

Stress in the office

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Are our employees
stressed?

Data

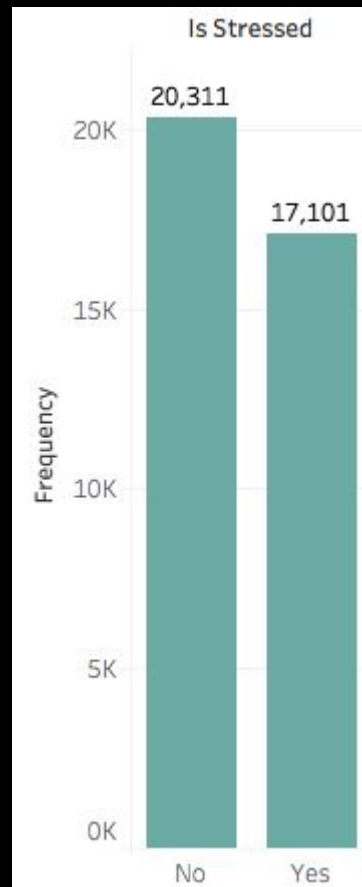
Questionnaire features

- **Age:** Age of participants in years.
- **Gender**
- **Nationality**
- **Native Language**
- **Education**
- **Writing Proficiency:** Self-reported writing proficiency of participants in a seven-point Likert scale, where 1 \equiv Not fluent at all and 7 \equiv Very fluent.
- **Daily Email Frequency:** Self-reported daily use of email in a seven-point Likert scale, where 1 \equiv Never and 7 \equiv Very often
- **Big Five Inventory (BFI)** - A trait psychometric related to the participant's key personality factors
- **Emotion Regulation Questionnaire (ERQ)** - A trait psychometric related to the participant's ability to regulate emotions. Two features: **ERQ Cognitive Reappraisal** & **ERQ Expressive Suppression**
- **Perceived Stress Scale (PSS):** Level of non-specific perceived stress of participants
- **NASA TLX** - A state psychometric administered upon completion of *DT* to gauge the perceived loading this task induced to participants.

Physiological features

- **Treatment:** The treatment during which each set of modal signal values was recorded.
- **Task:** Labeling of email vs. report writing activity during DT.
- **PP_QC:** Values of the perinasal perspiration signal in $^{\circ}\text{C}^2$.
- **EDA_QC:** Values of the EDA signal in μS , measured with E4 in the wrist of the participant's non-dominant hand.
- **BR_QC:** Values of the breathing rate signal in BPM, measured with the BioHarness in the participant's chest.
- **Chest_HR_QC:** Values of the heart rate signal in BPM, measured with the BioHarness in the participant's chest.
- **Wrist_HR_QC:** Values of the heart rate signal in BPM, measured with E4 in the wrist of the participant's non-dominant hand.

Our predicted
label



Models



Features used to model

- **ERQ_Cognitive_Reappraisal:** The degree to which a participant can change the way s/he thinks about emotion-eliciting events.
- **Perceived Stress Scale (PSS):** Level of non-specific perceived stress of participants. This is a trait psychometric that predicts health-related outcomes associated with appraised stress.
- **NASA_Performance:** Perceived success in executing DT.
- **EDA_QC:** Values of the EDA signal in μS , measured with E4 in the wrist of the participant's non-dominant hand.
- **BR_QC:** Values of the breathing rate signal in BPM, measured with the BioHarness in the participant's chest.
- **Wrist_HR_QC:** Values of the heart rate signal in BPM, measured with E4 in the wrist of the participant's non-dominant hand.
- **RR_QC:** Values of the heart rate signal in BPM, measured with the BioHarness in the participant's chest.
- **Treatments:** Dual Task, Priming/Relaxing, Presentation, Resting Baseline, Single Task.
- **Tasks:** Email, Report, Not Applicable (for Single Task).

