



HNO-Klinik Abteilung Phoniatrie und Pädaudiologie
Waldstr. 1 91054 Erlangen

Research Assistant (PhD Student - Dr.-Ing.)

(**Background:** Computer Science, Mathematics,
Artificial Intelligence, Life Science, Data Science, ...)

Or Post-Doctoral Researcher

(TV-L E13 – 100%, 3 years)

**Hals-Nasen-Ohren-Klinik
Kopf- und Halschirurgie**
Direktor: Prof. Dr. med. Dr. h.c. H. Iro
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Machine learning based severity estimation of voice disorders using imaging and acoustic data

Background: The voice or speech is generated in the larynx by the two oscillating vocal folds (100 – 400 Hz). Disordered voice production shows by disturbed vocal fold dynamics and /or a disturbed acoustic signal (i.e. hoarse voice). Currently, there is no clinical system that enables quantitative severity estimation of vocal fold dynamics and the acoustical signal. The goal in this project is to develop machine learning based models for severity estimation of disordered voice production that will then be used by our research partner WEVOSYS to develop a clinical usable software. The project is funded by the Bundesministerium für Wirtschaft und Klimaschutz (BMWK).

Your tasks: Develop **three machine learning models (ML)** for severity estimation of (1) disordered vocal fold dynamics based on clinical endoscopic high-speed imaging (4000 fps) and of (2) the acoustic voice quality based on the recorded acoustic signal and (3) of the overall phonation considering both imaging and acoustic data. Needed image processing and parameter computation methods have been developed in previous projects. Currently there are more than 100 parameters suggested for judgement, hence one important task is **feature importance analysis** to determine as few as possible and clinical interpretable parameters being used in the ML models. The goal is to develop models being robust and applicable for clinical use.

Supervision is enabled by the membership of Prof. Döllinger (supervisor) at the Technische Fakultät (Dep. Informatics and AIBE). Our team is highly interdisciplinary. Our division has several collaborations with technical and natural science chairs.

What we expect:

- Requirement 1: machine learning, deep learning, ... i.e. very good AI knowledge
- Requirement 2: Good Programming skills (Python, C#/.NET)
- Structured and independent working practice, good communication and English skills

Start of position: as soon as possible.

Please send your application (CV, certificates, skills) to

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