Attention is all we need

a Bachelor's Thesis by Gergely Horvath

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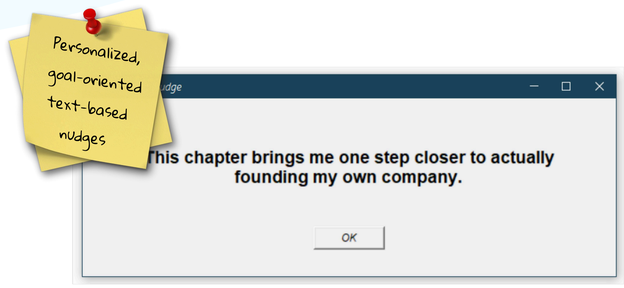
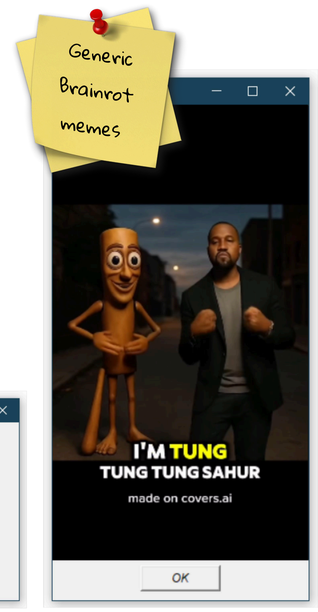
PROBLEM:

Attention is a fragile and limited cognitive resource — especially during exam preparation, something quick to vanish and fall prey to distractions. Despite our best intentions and awareness of the task's importance, **it almost feels like something lurks beneath our conscious control**...





CONTEXT:

According to Posner's model, the human attention system is governed by two interacting mechanisms:

- **Top-down** attention: goal-directed focus (e.g. deciding to study for an exam),
- **Bottom-up** attention: stimulus-driven shifts (e.g. reacting to a noise, hunger, or a meme).

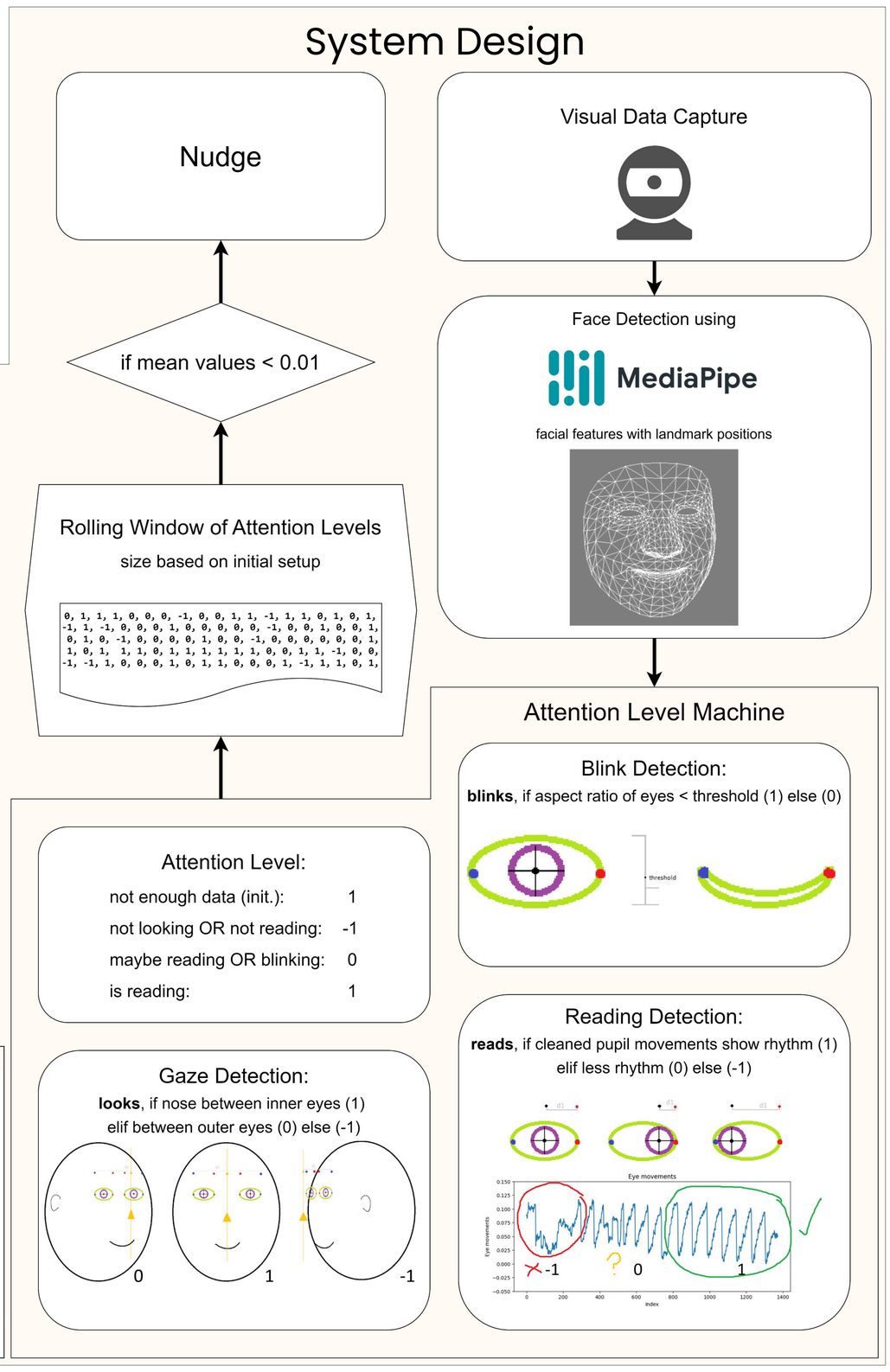
This project investigates whether attention can be gently nudged back toward goals by monitoring it passively and providing contextually timed reminders.

