Basic Interaction Design for Designers of AI Interactive Systems

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Introduction

Basic design exercises have a long tradition in the design domain. They are exercises with a limited scope, targeted to apprentices and meant to make them aware of the fundamental issues related to design. The origin and the initial practices can be found in the preliminary courses of the Bauhaus [1] and the Ulm Schools, but further studies and practices have continued and evolved along the years.
Basic interaction design represents an extension of these practices to the interaction design domain, maintaining the limited scope and the same type of target, making learners aware of issues related to interaction design.

Basic interaction design in the classroom

Starting from 2010, I've began to propose to my bachelor Computer Science students a set of exercises focused on interaction design issues. In compliance with the initial basic design practices, these exercises have been proposed at the beginning of the educational path, to students that usually had a limited knowledge and skills related to HCI and design.
Along the years, I've extended this activity to classes of students with different backgrounds, including Fine Arts Academy students and bachelor students of management studies.
This intense activity has led to the progressive development of a corpus of basic interaction design exercises, focused on different interaction paradigms (e.g. visual, tangible [4], sonic and ubiquitous interaction) and to an evolvement of the structure of the exercises, which will be described in the following subsection.

Typical structure of a basic interaction design exercise

After several years of practice, the structure of the exercise has evolved in three phases:

- Pre-exercise: in this phase the learners are introduced to one of the interaction models available in literature and to the related concepts. In the case of explicit interaction, the reference is the Interaction framework [3] and the main concept that is communicated to the learners is that interaction design is about designing input and output languages and mapping between these languages to the human language and the base language. Learners are asked to keep in mind the interaction model for the following design activity.
- Basic Interaction Design exercise: in this phase the learners are given a description of the initial requirements for their design proposal and the list of hardware devices and components they are allowed to consider. Learners are generally asked to send their proposals in a week or less. They are explicitly asked to use sketching techniques rather than written descriptions and to show how interaction evolves from an initial state.

- Post-exercise: the results are collaboratively discussed with all the group of learners, evidencing the points of strength and weaknesses of the proposals. The discussion aims also to show the apprentices if the solution to the critical points discovered by them may be found in existing design guidelines.

Benefits

Along the years, the work done with interaction design exercises has proved to be useful to the apprentices for a number of issues, including:

- gaining a first understanding of the interaction models and how their knowledge can be useful for practical design activity;
- making them understand the difference between hardware, components and the languages that can be built on the top of them;
- making them aware of the importance of complying with the project requirements and considering them as an opportunity rather than a limitation;
- making them focus on critical issues that along the years of HCI studies led to define guidelines for achieving usability and other relevant results;
- improving their awareness that, while different choices may lead to different design solutions, not all the solutions are equal in terms of meaningful language design and mapping;
- improving their awareness of the peculiarities of design discipline and thinking, which differ from the scientific thinking in several respects, among which the necessity of defining trade-offs;
- increasing their awareness of sketching techniques as a tool for designing ideas and sharing them with stakeholders;
- preparing them for more complex interaction design scenarios

Basic Interaction Design Exercises for Designers of AI Interactive Systems

The advent of new AI techniques and their intersections with HCI practices bring new challenges to designers and the need to make apprentices aware of the different design issues.
This is particular important in situations where the automatic processing of input data may lead to output choices which may hamper the safety of humans, as it has been demonstrated by the tragic incidents of the Boeing 737 Max which featured an automatic flight correction system whose existence was not properly communicated to the pilots.
Introducing basic interaction exercises as part of the educational path of designers involved in AI interactive systems can bring all the benefits described in the previous section.
In addition, because of the new scenario, a number of important questions rise, such as: Which is the interaction model which should be taken into account for basic interaction design exercises targeted to AI interactive systems? Which are the additional issues that the apprentices should be guided to consider?
Considering the IHCI model described by Schmidt [5] can be a good start, because this model represents an ample set of interaction channels, including explicit and implicit interaction and the role of context, which plays a relevant part in many AI systems.

The interaction model selected as a reference should take explicitly into account the probabilistic behavior of AI systems and its impact on the interaction experience. Concerning the additional issues to consider while proposing exercises to apprentices, the principle of appropriate intelligence [2] and the user awareness [5] should definitely occupy an important role.
A set of basic interaction design exercises taking into account the issues described above might play a relevant role in the educational path of all the apprentices which are learning how to shape AI interactive systems, establishing a base line that might help to prevent embarrassing or even tragic design failures.

Bibliographic references

[1] Delle Monache, Stefano, and Davide Rocchesso. Bauhaus legacy in research through design: The case of basic sonic interaction design. International Journal of Design 8.3 (2014).

[2] Dix, Alan, Finlay, Janet, Abowd, Gregory, and Beale, Russell (2003). Human-computer interaction. Pearson Education.

[3] Abowd, Gregory D., and Russell Beale. Users, systems and interfaces: A unifying framework for interaction. HCI. Vol. 91 (1991).

[4] Pittarello, Fabio (2011). Exploring the relations between physical objects and digital world with a geometric sorting board. In Proceedings of CHItaly 2011. ACM, New York, NY, USA, 53–58.

[5] Schmidt, Albrecht. Interactive context-aware systems interacting with ambient intelligence. Ambient intelligence 159 (2005).