RESEARCH-PRAXIS SEMINAR OR BACHELOR THESIS (M/F/D) – FEATURE ENGINEERING AND SENSOR FUSION FOR PERSONALIZED STRESS DETECTION MODELS

fortiss is the research institute of the Free State of Bavaria for software-intensive systems and services with headquarters in Munich. The institute currently employs around 150 employees, who collaborate on research, development and transfer projects with universities and technology companies in Bavaria, Germany and Europe. Research is focused on state of the art methods, techniques and tools of software development, systems & service engineering and their application to reliable, secure cyber-physical systems, such as the Internet of Things (IoT). fortiss has the legal structure of a non-profit limited liability company (GmbH). Its shareholders are the Free State of Bavaria (as majority shareholder) and the Fraunhofer Society for the Promotion of Applied Research. www.fortiss.org

In a current project, we search for a new team member:

Research-Praxis Seminar or Bachelor Thesis (m/f/d) – Feature engineering and sensor fusion for personalized stress detection models

Stress up to a certain level increases alertness and productivity and can therefore be considered positive, while high stress usually leads to decreased productivity, impaired decision-making ability and reduced situational awareness. Thus, accurate detection of intolerable stress contributes to reliable stress management, improved team performance, and reduced risk to individuals during dangerous operations.

We developed a VR simulation to trigger different stress levels, which enabled us to record a brand new dataset with real-time biosignal data such as ECG, EDA, EMG, EEG, RESP, ACC, TMP and Eye-Tracking, VR-sensor-tracking data. Further we acquired detailed psychological profiles.

A practical stress detection model should be able to identify inter- as well as intra-individual differences induced by different physical and psychological conditions such as gender, age, individual stress tolerance, and health status, which influence how humans experience stress. An efficient way to achieve better generalizability is to personalize stress detection by capturing inter-individual differences.

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Your tasks:

(The project scope will be adjusted depending on the position as a research praxis seminar or bachelor thesis.)

- Analyze a recently recorded dataset about stress detection with focus on intra-individual differences between participants
- Train and test common stress detection ML algorithms and personalization methods on the dataset
- Compare and test different combinations of biosignal sensor modalities (sensor fusion)
- Feature engineering (explore which features are best suited for stress detection)

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Your profile:

- Study in the field of engineering, informatics, mathematics or similar
- Basic knowledge in machine learning
- Beneficial: ML with Python (e.g. Decision Tree, Random Forest, AdaBoost DT, Linear discriminant analysis, k-nearest neighbor) and deep learning packages (e.g. Pytorch)

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Our offer:

- Work in partnership with leading companies in AI development
- Offices in central Munich (Nordfriedhof)
- Nice working atmosphere in a small team

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Did we catch your interest?

Please submit your application with a motivational statement, a detailed CV and a current transcript of records.

Contact: **Sören Klingner (klingner@fortiss.org)**