An early experience of doing research and teaching HCI for AI at Politecnico di Bari

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Carmelo Ardito, since August 2019, is Associate Professor at the Department of Electrical Engineering and Information Technology of the Politecnico di Bari. He was formerly Assistant Professor at the Computer Science Department of the University of Bari Aldo Moro. Since 2011, he has been teaching Human-Computer Interaction (HCI) for the bachelor curriculum at the Brindisi and Taranto campuses of the University of Bari. He was member (and still is a close external collaborators) of the Interaction, Visualization, Usability and UX (IVU) Lab, where he coordinated the research on "Novel Interaction Techniques and Pervasive Systems", in particular applied to the Cultural Heritage domain.

At the Politecnico di Bari Carmelo Ardito is member of the Information Systems Laboratory (SISINFLAB), in particular of the branch whose research interest are Recommender Systems and Machine Learning, Knowledge Graphs and Semantic Web technologies, Personalized Information Access, and Preference Representation and Reasoning. **Tommaso Di Noia**, one of the committee experts currently working on the definition of the proposal for a National Research Programme (PNR) 2021-2027, in particular for the Artificial Intelligence subject, coordinates this branch of the SISINFLAB.

In addition to the other Bachelor's degree courses, Carmelo Ardito now teaches Human-Machine Interaction (60-hour lectures) to the first year students of the Master's degree in Computer Science, while Tommaso Di Noia teaches Logic and Artificial Intelligence to those of the second year.

How this attempt integrating HCI and AI is been going so far?

Before going on, it is fundamental considering that the experience reported in this contribution, matured in the context described by the above broad premise, is limited by several factors: less than one year of work and hindered by the difficulties related to moving to a new institution, i.e.: new courses to be taught (Algorithms and Data Structures and Computer Science for Engineering for the first year students of the Bachelor's degree), the already mentioned Human-Machine Interaction, plus Pervasive and Wearable Computing for the Master's degree in Computer Science at the University of Bari.

First, consider that students attending the HMI course at the Master's degree have never received any notion or addressed HCI topics before. Therefore, even SISINFLAB PhD students do not have this specific background.

Thus, the very compelling challenge to be addressed is the "mindset" towards the HCI discipline: most of the effort, as well as of the lectures, has been spent in this direction. These students have received a strong education as professional developers and have their main interest on functionality and efficiency of the code, or of the Machine Learning algorithms; these are qualities of a software system that are of great interest for developers, but whose "presentation" to the end users has a fundamental impact on the overall User Experience.

The Human-Machine Interaction Syllabus has been organized to provide HCI fundamentals, as well as to show the impact of AI features on the user experience, according to the following Syllabus:

1) **Usability and HCI**: Norman's interaction model - Affordance and feedback - The notion of usability - Learning and memorability - Usability according to ISO 9241-11
2) **Know the user**: The diversity of users - User models - The user in his/her context - Ethnography
3) **Designing for the user**: What designing means - Designing interaction - Human-centred design - Use cases.
4) **Usability engineering**: The "waterfall " model - Iterative models - The ISO 13407 model and its upgrade to ISO 9241-210 - The role of the user in the design process - Costs and benefits.
5) **User requirements**: The requirements definition process - Usage scenarios - Use cases.
6) **Prototypes**: Types of prototypes - Sketches, storyboards and diagrams - Initial prototypes - Intermediate prototypes - Final prototypes.
7) **Principles and guidelines**: Principles, guidelines, project rules, standards - ISO 9241-110 dialogue principles.
8) **Graphics Design**: Interaction design and visual communication - The Gestalt laws.
9) **Usability and Evaluation**: Verifications and validations - Heuristic evaluations - Usability tests - Formative and summative tests.
10) **Information Visualization**: Static and interactive visualization - Information Visualisation tools.
11) **Pervasive computing**: Design of mobile, pervasive and wearable device applications - The Internet of Things (IoT) - Tools and techniques for designing pervasive experiences based on IoT.
12) **Human-AI (Artificial Intelligence) Interaction**: Fundamentals of ML and AI - Risks and benefits of adding AI/ML to a user experience - Interpreting and Explaining Algorithms - Microsoft's Guidelines for Human-AI Interaction.

It is evident that in 60 hours of lectures there is not much room for a deeper analysis of HCI for AI aspects, as the students are unfamiliar with HCI. Also, it would have been wiser to anticipate the AI topics at the end of the "very fundamentals" of an HCI course, i.e. after the Usability Evaluation teaching-block. This would have allowed for a wider and longer discussion with the students. Nevertheless, a significant number of group projects have addressed AI topics.

The HMI course was also attended by around 10 PhD students. Four of them are members of the SISINFLAB; we are currently working at writing a couple of papers, about AI for cyber and personal security in healthcare, to be submitted to international conferences. This shows that HCI topics have great potential to attract the interest of researchers who have a solid background in AI.

The next step of this early experience will be to check if in the course of Logic and Artificial Intelligence taught by Tommaso Di Noia, which is going to be attended next fall by the currently HMI students, there will be some "HCI" effect.