sleep-cycle-alarm-clock/id320606217?mt=8. [Accessed: 01-Feb-2017].

[3] U. Team, *Sleep as Android Unlock*. Urbandroid Team, 2016.

[4] M. M. Ohayon and C. M. Shapiro, ‘Sleep disturbances and psychiatric disorders associated with posttraumatic stress disorder in the general population’, *Compr. Psychiatry*, vol. 41, no. 6, pp. 469–478, Nov. 2000.