Top three models used to make predictions

LOGISTIC REGRESSION

Accuracy: 0.70

K NEAREST NEIGHBORS -

Accuracy: 0.86

RANDOM FOREST

Accuracy: 0.97

0.87

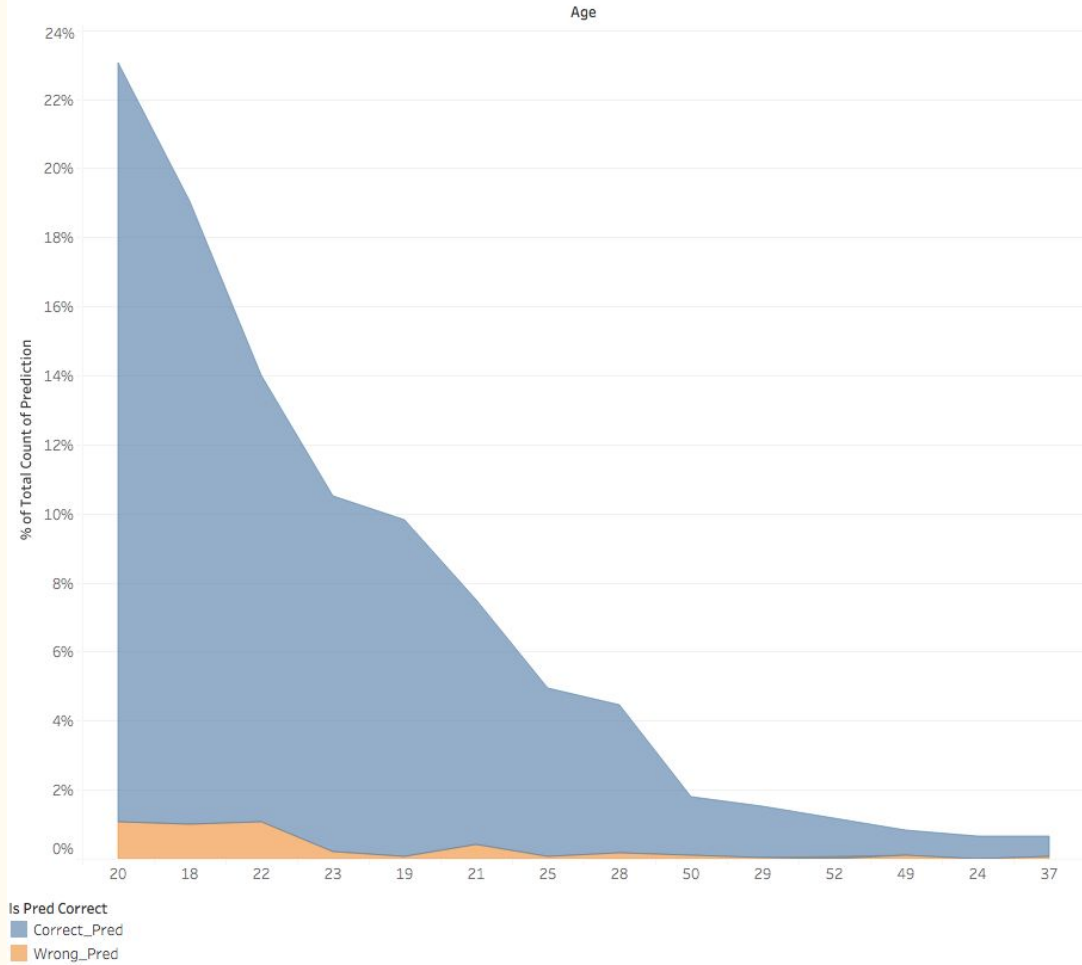
K NEAREST NEIGHBORS Accuracy on Testing set

When we
predicted stress...

