Research Statement

Aliaksandr Birukou
Department of Information and Communication Technology
University of Trento - Italy
birukou@dit.unitn.it

My research interests include intelligent and information agents, multi-agent systems, data mining, machine learning. I am also interesting in information retrieval and recommendation systems, in part because of their relevance to application field of my research, and software engineering.

Thesis description. In my thesis I am working on a formal multi-agent framework (Implicit Culture framework) aimed at solving the problem of implicit knowledge transfer between communities of agents. The framework is based on the ideas of Implicit Culture (IC) [3]. Personal agents are endowed with Systems for Implicit Culture Support (SICS) which use data mining techniques to understand behavior (namely, actions) of their users in different situations and extract behavioral patterns from observations. The agents interact with one another and exchange suggestions, producing the transfer of knowledge. IC was developed by my advisor Paolo Giorgini and my co-advisor Enrico Blanzieri at the University of Trento. However, it is still lacks sound semantics and is poorly tested. My research is aimed at eliminating these shortcomings.

The framework can be applied for different tasks where it is necessary to preserve or encourage a specific behavior related to the knowledge of community members: for example, the process of software release should not depend on the people currently working in the company [4]; PhD students would like to use the knowledge of their tutors about the state-of-the-art in the research field. Preliminary results of my research, concerning recommendation system for web search and system that facilitates scientific publications search, are published in [2, 1].

Multi-agent systems and data mining. Currently I am working in this area in the context of my thesis. Namely, I am interesting in agents that use learning techniques to learn about their users and to assist them. My future research directions in this area include methodologies for multi-agent learning and methodologies for multi-agent decision support.

Recommendation systems. Recommendation systems aim at helping users to cope with the problem of information overload. My interest in this field concerns agent-based recommendation systems. In particular, I am using Implicit Culture framework in the recommendation system for web search. Personal agents in the system observe how users use web links and exploit this information to produce useful recommendations. Future work in this field consists in studying the applicability of different learning techniques for producing recommendations and evaluation of the system performance. In principle, I am also curious about evaluation methodologies and user models for recommendation systems.

Intelligent and information agents. This topic a bit overlaps with agent-based recommendation systems. However, here we speak in general about agents that facilitate the access of users to information, in particularly that available on the Internet. Agents can act in a variety of ways, e.g. as personal agents or as intelligent interfaces. Currently, I am working on the application of Implicit Culture framework to facilitating of the scientific publications search. I am developing a multi-agent system where agents use learning techniques in order to find articles relevant to the interests of their users. As future work I will use Implicit Culture framework in a system for web service discovery. Possibly, I will move towards ambient intelligence, dealing with personal assistants on mobile devices.

Learning from observation. This is the topic that attracts a great interdisciplinary research interest nowadays. My interest here is currently focused on goal or plan recognition techniques which I could use in Implicit Culture framework to recognize a hidden need behind user's actions. The knowledge about this need would definitely be of great help in suggesting further actions, possible decisions or giving recommendations.

Queueing systems. Well, this topic is quite apart from what have been described so far. But I have a certain background and a number of publications in this field and I hope one day I will find a possibility to intersect this topic with computer science field. Previously, I was dealing with retrial queues and queueing systems that allow group processing of requests. I was also developing algorithms for controlling such queues.

1. REFERENCES

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