

Eye-tracking to Optimize Lighting for Stress Management

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Overview



Project objective:
to develop a system that
monitors the user's eye
movements and adapts
ambient lighting accordingly.



Objective



Architecture/
Technologies Used



Problems faced



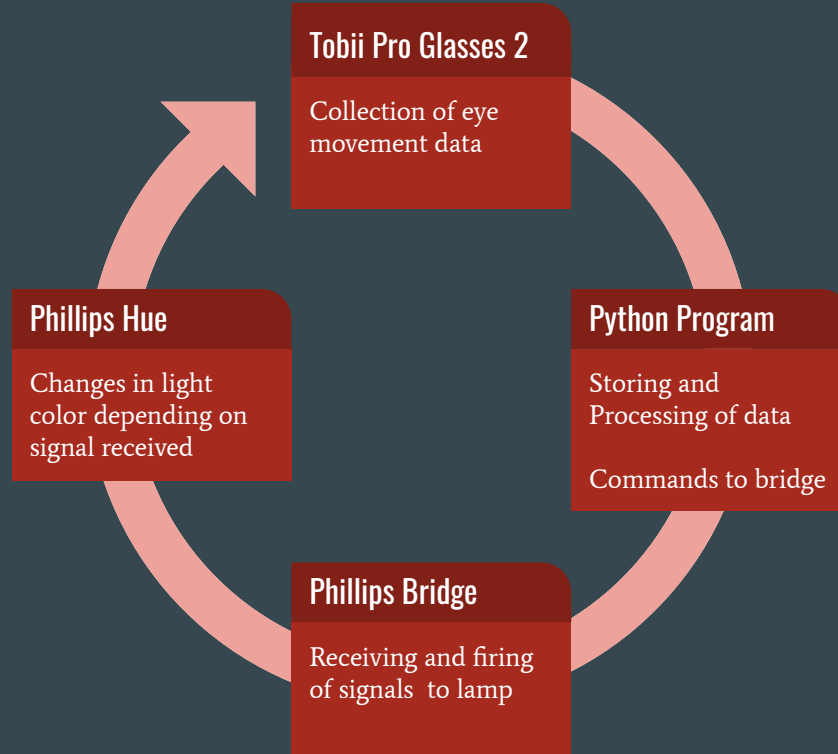
Live Demo



Conclusion

Architecture

Architecture



Connection to Glasses

```
(tobii2) hongpo@Hongpos-MacBook-Air TobiiGlassesController2 % python tobii_hue.py
[DEBUG]: Connecting to the Tobii Pro Glasses 2 ...
[DEBUG]: Tobii Pro Glasses 2 successful connected!
[DEBUG]: Project oa2vanl already exists ...
[DEBUG]: Participant xyz5ula already exists ...
```

```
[DEBUG]: Calibration status calibrating
[DEBUG]: Calibration status calibrated
[DEBUG]: Calibration 2mkstzp successful
[DEBUG]: Start streaming ...
[DEBUG]: Video streaming started...
[DEBUG]: Data streaming started...
[[0.4849, 0.5576]]
21
User is on SleepingTime
```