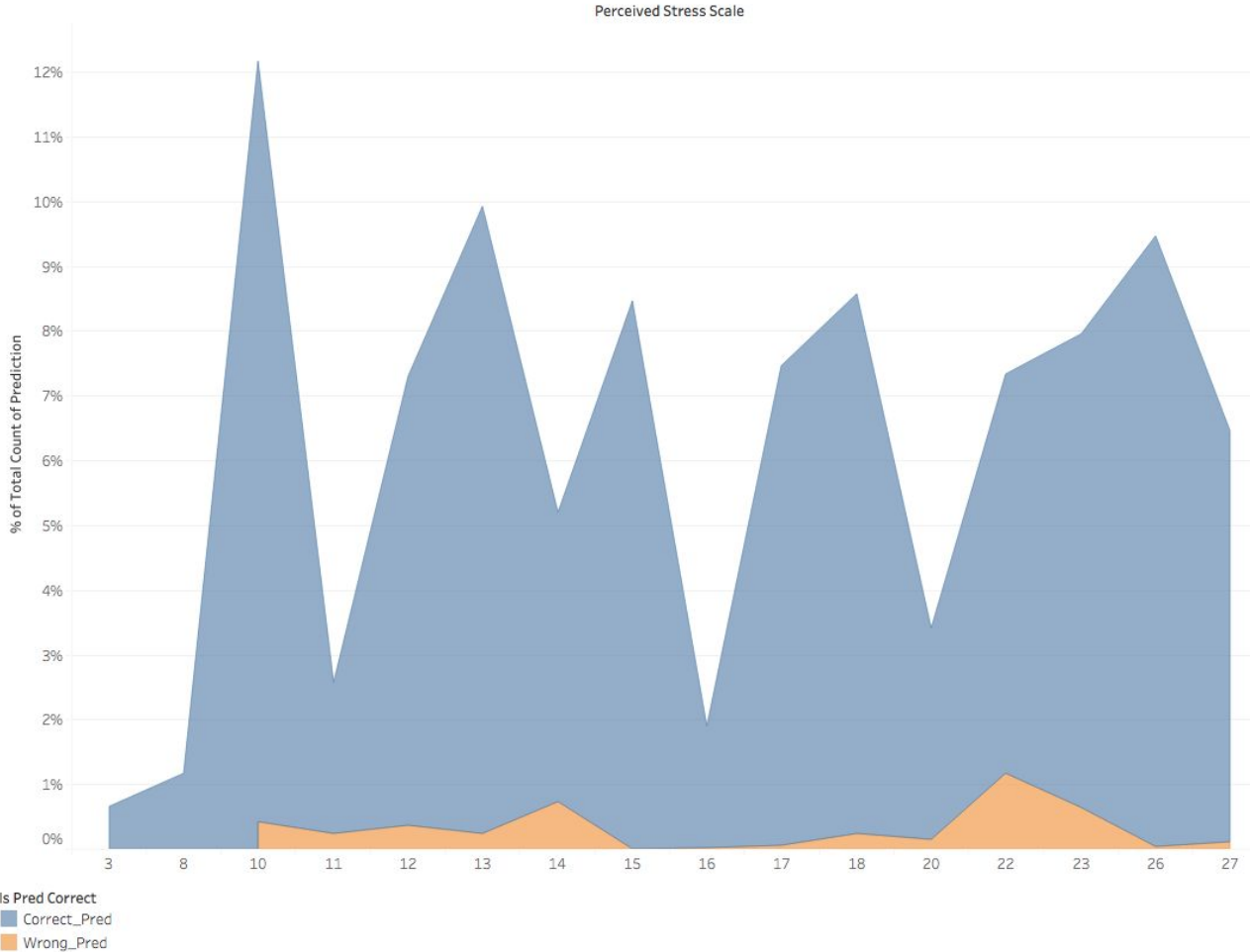
Confusion matrix



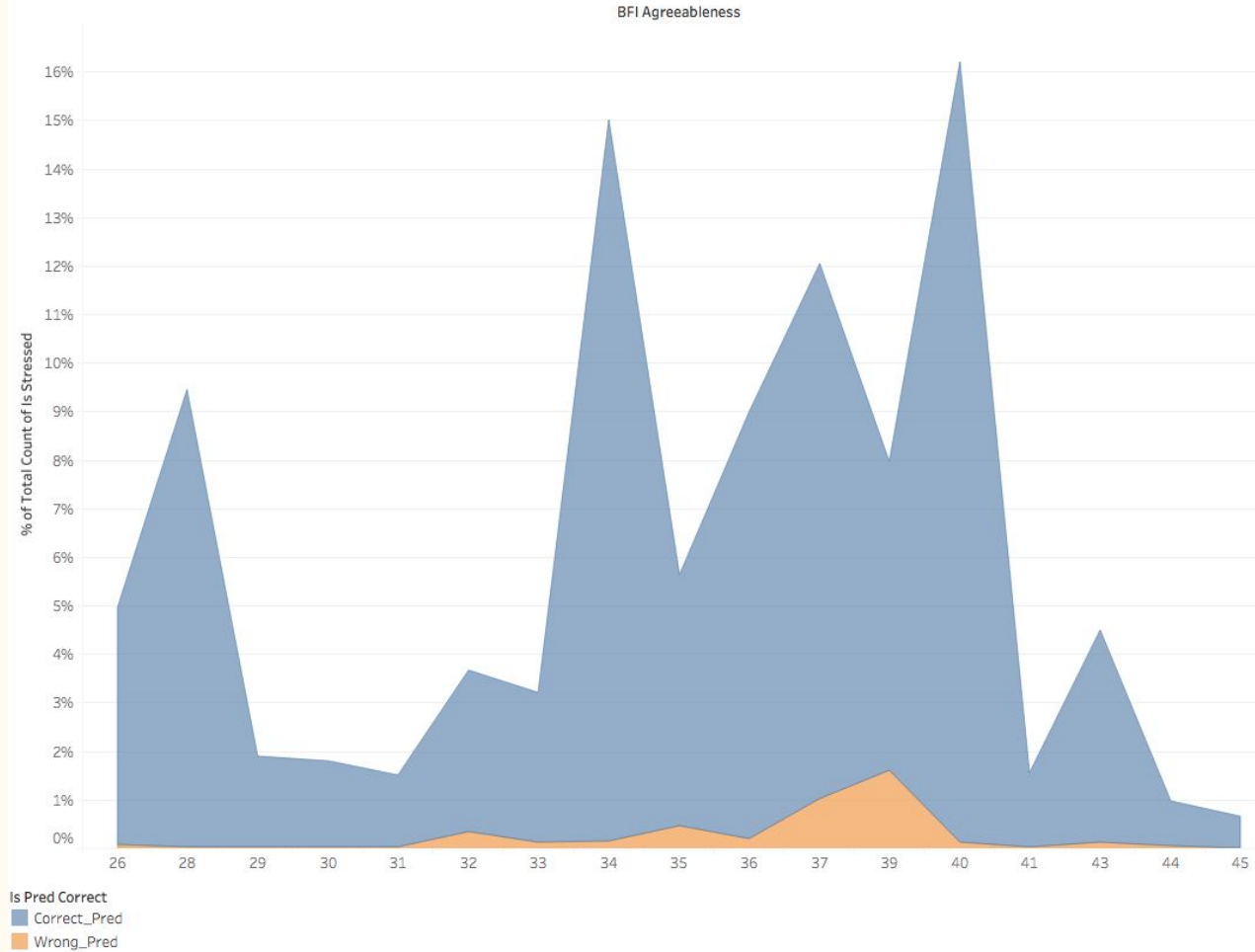
Age



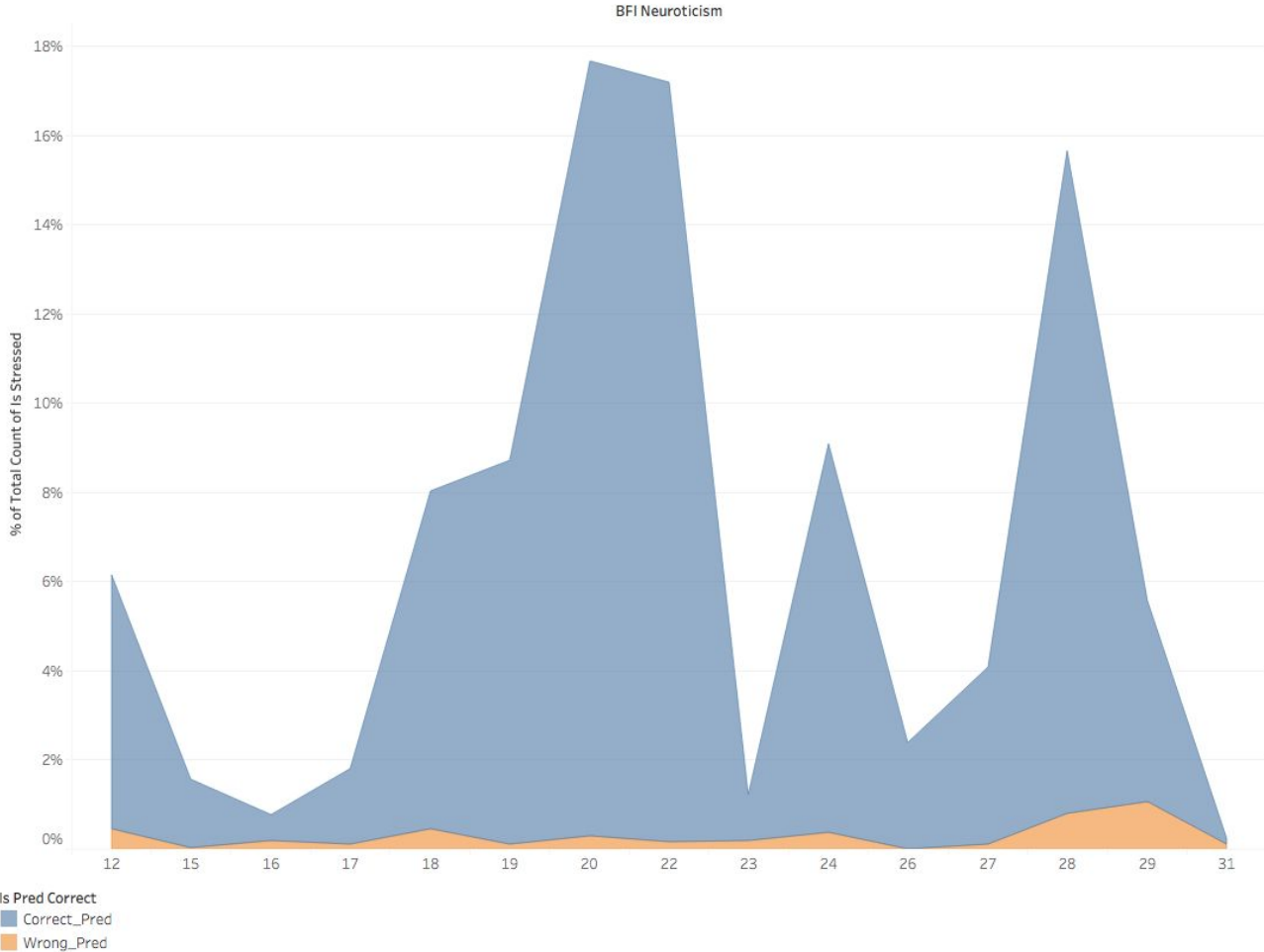
Perceived Stress Scale



BFI Agreeableness — The level of participant's friendliness



BFI Neuroticism — The level of participant's nervousness



Future work

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- Expensiveness of study does not make it easy to replicate on a higher scale
- Office work is temporarily suspended
- Worth exploring WFH for more insights on how the old office work is translated to a home set

Thank you!

