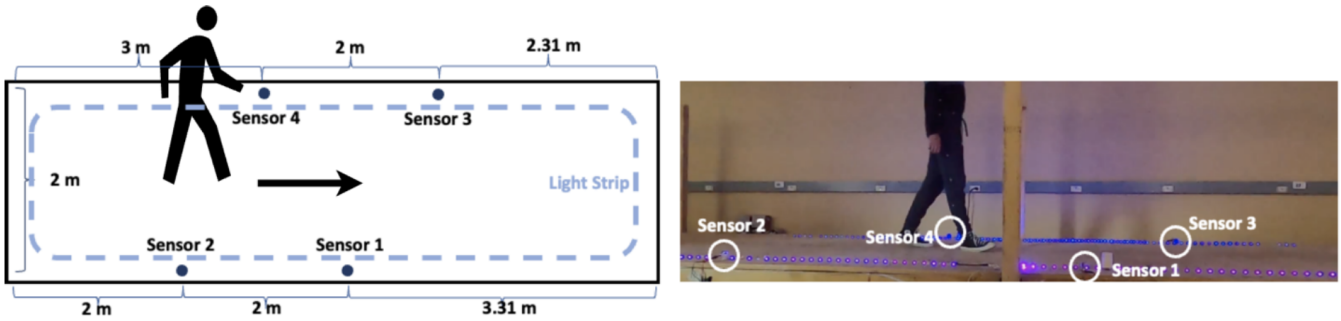
Docket #: S23-155

Emotion Recognition Using Footstep-Induced Floor Vibrations

Researchers in the Noh Lab have developed a gait based, emotion recognition system using geophone sensors that are attached to the floor. People's gait changes under various emotions creating distinct structural vibration patterns. The gait-based emotion recognition system collects and analyzes those patterns in three modules: footstep detection and data preprocessing; emotion-related feature extraction; and emotion recognition, which is a multilayer perceptron model to estimate the pedestrians' emotional states. This approach allows for a non-invasive emotion recognition with applications in mental health monitoring, human-computer interaction, emotion-driven advertisement, and to provide personalized and relevant suggestions from recommendation systems.



Sensor Set Up
Image courtesy the Noh Lab

Stage of Development – Proof of Concept
The Noh Lab continues to test the robustness of the hardware and software under different environments and to develop and refine the user interface.

Applications

- Clinical and non-clinical/in home **mental health monitoring**
- Enhance **human – computer interaction/smart home applications/human-building interaction** by adjusting interface or response based on emotional state of the user
- Advertising or marketing tool to target customers based on their emotional state and create a more personalized experience

Advantages

- **Non-intrusive monitoring** without carrying or wearing devices
- **User friendly, convenient**, and easily scalable
- **Privacy-friendly** – no visual nor biometric data collection

Publications

- Wu, Y., Dong, Y., Vaid, S., Harari, G. M., & Noh, H. Y. (2023). Emotion Recognition Using Footstep-Induced Floor Vibration Signals. *STRUCTURAL HEALTH MONITORING 2023*. DOI:10.12783/shm2023/36968

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