SOLUTION:

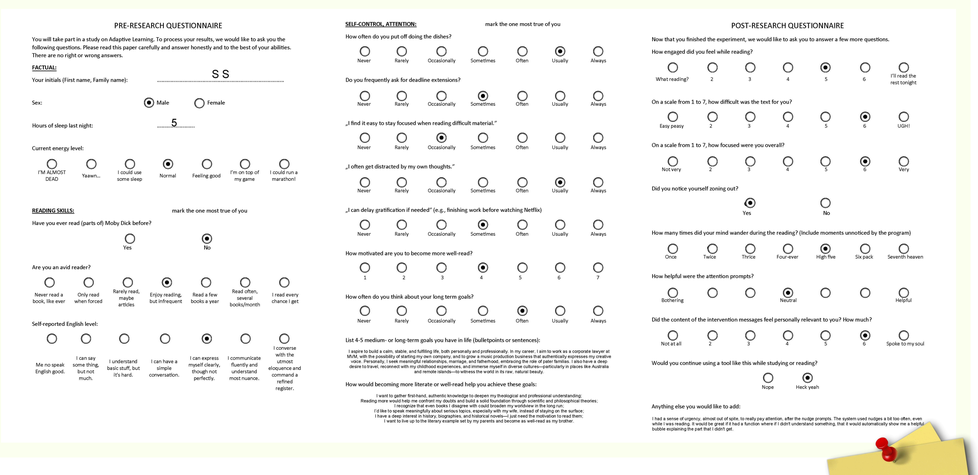
The program I wrote works the following way: you fill out a short questionnaire, input your medium- to long-term goals, and start studying. Your laptop's webcam monitors your attention level (reading), and if it drops below a certain threshold, you are reminded of **why you sat down to study in the first place**, triggering a personalized motivational reminder.

One might argue, that by using this program you **outsource your high-level reasoning**, and if that low-level instinctual desire creeps up on you and takes control, you can get back to the material much more quickly.