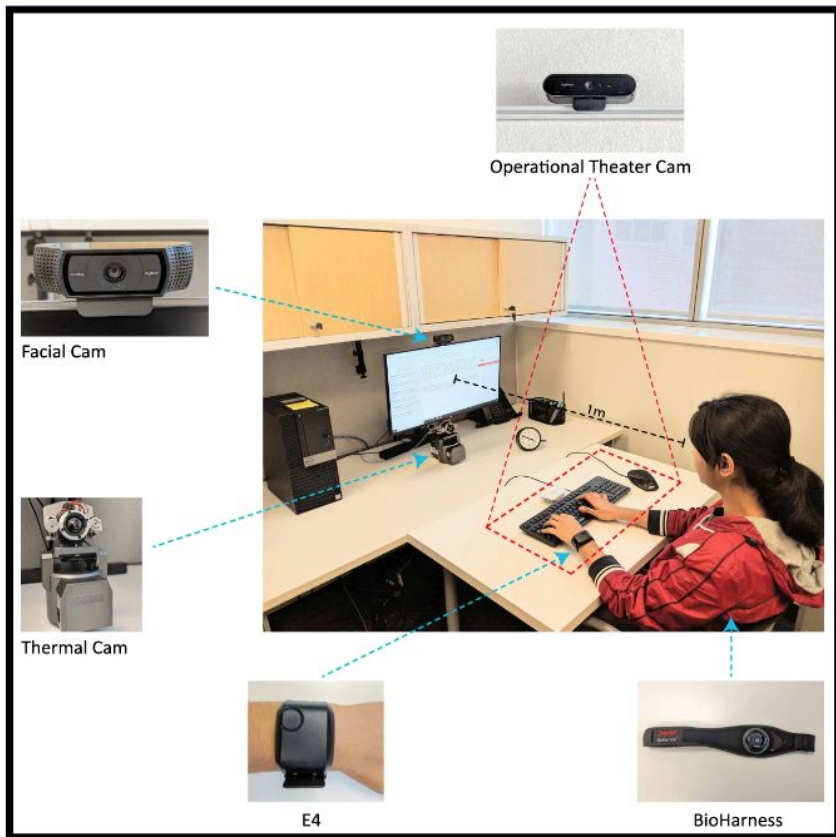


APPENDIX

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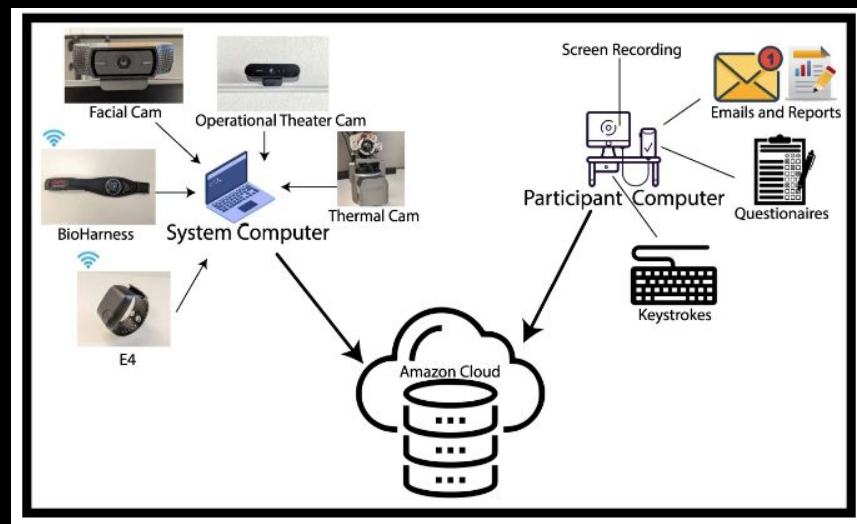
Experimental setup and
system architecture.

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(a) Experimental setup. The specific setup is from the University of Houston site; mirror setups existed at Texas A&M University and the University of California, Irvine.

(b) Experimental system architecture. Information channels acquired by the system and participant computers are archived in the Amazon cloud.



Links

- [Zaman, S., Wesley, A., Silva, D.R.D.C. et al. Stress and productivity patterns of interrupted, synergistic, and antagonistic office activities. Sci Data 6, 264 \(2019\). https://doi.org/10.1038/s41597-019-0249-5](https://doi.org/10.1038/s41597-019-0249-5)
- [Office Tasks 2019 – A Multimodal Dataset](#)