Stress is physiologically and psychologically damaging.

StressNet is the first approach that uses deep learning to estimate physiological signals and detect stress [1].

**Introduction**

- Stress is physiologically and psychologically damaging.
- StressNet is the first approach that uses deep learning to estimate physiological signals and detect stress [1].

**Motivation**

- Traditional stress detection is invasive and lacks automation.
- Contactless health monitoring needed in the post-COVID world.
- Can be used as a precursor to a more formal diagnosis.

**Data**

- Cold Pressor Test (CPT): Inducing physical stress by submerging hand or feet in ice water.
- Original Data: BOSS Dataset recorded thermal videos, ECG and ICG signals of Subjects with feet in and out of ice water [2].
- New Data from UCSB IRB: approved experiments will not have ICG signal and do hand CPT.

**Qualitative Results**

- Traditional stress detection is invasive and lacks automation.
- Contactless health monitoring needed in the post-COVID world.
- Can be used as a precursor to a more formal diagnosis.

- StressNet can be used to facilitate wireless health monitoring.
- Thermal dataset is highly unique and offers various applicability in future research.

**Limitations of the model:**
- Noisy ECG signal due to poor electrode connection.
- Subjects move head out of field of view of camera.

**Conclusion**

- StressNet can be used to facilitate wireless health monitoring.
- Thermal dataset is highly unique and offers various applicability in future research.
- Limitations of the model:
  - Noisy ECG signal due to poor electrode connection.
  - Subjects move head out of field of view of camera.

**Experimental Process**

**Recruitment**

- Flyer
- Scan QR Code
- Interest/Exclusion Form Form

**Data Sync**

- List of available time slots sent to Subject
- View of more boxes checked in inclusion
- Some cannot participate in the study.

**Method**

**Network Architecture**

**Test Accuracy**

- Training Loss
- Plotting Loss

**Potential Improvements**

- Segment Anything Model (SAM): We are currently evaluating if SAM can be used to replace our spatial module [3]. SAM is a vision transformer that is better at learning long term dependencies than traditional models. However, we currently lack the necessary computing power to properly train the model.

**Acknowledgement**

This research is partially supported by the grant from NSF award #1664172 and International Foundation for Telemetring (IFT 2023). We thank Dr. Tom Bullock and the Department of Psychological & Brain Sciences for providing the equipment and guidance to make this study possible.

We thank Professor Andrew Kirillov, Professor Ilan Ben-Yaacov, Chris Cheney, and Ray Chang from the Department of Electrical and Computer Engineering for advising this project. We also thank Kelly Yan for designing the StressNet Logo.

**Reference**

