Detecting and analysing user engagement in virtual meetings

Virtual meetings, lectures, and presentations have been a way of work life, especially in recent times with COVID restrictions. The success and productivity of underlying subject of discussion in a meeting highly depends on the attention allocation and user engagement among the participants. In virtual meetings there is no direct eye-contact and social connect among participants, and hence the attendee behaviour and attention allocation might be different as compared to conventional physical meetings. The attention and engagement could depend on both verbal and nonverbal communication. While one can think and control the verbal language before using words, nonverbal communication is much more subconscious, e.g., a smile, laugh, sigh, nod, facial expression conveys more implicit message, reaction, or feedback. In social science and psychology research, nonverbal signals has been considered as powerful communication channel and has been the subject of study for many years. In this project, the goal is to study it in the domain of virtual meetings from real-world data and computational analysis. More interestingly, in correlation with eye gaze attention the non-verbal cues may provide greater context, e.g., a smile from attendee while looking at the current speaker window might indicate agreement with the content, while the smile looking at a non-speaker colleague's window might indicate disagreement.

For designing the analysis framework, this project will focus on collecting data from web cam and microphone. The computation will include classifying the visual data for gaze/head tracking, emotion detection, and audio data for classifying non-verbal voice signals. The student is encouraged to use any available open-source modules for classification tasks wherever applicable.

Research idea
- Online meetings are often on the agenda, especially now during this recent pandemic with the covid restrictions
- They differ from physical meetings due to their structure in the following points:
    - In terms of the influence of emotions in virtual meetings
    - Attention allocation of the participants
    - User engagement among the participants
    - And many more…

→ In this work we want to focus on the differences in attention and user engagement in physical and virtual meetings. The general contribution of the work is described on the second page.

Step-by-step approach:

First step: Designing the analysis framework
- Identify & Evaluate existing tools for both eye tracking and emotion detection
- Use (browser-based) video conference tool (e.g. Jitsi.meet, Microsoft Teams,...)
- Integrate Tools via Javascript (Console/TamperMonkey), optional: Browser Extension

Second step: Formulate hypotheses
- Find and formulate meaningful null- & alternative hypotheses for the research project
- For example: If participant A is smiling at participant B, who is the presenter, is it most likely that participant A is agreeing with the context of the presentation?

> *Nullhypothesis H0.1: There is **no** significant difference between the approval of participants who smile at the presenter and those who don't.*
> *Alternative hypothesis HA.1: There is **a** significant difference between the approval of participants who smile at the presenter and those who don't.*

Third step: Collecting & Analysis of the data
- Test/Analyze how participants behavior differentiates in virtual meetings in contrast to regular physical meetings.

  E.g.:
  - Reaction to emotions
  - Reaction to be looked at
  - Reaction to the content of the lecture

Fourth step: Evaluate (Reject/accept) the hypotheses
- Depending on the results of the analysis of the quantitative and qualitative data we can accept the null-hypothesis or reject it in favor of the alternative hypothesis

Fifth step: Design guidelines and features for online meetings
- Create new design guidelines and features for online meeting software for improved attention allocation and user engagement depending on the found results of the research

Last step: Writing a report about the results of the research project
- The results of the research must be documented in a detailed elaboration with at least 15 pages (qualitative vs quantitative thought!)

Contact

Students:	XXXXXXX	Student (mail):
	XXXXXXX	
	XXXXXXX	Supervisor (mail):
	XXXXXXX	
Supervisor/Advisor:		
Examiner:		
Start date:	XX.XX.202X	
End date:	XX.XX.202X	