



Two-year postdoc position in machine learning in Toulouse

Multimodal data processing for multimedia artistic creation

Description of work

The objective of the work is to investigate multimodal data processing techniques to generate works of art in a given media (either, visual, audio, text), guided by some input in a different media. More specifically, the target settings are 1) **audio-guided video synthesis** and 2) **assisted song writing based either on textual or musical cues**. In application 1), the objective is to learn audiovisual patterns from training data (such as short movie excerpts) in a first stage. These audiovisual patterns can be used in a second stage to synthesise a visual stream from a new audio input. Using a multimodal nonnegative matrix factorisation (NMF) architecture, this principle has been exploited by Cédric Févotte & Jérôme Grivel (visual artist & musician) to generate a prototype video presented in a number of artistic events.¹ One objective of the postdoc position is to continue this work in more elaborate settings (large-scale/real-time settings, new architectures such as deep nets). In application 2), the objective is to learn correlation between musical cues (such as the distribution of chords) and lyrics (e.g., represented as bags of words) from training songs. Given these *audiotextual* patterns, musical cues can be generated given textual input, or vice-versa, to assist songwriting. These musical & textual cues may also be used as additional input to a neural network architecture, in order perform full audio & lyrics generation. This is a new application that will benefit from the complementary expertise of the two advisors in music data processing (either audio or symbolic) and natural language processing.

The postdoctoral researcher will be in charge of methodological developments that will result in research papers, implementation and application to real data in the context of artistic projects involving scientists, artists and institutional partners.

Advisors

Tim Van de Cruys (CNRS, IRIT)
Cédric Févotte (CNRS, IRIT)

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Place of work

The position is part of project **FACTORY** (*New paradigms for latent factor estimation*), funded by the **European Research Council** under a Consolidator Grant (2016-2021) and coordinated by Cédric Févotte (CNRS). FACTORY is hosted by the **Institut de Recherche en Informatique de Toulouse** (IRIT), a joint laboratory of CNRS and Toulouse universities & engineering schools. The physical location for the project is the ENSEEIHT campus, in a lively neighbourhood of the city center.

Candidate profile and application

Prospective applicants should have a PhD in **machine learning, signal processing, natural language processing**, or a related discipline, good programming skills, and good communication skills in English, both written and oral. The monthly net salary is 2400€ for researchers with less than 2 years of professional experience after the PhD, and starts from 3000€ in other cases. The position comes with health insurance & other social benefits.

Applicants are requested to send a CV, a brief statement of research interests and the contact details of two referees in a single PDF file. Applications will be collected until early June 2019 and then on until a suitable candidate is found.

¹<https://www.irit.fr/~Cedric.Fevotte/projects/melodrame/>