Tecnológico de Monterrey

AstraZeneca

TH!NK

Embracing Neurodiversity

Team 49

FocusFidget

Valeria Cruz Tamayo
Daniela Herrera Montes de Oca
Daniela Fernanda Orozco Granados
Pedro Esteban Chavarrias Solano

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Context

#3 - Mirella Berger
Mirella is a district sales manager (diabetes and respiratory diseases)

Working with brand and marketing teams to manage her 10 primary care reps, enabling them to educate and support medical professionals.

As someone with **ADHD** and working memory issues, its hard for her to **retain focus** and this is complicated by not being able to retain detailed information or recall it on demand.

Problematic

- ADHD has a prevalence of 3.4% among adults between 18 and 44 (America, Europe and Middle East)
- Manifestations of ADHD in adults include
  - Inattention*
  - Restlessness
  - Working memory

Brent et al , 2019

State of the art

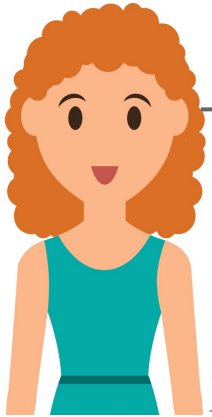
- Chinese wearable technology to measure the attention level of students. It includes head motion, pen motion, and visual-focus modules.

- Eye tracking as a gold standard for attention quantification.

