Exploration of resolving colleague relationships in telecommuting through micro-expression analysis

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Abstract

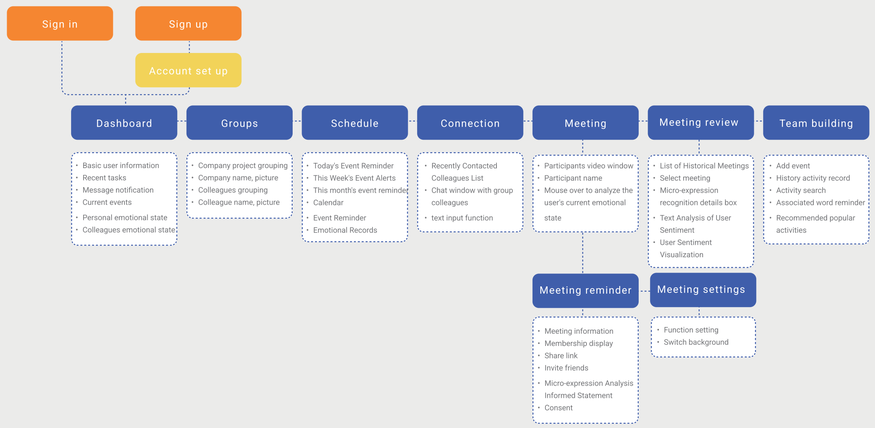
Based on a research paper based on user-centred research, this paper explores micro-expression recognition technology in telecommuting software to help users understand each other's emotions, thus facilitating communication between users. The findings show that micro-expressions, as subtle changes in human facial expressions, are often related to real emotions and are difficult to control in a short period of time. In the project, five functional points as the core requirements, the establishment of real-time emotion analysis, meeting micro-expression recording, emotion feedback mechanism, emotion visualisation analysis and online group building function software, by helping users quickly understand each other's emotions and establish in-depth communication. Micro-expression recognition technology brings new possibilities and opportunities for communication in telecommuting, but also needs to fully consider issues such as user privacy and cross-cultural adaptability.

