INSA Rennes hires a postdoctoral researcher in computer science

Project e-Fran ACTIF: Learning and Collaboration with digital Tablets, Interactions and Feedback.
Subject: Automatic « Clustering » of handwriting gestures

EMPLOYEMENT

- Institution : **INSA Rennes, IRISA Laboratory**
- Service : **INTUIDOC research team - IRISA**
- Project : **e-fran /ACTIF** (Learning et Collaboration with digital Tablets, Interactions and Feedback)
- Job vacancy between the **1st of June and 30th of September 2017**
- Duration : fixed-term contract of **12 months**

CONTEXT

IntuiDoc (http://www.irisa.fr/intuidoc/) team is a research group from IRISA laboratory working on analysis and recognition of documents and handwritten gestures realised on digital devices. IntuiDoc is interested in the conception of pattern recognition engines and new uses around gesture interactions on touchscreen tablets.

This position is related to the new project "e-fran" called **ACTIF** with a 4 years funding from the French government ("programme investissement d'avenir"). ACTIF aims at designing and experimenting tools and pedagogical approaches to help the "active" and "collaborative" learning in secondary school based on digital tablets oriented "stylus". A prevailing part is given to the feedback delivered to each student, to the classroom or to group of children. Among the partnership of the project can be cited INSA, IRISA, LP3C, Loustic, the company Script&Go, the Brittany region and the academy of Rennes.

More precisely, the proposed position is related to the second part of the active project: "Peer education and collective feedback in class". In this part, we will develop a collaborative environment to encourage interactions between students and teacher, and collaboration between students. The material used will be constituted of an interactive digital environment based on a network of hybrid tablets equipped with stylus and interactive screens. Interactions are expressed with open question answers that are produced freehand (writing, diagrams, symbols, formulas) on the screen of digital tablets with stylus.

The objective of this work is to analyse all the graphical productions to organise them and produce in real time a synthesis that is directly exploitable by the teacher and the learners. Scientifically speaking it is related to the problematic of automatic clustering of handwritten gestures.

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By associating complementary partners, experts in the domains of computer science, cognitive psychology, ergonomics and teaching, this project is of a nature multidisciplinary. A transversal part will consist of putting in place at the beginning of the project a user-centered design (UCD) implying children from pilot schools, teachers, researchers and companies in the development of pedagogical approaches and feedback tools.

ASSIGNEMENTS

The interactive environment developed will allow for instance the teacher to ask an open question to all the learners by expecting a drawing, a symbol or a formula as answer that will be handwritten with a stylus (electronic ink) on a tablet screen.

The objective is to analyse in real time all graphical responses of learners to make a synthesis explicable by the teacher: aggregation, interpretation or automatized clustering of graphical responses.

The challenge consists in having a generic approach allowing different nature of graphical responses (e.g. formula, writing, symbols …) to be apprehended for:

- Combining graphical responses of children in an intelligible way (saliency map, interactive graphics clouds) ;
- Elaborate different visualisation levels from the emergence of “cluster” of solution ;
- Make the summary map interactive to allow an intuitive and progressive reading of the elements of responses based notably on the identified clusters.

As an example, this exploratory work could be inspired of a recent work on “Graphical Clustering” : S. Polsley, J. Ray and T. Hammond, "SketchSeeker: Finding Similar Sketches," in *IEEE Transactions on Human-Machine Systems*, vol. 47, no. 2, pp. 194-205, April 2017.

MAIN SKILLS

We are looking for a PhD graduate having a thesis in the pattern recognition or machine learning field. An expertise on the problematic of the analysis of handwriten gesture or clustering would be a plus.

Mastery of object-oriented programming (conception, development) would be an advantage for this position: C++, C# …

ENVIRONNEMENT

The fixed-term contract will be in the IRISA laboratory in the INTUIDOC team. It will be supervised by Eric Anquetil, head of INTUIDOC team and professor at INSA Rennes.

For more information, please contact M. E. Anquetil by email: **eric.anquetil@irisa.fr**

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