Zhang et al. 2017

Brunye et al 2019

Solution model



Eye tracking

Feedback

Questions

Classification

Suggestions

Attention Level

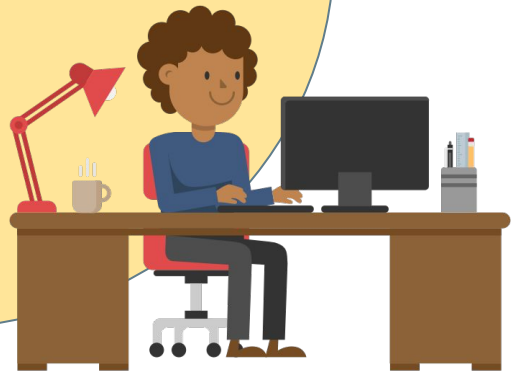
Vibrating alarms

Activity level

Idea presentation

Phase 1

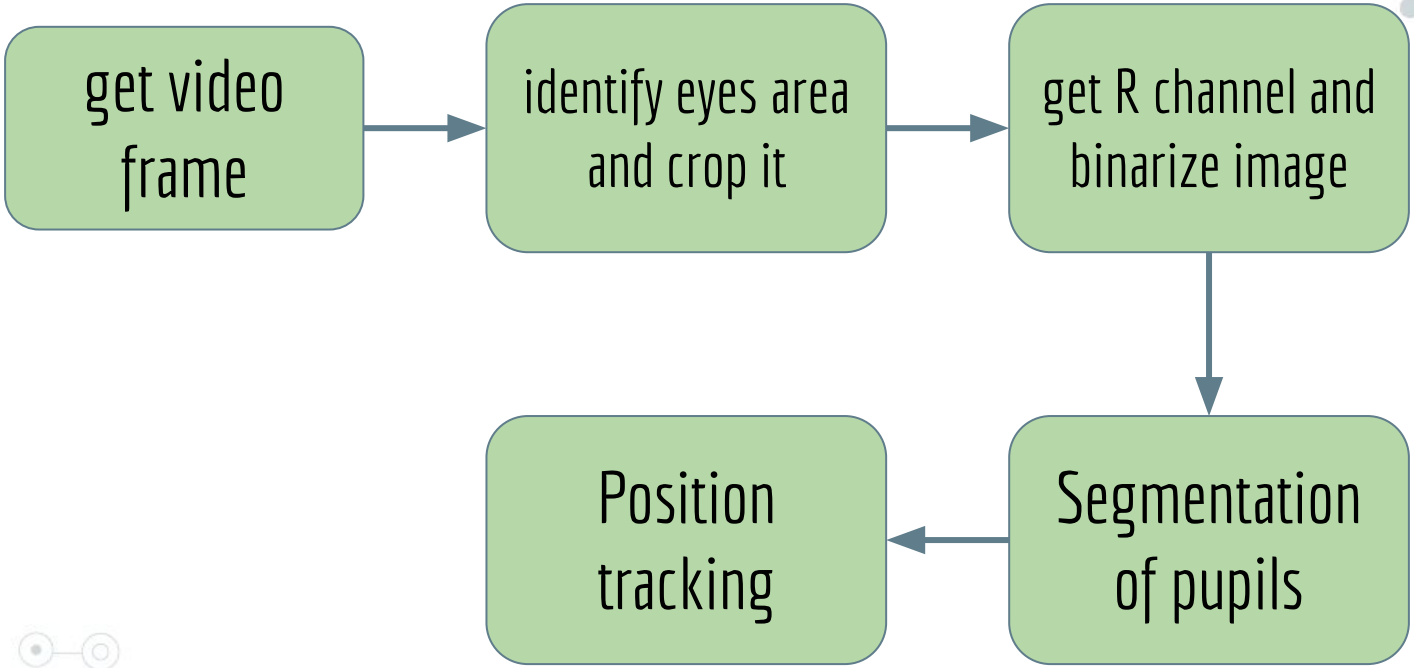
Personal algorithm training



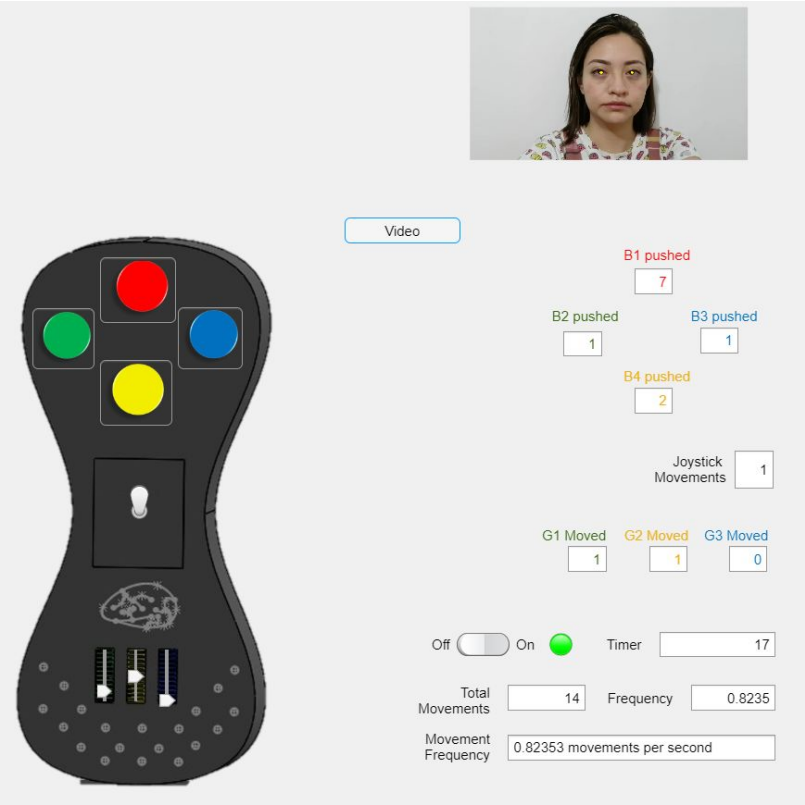
Phase 2

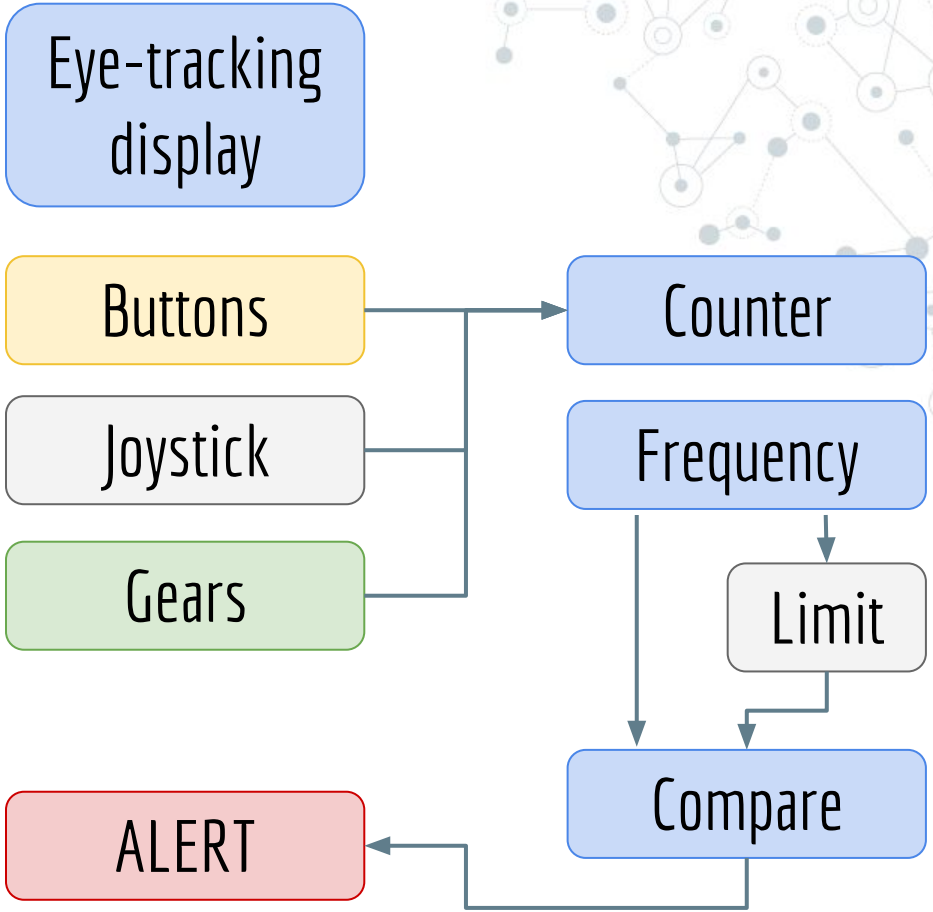
Personal notifications depending on analyzed attention customs