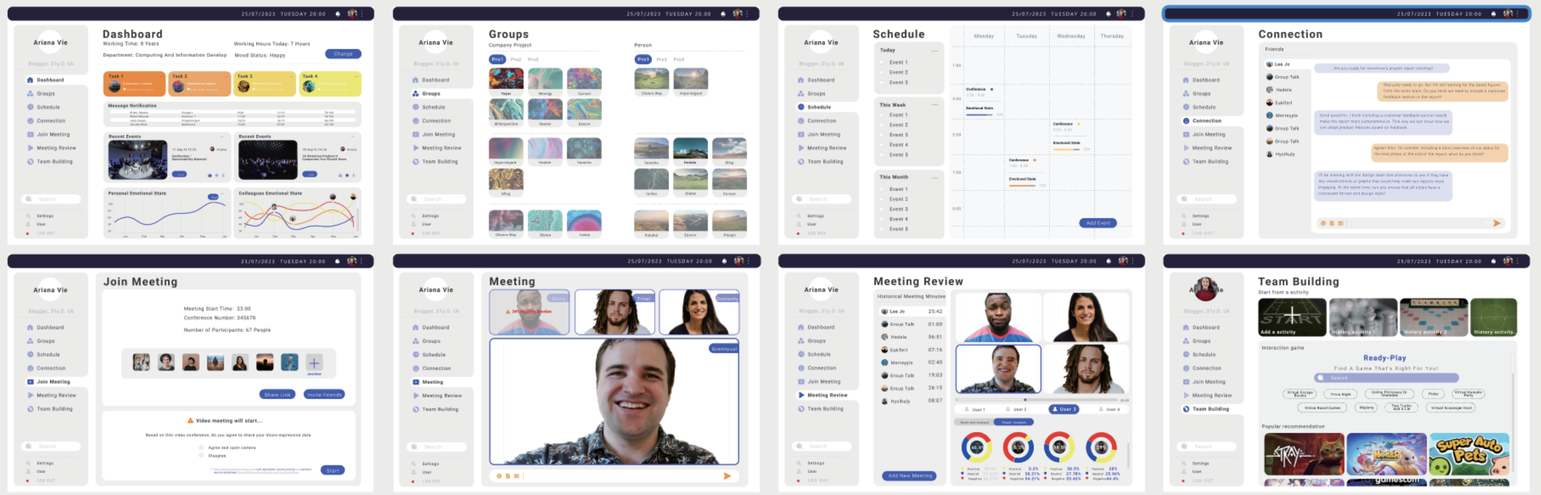
Introduction & Background

With the popularity of telecommuting, effective communication between teams has become key to improving productivity. Particularly against the backdrop of the widespread spread of the 2020 covid-19 pandemic, many companies are opting for a telecommuting model in order to reduce operational costs and minimise the risk of employee infection. In the UK alone, 36% of the workforce works from home, while a Silicon Valley company plans to have 20% of its 140,000 employees work remotely on a permanent basis from 1 September 2020, even though they had originally planned to require employees to be in the office at least three days a week. This way of working has led to more flexible work, with employees sending 52 per cent more office instant messages between 6pm and 12am, and twice as much collaborative work at weekends. Against this background, this study delves into the use of micro-expressions technology in remote working software. The survey shows that remote workers often encounter difficulties in communication due to the inability to directly perceive each other's emotions. However, micro-expression technology can facilitate communication and emotional understanding by capturing and assessing users' emotions in real time. These tiny changes in facial expressions are difficult to conceal, but can accurately reflect real emotions and are important for enhancing emotional communication and understanding in teleworking.

Research question： Can users in telecommuting understand each other's emotions to facilitate better communication?

Diagram / Design





Study Methodology

- Qualitative research based on interpretivism + User-centred research methodology

Questionnaire **AB Testing + SUS** **Wizard of Oz Testing**

- In the first part, a questionnaire is used to understand the basic situation of teleworkers in the current telecommuting group, and then determine the core user needs.
- In second part, the designed low-fi prototype Group A and low-fi prototype Group B were tested respectively, and the real feedbacks from the two groups of testers were analysed against each other, and the page contents were optimised. During the testing process, users rated the designed versions through the SUS System Usability Scale.
- In the third part, the high-fidelity prototype was identified and the Wizard of Oz test method was applied to verify the product feasibility and validate the rsearch question.

Testing & Evaluation

- **Questionnaire:** Through a questionnaire survey of 53 respondents, the aim was to gain insight into the current state of emotional problems in telecommuting, their causes and possible solutions.
- **AB Testing + SUS:** The 8 test users were divided into two groups to test the product sequentially, and Test Groups A and B used 2 sets of low-fidelity prototypes of the product for 3-5 minutes respectively.
- **Wizard of Oz Testing:** Six testers were recruited to conduct in-depth testing of the product based on its innovative feature points. Subsequently answered questions in the feedback form, raised product queries about the product situation, and ultimately documented the feedback notes.

Research Results

- **Real-time sentiment analysis:** 83.5 per cent of users believe that it helps to understand each other's moods, and that users make adjustments to their communication style in meetings based on negative sentiment alerts.
- **Meeting micro-expression recording:** 65% of users think this feature can detect unaware emotional changes.
- **Emotional feedback mechanism:** 83.3% of users use emotional feedback to adjust communication.
- **Emotional visualisation and analysis:** 83.3% of users think that colour differentiation of emotional states is intuitive and clear, but users would prefer to see line graphs and emotional radar charts.
- **Of the online group building features:** 50.1% of users think it can enhance relationships, but 33.2% are unsure about it.

Conclusions & Future Work

According to research, understanding each other's emotions can help build more effective communication. However, this inevitably poses some challenges due to the limitations of technology and concerns about the privacy of emotions. The individualisation of emotions makes cross-cultural adaptation and personalised analysis complex, which needs to be further explored and challenged in future research. And with the combination of deep learning and artificial intelligence, the accuracy of the techniques and real-time analyses have been significantly improved. However, cross-cultural adaptation and personalised analytics remain an important area as they affect how accurately software can identify and interpret the emotions of users from different backgrounds and cultures. Enhanced privacy protection mechanisms are also key in order to increase users' trust and ensure their privacy. There is also a need for third-party developers in the future who can now extend and enhance the functionality of the software, which offers great potential and opportunities for other application areas beyond the office environment.