MSc Internship project proposal 2025

"Speech Recognition Algorithm for research with children and adults with language disorders."

We are looking for a 6-month intern, for a project starting next year. Please find more information below:

Who we are:

Campus Biotech is a Swiss center of excellence in biotechnology and life sciences research focusing on three domains: Neuroscience & Neurotechnology, Digital Health and Global Health.

The Virtual Reality Platform (https://vr.fcbg.ch/) at the Fondation Campus Biotech Geneva (FCBG) provides researchers with state-of-the-art equipment and expertise in the field of immersive interaction and motion analysis in virtual reality for experimental research and clinical applications (e.g. cognitive and affective assessment, cognitive and behavioral therapy, neurological rehabilitation, gait and upper limb neuro-prostheses).

The internship will be co-directed by Nathan Attia and Prof. Daphne Bavelier.

Project description:

As part of designing interactive experiences that allows us to monitor participants cognitive or emotional states as well as their social competence, speech and thus the use of ASR (Automatic for Speech Recognition) to feed-back in real time in the experience is becoming a must-have. While ASR commercial solutions have evolved very rapidly over the past few years, remain the challenges of fitting less representative populations such as children (in languages other than English) or patients with speech or language disorders. This means that while VR and iVR are particularly well suited to assess and train speech and language in more ecological/communicative contexts, such developments are limited by the performance of ASR with adult speakers presenting impaired speech/language and with children. An ongoing study on children[1] on the assessment of language in interactive/communicative contexts are currently struggling with ASR problems and would benefit from an improvement of ASR with those populations.

[1] Bavelier group: ongoing project on assessment and training of reading in children and early detection of children at risk of dyslexia

The goal of this research project will be to deliver an ASR (algorithm speech recognition) app that permits real-time interface between an immersive world and speech commands that (1) can be used with utterances produced by young children or adults with impaired speech and/or language speech and/or language, and (2) with novel, isolated words and short sentences, but limited contextual information.

Project Planning:

1. Identify and test existing ASR solutions – 1 month
2. Train a selection of ASR on labelled audio data (already available) from:
    a. Children (Italian and French with novels words)
    b. French-speaking adults with impaired and/or language isolated wors and on short sentences
3. Build an app that can integrate training data sets to apply ASR in real time for direct interactivity within immersive worlds (game or experiment).
Applications already developed on the platform will be available. Students can propose and develop a simple scenario.

Profile required:

- Knowledge or strong interest in algorithms for speech recognition
- Mastery of the development language: C# and Python
- Knowledge of versioning tools (Git)
- Excellent communication and teamwork skills
- Excellent autonomy
- Fluency in English or French (oral and written)

The "Plus":

- Knowledge of the Unity engine
- Knowledge in Artificial Intelligence

The internship is for MSc level students performing their 5/6 months final research project in 2024. The position is full-time at FCBG in Campus Biotech, some trips to Zurich will be required. Ideally, the internship would start between February and May. Small monetary compensation.

Please send your resume and cover letter to vr@fcbg.ch.

If you have any visuals to show or project we can browse, don't hesitate to add them as well! We look forward to receiving your application.

The VR Team at FCBG