Preference modeling for artwork suggestion during a museum visit

We propose a six months paid Msc. internship in Computer Science.

Title   Preference modeling for artwork suggestion during a museum visit

Keywords   decision theory; preference learning; semantic technologies.

Subject   The internship is at the crossroad between Decision theory, Preference learning and Human learning using ontology-based reasonings. The application context is human learning in the context of visits of museums.

Context   Systems have been developed aiming at helping a visitor of a museum plan her tour or provide her with more information about the displayed artwork. Those systems are usually based on ontologies, which permit to consider links between artworks. For example, the ontology may indicate that such artwork has the same author than such other artwork. This may constitute a reason for proposing the second one to a visitor who would be looking at the first one. A PhD thesis aiming at improving such systems has been recently achieved in Heudiasyc, and another one is under progress. An Android application has been developed, which already permits artwork suggestion.

Giving relevant recommendations requires capturing the visitor's subjectivity, a task which Decision theory has studied extensively. Relatedly, Preference learning, a field of Machine learning, has been interested in predicting preferences of persons according to some of their characteristics. Works in semantic technologies currently do not use results from Decision theory or Preference learning; and conversely these two fields are mostly not able to integrate the use of ontologies in their recommendations.

Goal   The internship aims at integrating a formal model of the visitor's subjectivity, based on Decision theory, more precisely on multicriteria decision aiding. This would permit to tailor the suggestions to be provided to the visitor, depending on her perceived interest, and to link the research in Semantic technologies to Decision theory. Alternatively, suggestions could be improved thanks to methods of Preference learning. This could also provide an ability to integrate domain specific knowledge to Preference learning methods.

Outputs   The proposal aims at exploring links between Semantic technology and the domains of Decision theory and Preference learning. It could lead to general methodological improvements applicable, e.g., to recommender systems (a known example of which being Amazon recommending objects a visitor may like depending on the objects he bought previously). The difficulty is moderated by the existence of a precise application domain permitting to direct the study towards more concrete questions, if desired. For example, the internship could lead to the development of a user interface allowing to explain, in natural language, the proposed suggestions to the museum visitor. Those explanations would be computed on the basis of the numerical preference model and using semantic reasoning.

Expected profile   The candidate is expected to have an interest towards Semantic technologies and at least one of the two other fields of Decision theory and Preference learning. Previous experience with one or several of these three fields is a plus.

Salary   430 € / month. The salary could be doubled in case of an excellent candidate (contact us for details).

Laboratory   Heudiasyc (HEUristique et DIAgnostic des SYstèmes Complexes, Heuristics and diagnostics for complex systems), a joint research unit between the Université de Technologie de Compiègne and the CNRS (attached to the INS2I). Heudiasyc operates in the field of Information, Technology and Communication Sciences (STIC), namely computers, automation, robotics, decision making and image processing. Heudiasyc's activity is based on the synergy between upstream research and final research to meet the major challenges of today's society (safety, mobility and transport, environment and health), working hand in hand with business partners, in particular industrial companies. Several platforms and demonstrators, developed within the laboratory, illustrate this desire to bring fundamental research closer to the complexity of its real-life applications. The candidate will work within the ICI (Information, Knowledge, Interaction) and the DI (Decisions, Images) teams.

Contacts   Olivier Cailloux; Sébastien Destercke; Dominique Lenne {olivier.cailloux; sebastien.destercke; dominique.lenne} @utc.fr