System Design



Questionnaire



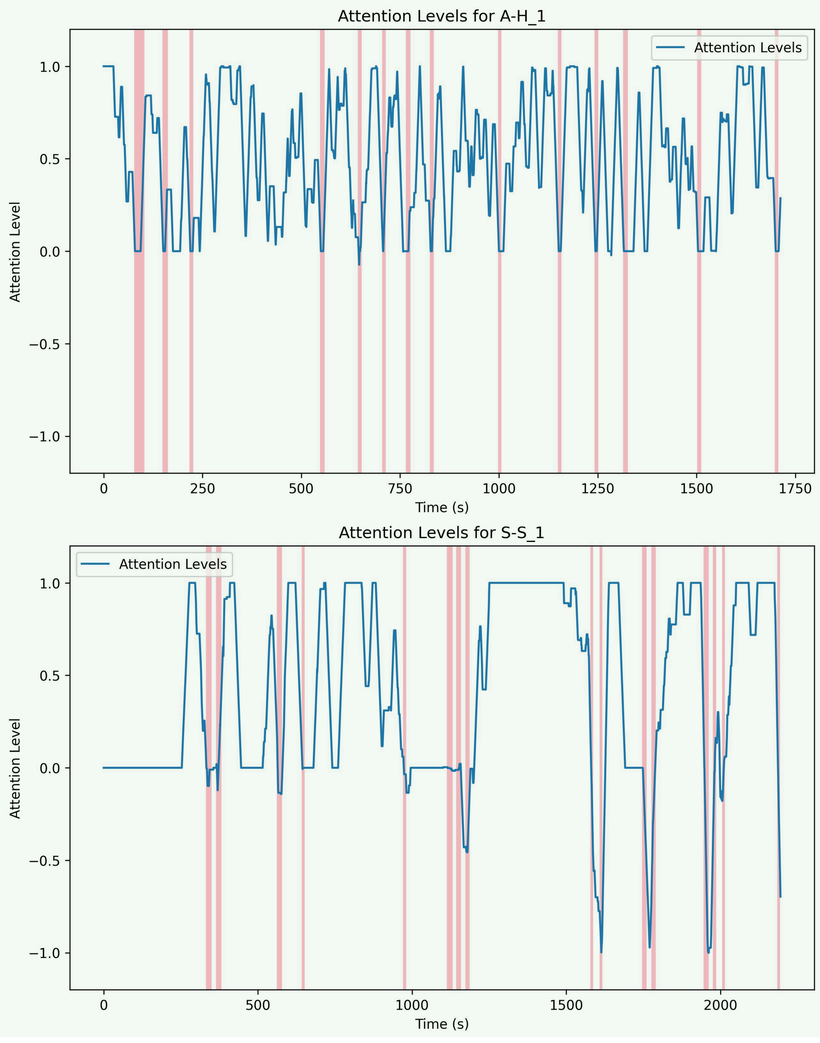
N = 10

RESULTS:

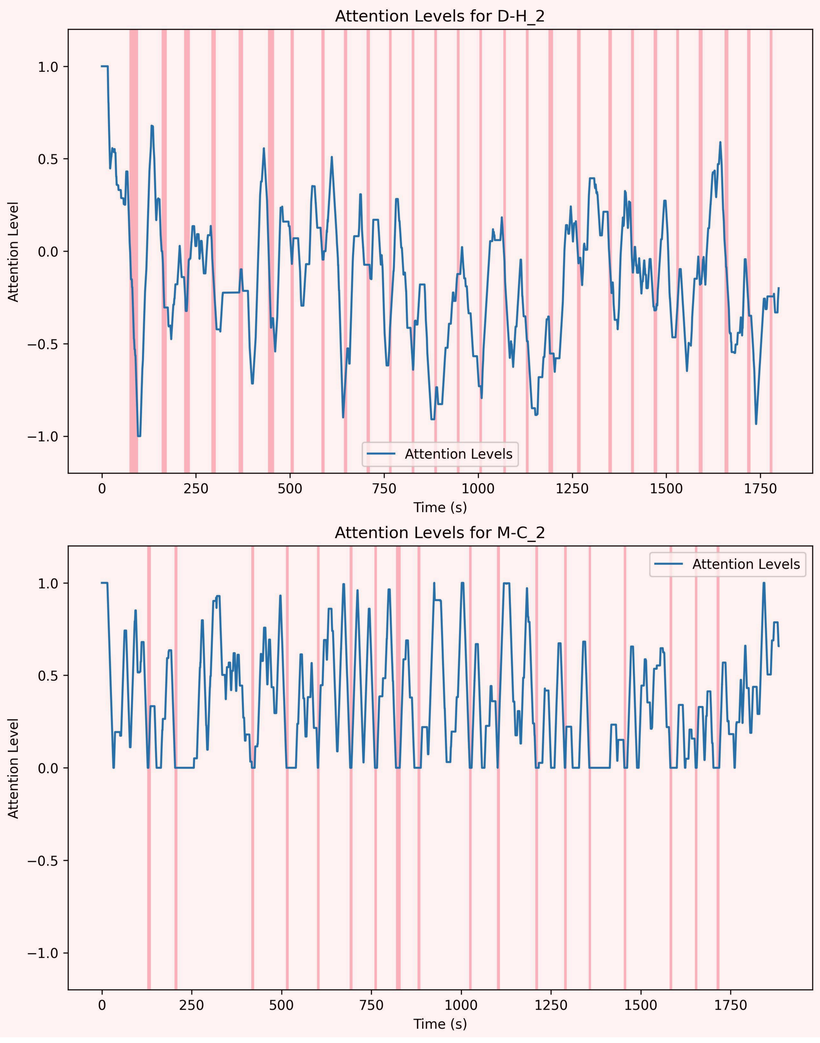
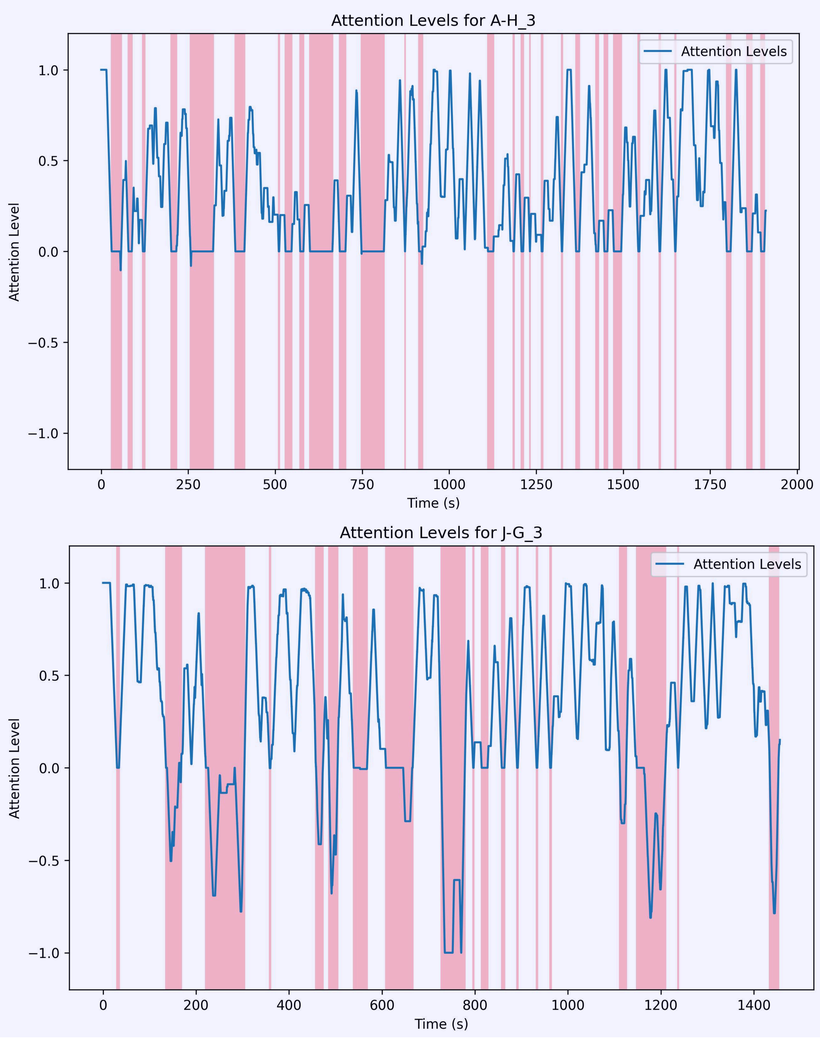
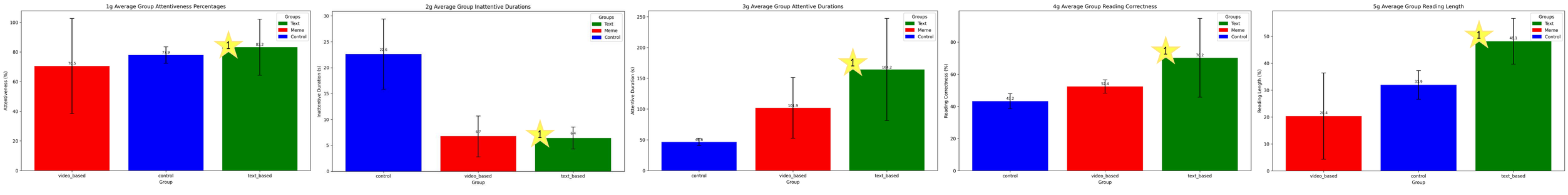
This program has been subjected to a series of experiments done mostly on university students. Here's what changed when they studied with goal-aware nudges:

- **Personal goals beat memes.**
  - Reminders tied to long-term goals were way better at pulling attention back than random funny images.
- **Focus stuck around**
  - People zoned out less and stayed on task more.
- **Mind-wandering dropped.**
  - The brain spent less time chasing squirrels.
- **Comprehension comprehends better**
  - They didn't just read more — they understood more.
- **More material, same time**
  - With less distraction, students crammed more without adding hours.
- **However...**
  - Users were not too fond of being nudged. Some parameter tuning is needed.

Goal-based: Sustained attention, quick recovery



Meme-based: Periodic relapse, lower level of attention



Control: Long periods of distraction, lower comprehension