Eye tracking



Interface


Video
B1 pushed
7
B2 pushed
1
B3 pushed
1
B4 pushed
2
Joystick Movements
1
G1 Moved
1
G2 Moved
1
G3 Moved
0
Off
On
Timer
17
Total Movements
14
Frequency
0.8235
Movement Frequency
0.82353 movements per second


Eye-tracking display
Buttons
Joystick
Gears
Counter
Frequency
Limit
Compare
ALERT

Device

Hand-sized

Interactive

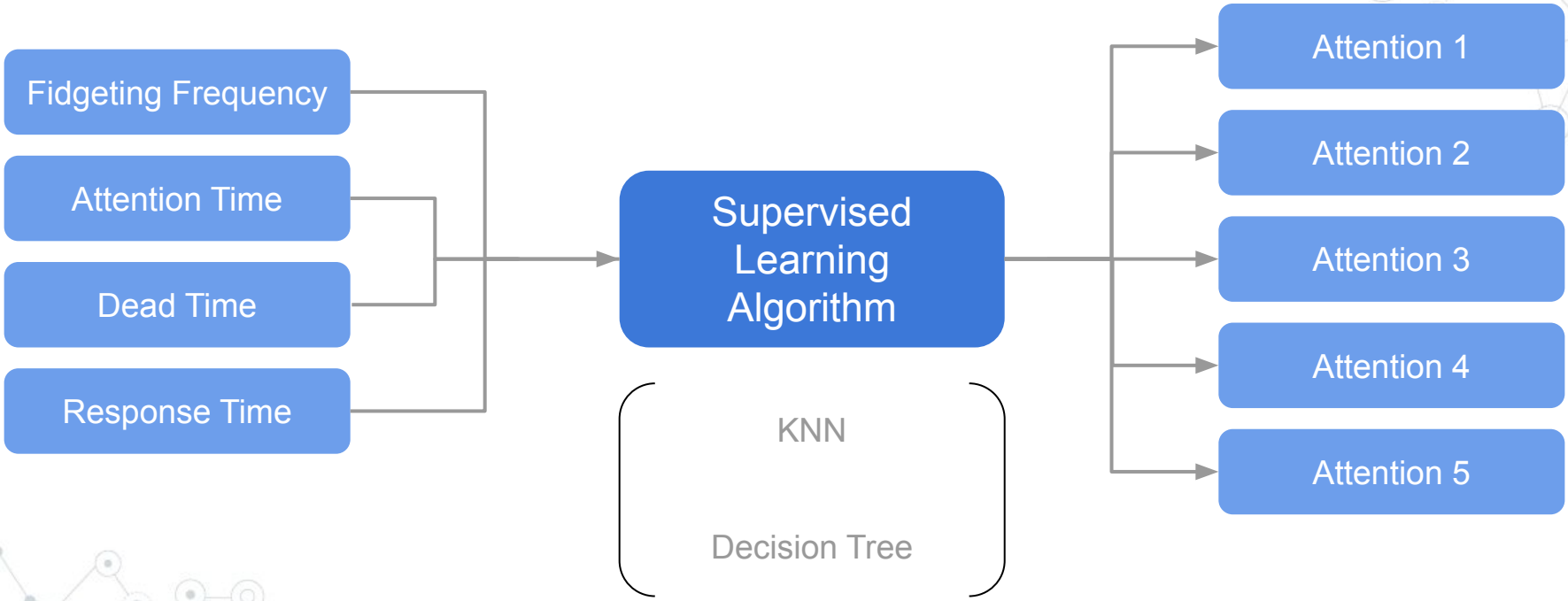
Simple

Input/Output

Bluetooth

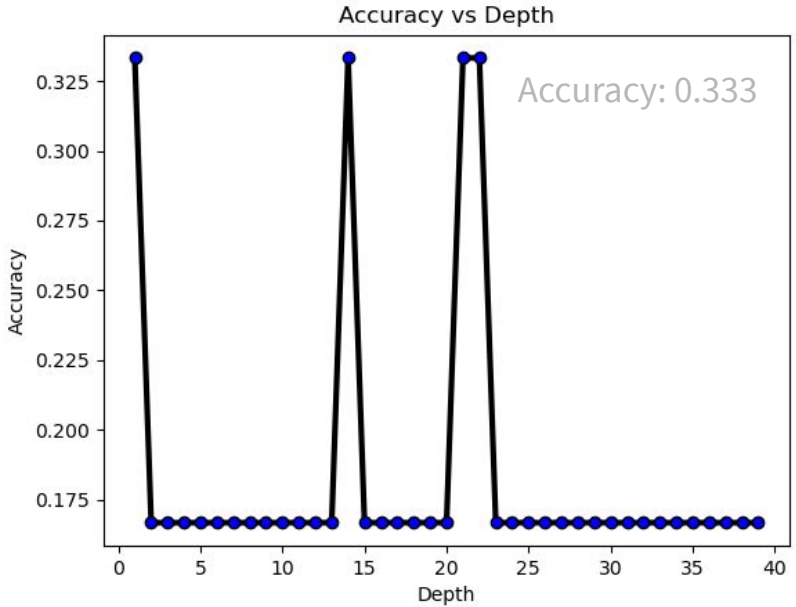
Rechargeable

Machine Learning Algorithms

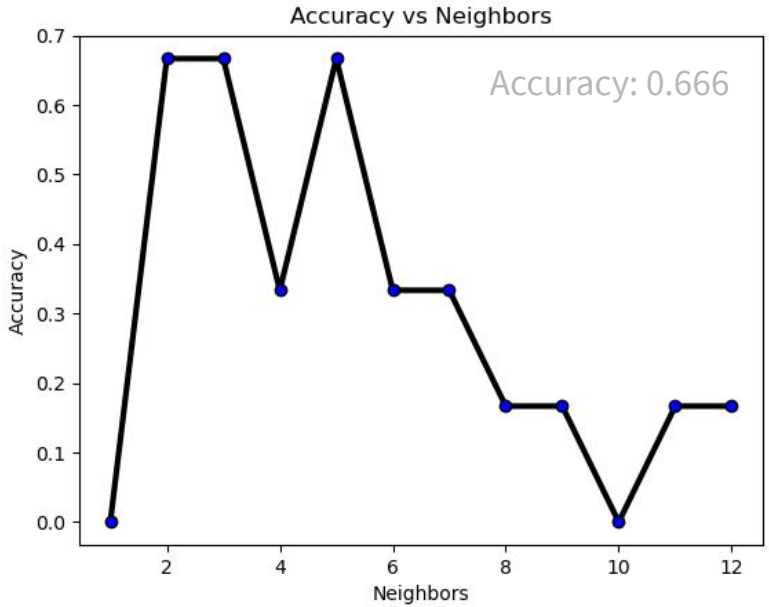


Machine Learning Algorithms

Decision Tree



KNN



Future work

- Migrate to Python
- Implement the hardware design
- Evaluate eye-tracking in different situations
- Validate the solution with neurodiverse people
- Train and test Machine Learning models with real-data

Thank you!

- Team 49

References

- X. Zhang, C. Wu, P. Fournier-Viger, L. Van and Y. Tseng, "Analyzing students' attention in class using wearable devices," 2017 IEEE 18th International Symposium on A World of Wireless, Mobile and Multimedia Networks (WoWMoM), Macau, China, 2017, pp. 1-9, doi: 10.1109/WoWMoM.2017.7974306.
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- David Brent, MD et al. “Attention deficit hyperactivity disorder in adults: Epidemiology, pathogenesis, clinical features, course, assessment, and diagnosis” UptoDate, Nov, 2019
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