Chair of IT Security
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Machine Learning for Audio Deepfake Detection

With the emergence of machine learning, there has been a dramatic improvement in text-to-speech development. This advancement has brought many benefits, but it also presents significant challenges. Some of the primary concerns include:

1. Audio deepfakes: Synthetic audio content created to deceive humans.
2. Audio spoofs: Fabricated audio designed to trick automatic speaker verification systems.

Such techniques can be exploited in numerous ways, leading to misinformation, fraud, and slander. It is imperative to develop robust mechanisms to reliably identify and counteract audio spoofs and deepfakes.

Our department is at the forefront of research in this domain. Some of the most relevant resources regarding this position include:

1. Speech is Silver, Silence is Golden: What do ASVspoof-trained Models Really Learn?[1]
2. Does Audio Deepfake Detection Generalize?[2]
3. The ASVspoof database[3]

For hands-on demonstrations, you are welcome to visit our website[4]. We also invite you to explore our latest initiative, Deepfake-Total[5], where you can interact with state-of-the-art models.

We are in search of a dedicated HIWI student to collaborate with us over the long term. The chosen candidate will assist in the development of new datasets, innovative models, and contribute to scientific publications, including those in top-tier journals like Interspeech.

Task Description

The selected student will collaborate closely with us on the aforementioned topics. While the expectation is for the student to work and think autonomously, weekly meetings will be arranged to discuss challenges, progress, and other relevant matters.

Our initial engagement will revolve around the creation of the 'In-the-Wild 2' dataset, as referenced in our paper "Does Audio Deepfake Detection Generalize?". Following this, the focus will shift to the evaluation of ML models based on this dataset, and delving into research areas like model explainability and generalizability.

[1] https://arxiv.org/pdf/2106.12914.pdf
[2] https://arxiv.org/pdf/2203.16263.pdf
[3] https://arxiv.org/pdf/1911.01601.pdf
[4] https://www.aisec.fraunhofer.de/en/about-us/scientific_excellence/Deepfakes.html
[5] https://deepfake-total.com/

We place great importance on aligning the tasks with the student's interests and capabilities. Opportunities abound for the student: from being credited as a co-author in scientific publications to the potential of undertaking bachelor's and master's theses, as well as participating in Guided Research projects or similar endeavors. We have state-of-the-art high-performance GPU servers, which the student will be able to access.

Requirements

We seek a student who:

- Is deeply motivated and has a genuine interest in the subject matter, with the capability to work independently.
- Can demonstrate strong qualifications, either academically (with skills in Python, PyTorch, ML) or through personal projects.
- Has a vision for long-term engagement, ideally for a duration of 1.5 years or more. This makes the position especially suitable for those in the concluding stages of their bachelor's degree or in the early to middle phase of their master's program.
- (Optionally) Possesses prior knowledge or experience in signal/audio processing, antispoofing, or familiarity with the ASVspoof challenge. Such expertise will be considered advantageous.
- (Optionally) Proficiency in Text-to-Speech (TTS) research and models, such as Tacotron2 and WaveNet.

We are looking to hire one or two students, each 10-15 hours per week. Limited remotework from within Germany (not abroad) is possible - however, the GPU-servers are accessible only from the institute. Payment is fixed by TVÖD agreement, and depends on your qualifications (no degree or completed bachelor's degree).

Contact

For your application, please submit your up-to-date CV and transcript of records to the email address provided below. Use the subject line "Application HIWI student" for your email. If you are proficient in German, you are warmly encouraged to submit all documents in German.

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