Data and firing of signals

```
[[0.4849, 0.5576], [0.7445, 0.3598], [0.9917, 0.9719], [0.9369, 0.3563], [0.1669, 0.8711]]
```

```
21
```

```
User is on SleepingTime
```

```
https://maker.ifttt.com/trigger/SleepingTime/json/with/key/dkGggE04bUpAq2pHaIFTv
```

```
[[0.4849, 0.5576], [0.7445, 0.3598], [0.9917, 0.9719], [0.9369, 0.3563], [0.1669, 0.8711], [0.8969, 0.7815]]
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```
User is on LowLevelStress
```

```
https://maker.ifttt.com/trigger/LowLevelStress/json/with/key/dkGggE04bUpAq2pHaIFTv
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Live Demo



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Technologies used

Technologies used

Tobii Pro Glasses 2

- Captures gaze data



Tobii API (python)

- Read & process data
- Classify level of eye movement (stress)



Philips Hue Light

- Changes ambient light color
 - Normal
 - Night Mode
 - Low Stress
 - Medium Stress
 - High Stress



Technologies used



Tobii Pro Glasses 2

Collection of eye movement data



Phillips Hue

Changes in light color depending on signal received

Phillips Bridge

Receiving and firing of signals to lamp

Python Program

Storing and Processing of data
Commands to bridge





Tobii Pro Glasses 2

Collection of eye movement data



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Python Program

Storing and Processing of data
Commands to bridge



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Objective



Architecture/
Technologies Used



Problems faced



Live Demo



Conclusion

Problems faced

Problems faced

Problem 1

How to detect level of eye movement effectively?

How we solved it:

- Store (quantity of) gaze points in a given time period
- Queue data structure - **FIFO**
- Clear the temp queue after 3 counts of no significant change in gaze point

Problem 2

Which color to use for what stress level?

How we solved it:

- **Study** - blue light and pink light have 'calming' effects
- But blue has anti-sleep effects
- Only for extremely high stress level

Problems faced

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Extra functionalities?



Objective



Architecture/
Technologies Used



Problems /
Lessons



Live Demo



Conclusion

What we learnt

Lessons Learnt

Lesson 1

Having too much data presented to us was daunting and confusing.

However, we just had to focus on a few parameters. Selecting and zoning in on the specific parameters that we required helped to make things a lot simpler and manageable.

Lesson 2

Sometimes there was too much of a focus on which part of our code went wrong.

In reality, there was nothing wrong with the code, but instead more of the hardware and setup that was causing problems.

The problem was easily solved such as by changing batteries on the glasses.

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Objective

2

Architecture/
Technologies Used

3

Problems /
Lessons

4

Live Demo

5

Conclusion

Demo







Objective



Architecture/
Technologies Used



Problems /
Lessons



Live Demo



Conclusion

Conclusion

Conclusion

Objectives met?

- Able to construct a working prototype
- Rigorous testing was not feasible due to time constraints
- Effectiveness can be improved upon in future iterations
- Overall, project was a **success**

Thank you!
Any questions?

Proposed deliverables

Deliverable 1

- Lorem ipsum dolor sit amet
- Sed do eiusmod tempor incididunt ut labore

Deliverable 2

- Lorem ipsum dolor sit amet
- Sed do eiusmod tempor incididunt ut labore

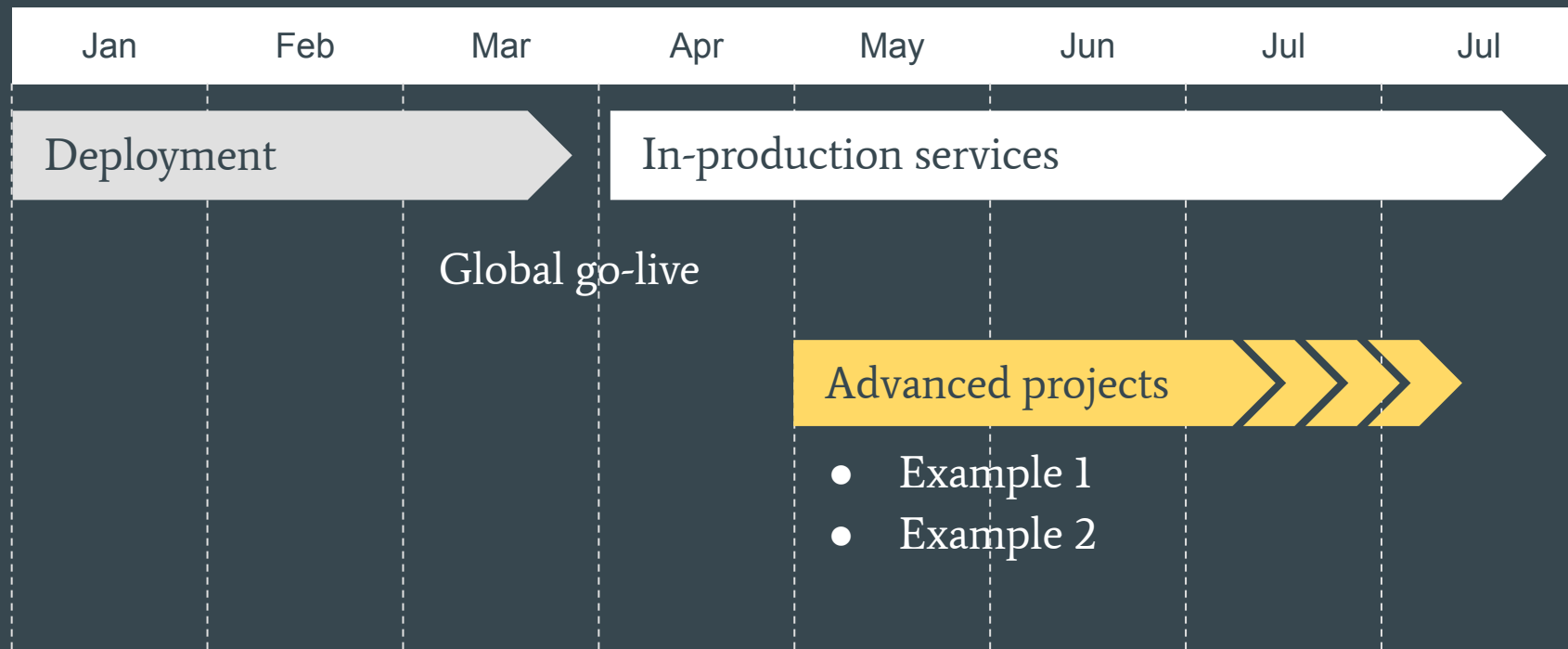
Deliverable 3

- Lorem ipsum dolor sit amet
- Sed do eiusmod tempor incididunt ut labore

Deliverable 4

- Lorem ipsum dolor sit amet
- Sed do eiusmod tempor incididunt ut labore

Timeline



The Team



Wendy Writer, CEO

Lorem ipsum dolor sit amet,
consectetur adipiscing elit,
sed do eiusmod tempor



Ronny Reader, CFO

Ut enim ad minim veniam,
quis nostrud exercitation
ullamco laboris nisi ut
aliquip ex ea commodo
consequat



Abby Author, CTO

Duis aute irure dolor in
reprehenderit in voluptate
velit esse cillum dolore eu
fugiat nulla pariatur



Berry Books, CPO

Excepteur sint occaecat
cupidatat non proident, sunt
in culpa qui officia deserunt
mollit anim id est laborum