
Research topics	Integrated deepfake detection and automatic speaker verification
Position (M/F)	PhD studentship
Reference offer	SN/NE/PhD/PEPR1/072024
Research Department	Digital Security (SN)
Publication date	04/07/2024
Start date	Sept./Oct. 2024
Duration	Duration on the thesis

Description

Research to improve the robustness of voice biometric systems to spoofing attacks is now relatively mature. Typical solutions involve the use of an auxiliary binary classifier to detect and filter deepfake or spoofed samples. The role of the speaker verification system is then only to determine whether or not enrolment and test utterances correspond to the same speaker. The use of separate sub-systems combined in this fashion might be sub-optimal and be limited by the propagation of errors; errors made by one system cannot be corrected by the other sub-system. Recent work has shown the potential of joint optimisation whereby the two sub-systems are trained together to solve the single task of reliable automatic speaker verification.

The performance of jointly optimised and single, integrated systems is limited by the use of training data collected from too few speakers. The ASVspooF 5 database [1] contains data collected from a substantial number of speakers and will allow not only the further exploration of joint optimisation but also more closely integrated systems, specifically single classifiers which perform simultaneous detection and recognition. This thesis will investigate such single, integrated solutions based either upon the fine-tuning of pre-trained binary classifiers or upon multi-task learning techniques. The goal will be to learn the subspaces containing speaker-related and spoofing-related artefacts and then to perform reliable automatic speaker verification with a single classifier. Since there is potential for degraded generalisation when the roles traditionally fulfilled by two separate sub-classifiers are performed by a single classifier, we will explore the use of data augmentation to help improve robustness to unseen attacks and speakers.

The successful candidate will join the Audio Security and Privacy Group within EURECOM's Digital Security Department. You will work under the supervision of Profs. Nicholas Evans and Massimiliano Todisco and with Prof. Driss Matrouf at the Laboratoire d'Informatique Avignon (LIA), and there will be opportunities for international collaboration, e.g. with members of the ASVspooF organising committee. The position is funded by the French National Research Agency (ANR) Cybersecurity Priority Research and Equipment Programme (PEPR).

[1] "ASVspooF 5 Evaluation Plan", Hector Delgado, Nicholas Evans, Jee-weon Jung, Tomi Kinnunen, Ivan Kukanov, Kong Aik Lee, Xuechen Liu, Hye-jin Shim, Md Sahidullah, Hemlata Tak, Massimiliano Todisco, Xin Wang, Junichi Yamagishi, ASVspooF consortium, 2024 https://www.asvspooF.org/file/ASVspooF5_Evaluation_Plan_Phase2.pdf

Requirements

- Education Level / Degree: Master's degree
- Field / speciality: Computer Science, Artificial Intelligence, Speech Processing, Deepfake Detection
- Technologies / languages / systems: machine learning, deep learning, Python and PyTorch
- Other skills / specialties: strong mathematics, analytical, problem solving, communications and writing skills
- Other important elements: an excellent academic track record, proficiency in English.



Application

The application must include:

- Detailed curriculum,
- Motivation letter of two pages also presenting the perspectives of research and education,
- Name and address of three references.

Applications should be submitted by e-mail to secretariat@eurecom.fr with the reference:

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About EURECOM

EURECOM is a major Engineering School and a Research Center in digital sciences founded in 1991 as a consortium in the international technology park of Sophia Antipolis. The IMT is a founding member of the GIE. Teaching and research activities are organized around 3 promising fields: digital security, communication systems and Data Science.

EURECOM has a staff of 150 (researchers and support teams) and welcomes 400 international students on the Campus Sophia Tech, the largest information science and technology campus of the region. EURECOM enjoys a privileged geographical environment on the French Riviera (Côte d'Azur), between sea and mountains, at the heart of a dynamic and multidisciplinary ecosystem that promotes high-level scientific and technological innovation.

Social advantages

- International and multicultural environment
- Attractive salary - Corporate saving plans
- Private retirement plan (executive, employer participation of 100%)
- Employee profit sharing policy
- Company health insurance (mutuelle) with high levels of guarantees for the whole family (employer participation of 60%)
- Restaurant vouchers (employer contribution of 60%)

EURECOM is one of Europe's leading engineering schools specializing in digital technologies. It is located in the heart of the Côte d'Azur, in Europe's Silicon Valley (Tech Park Sophia-Antipolis). EURECOM's research teams work in an international, multicultural environment.

EURECOM has a dynamic policy in terms of **inclusion and quality of life at work**. We are committed to diversity and give equal consideration to all applicants, without discrimination. Above all, we look for competence and team spirit.

All our positions are open to **people with disabilities**. EURECOM has set up a disability advisor to provide support and advice, organize accommodation and make positive commitments to personal integration.

As part of its **gender equality plan**, EURECOM encourages gender diversity within its teams. As part of our gender equality action plan, we encourage male applications for administrative positions, traditionally held by women, and female applications for IT and research positions, traditionally held by men.

EURECOM is taking positive action as part of its **CSR policy**. A CSR representative oversees EURECOM's CSR and energy transition policies (electric charging stations, solar panels, waste sorting, etc.).

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