**INFOB3IT 2022/23**

**Assignment 1**

**Group #:**

**Student name:**

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**Type: Group work**

**Deadline:**

**Submit: Blackboard**

**Evaluation: Graded**

**Description**

You need to write an 8-to-10-page paper which describes the functional and technical features and details of your smart interactive automatic toilet freshener, including the process of building it and a reflection on its success (or lack thereof). This description allows you to elaborate on the topics covered in your video. Use it to add detail to these topics and/or cover subtopics which could not be covered in the video, time-wise. But please make sure that the description can be read stand-alone: if one only has the description, it should be clear what you’ve built, how you’ve built it, why you’ve built it that way and whether you think building it was a good idea.

**Be sure to include a state diagram of your system** (no specific format required). Please do add pictures to illustrate certain points. For teams of three this is also the place to shine and reflect on your experience with two installations of your system. Report on your user needs gathering exercise (write who your participants were, how you recruited them and how you gathered data). Include your context of use and requirements specifications. Similarly, report on your heuristic evaluation.

NOTE: This is a template that can be used to deliver your work. However, you can use other formats, if you prefer as long as you remember to write your group number and student names and adhere to the description.

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| Context of Use Description |
| User Needs Gathering Explain how you conducted your Context of Use research by eliciting from your first Assignment (0). Describe how you carried out the study and what research questions were asked in the interview/questionnaire. This section describes your research goal and the study setup. |
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| Target group Explain which groups of users you identify for the prototype. These groups can be the main target groups as well as secondary ones who will interact with the device. Describe what is the context their share and what are their primary activities (e.g., students sharing toilets from the University building). |
| Main target group: Our main target group is primarily people living in a house with a bathroom that is described in the physical-section below heading ‘Environment of the System’. Preferably, the types of people we test on are diverse given that we would like to have as unbiased results as possible. This would mean: families from three to five people, but also student houses with the same capacities. We will only conduct surveys on the adults of the test subject, but this does not exclude other inhabitants from exposure to our prototype  Secondary users: As for the secondary users of the prototype, we are primarily looking at visitors for the main target group. The subjects that fall in the group of secondary users will not be asked about their experience with our prototype. |
| User characteristics Specify your users’ characteristics such as age, height, and gender. You can specify their behavior/habit if relevant to the study. |
| User characteristics:  Physical characteristics: as for the physical characteristics, age is not as much of a problem here. Let’s assume for the sake of it however that the user is of age that they are able to use the restroom by themselves, without any third-party help. Put in a definition, our users are of age that they are potty trained. We are aware of the fact that this does not answer the question, however we want to point out that there is no precise age for which an individual suddenly is potty trained. However, we would prefer if all users are adults which of course would mean that they would be 18+. This would then infer that they are eligible to fill in our questionnaire(s).  When it comes to the height of our users, we require our users to be of a minimum height of 1.30 meters tall.  Gender is not within the scope of what we want to test.  Behavioural characteristics: (We assume that) our users do not use the toilet for comfort time. That means, they do not use the restroom to scroll their phone endlessly, or that they bring a book while serving their private time.  Absent behaviour is that none of our users consume lactose-containing products if they are lactose intolerant. |
| Goals and Tasks Explain what are the goals of your prototype development and study. Clearly list what are the features expected from the device and in which scenario context they are needed. |
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| Environment of the System Write about the 1) technical, 2) physical, and 3) social constraints of developing the toilet freshener considering the context of use, users, and target groups. You can write a paragraph for each of these three aspects of your product development. You can support your description with figures and schematics of the environment of the system. |
| Technical: For our technical constraints, we assume a maximum time of 15 seconds that is required to open and close the door. We do this in order to be able to distinguish between the use cases of a number one and two, and cleaning.  Physical: Our first physical constraint is that, given that gas- and electricity prices are at a high point, we assume that our users are energy-friendly and turn off the light whenever they leave the toilet after they are done.  Our second physical constraint is about the size of the room. We will conduct the experiment in small bathrooms, measuring between two and six square meters. Furthermore, for our design we also have the constraint that the bathroom is only lit by non-natural lighting that only comes from the room itself.  Another physical constraint is that the door remains open whenever the toilet is cleaned. Given that the space for a toilet is relatively small, we figured that it would be rather difficult to clean the toilet whilst the door is closed.  Social: Our first social constraint is that we assume that all users of the toilet close the door and turn off the lights after their use. This has as primary reason that it is easier to reason about the program logic and distinguish between the different use cases (not in use, number 1, number 2 and cleaning). Besides, house it’s not comforting to have the smell of the restroom somewhere else in the house.  Not per se a constraint, but something we still want to address nonetheless: we do not limit the number of users in these bathrooms, as this might influence the comparison with the regular experience. |
| Requirement Analysis List 1) client requirements (functional needs of the users e.g., not spraying when cleaners are working), 2) usability requirements and objectives (e.g., system designed to be intuitive, reliable. Possible ways to gather more usability needs from users), 3) requirements derived from user needs and context of use (summary of the system features evaluated by the study participants). |
| 1: client requirements  For our users, it would be trivial that they would not appreciate it to be sprayed on while they are doing their private business. Therefore, there should be a delay between the end of a use and a user leaving the room, and the spraying.  Another functional need the users have, is that the toilet is not sprayed when the cleaners are working (or afterwards, when they are finished cleaning).  2: usability requirements and objectives:  We want our system to be designed in such manner that it takes no or not much effort in order to get used to working with the prototype |
| Functional and Technical Features Describe how the system addresses the above-mentioned requirements and what other features it provides. You can make use of tables to describe the system states and how they are mapped by the prototype sensors/actuators (e.g., LED color/pattern). |
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| Building process Explain what choice you made to determine the use of the components available to you and the logic that you followed (e.g., Early on, we made the choice to use the light sensor as an indicator for when the user would enter or leave the toilet since it is an instant visual clue.) You can explain how you designed the menu system aided by screenshots and photos. |
| When we started the process of working on the system, we scanned through the requirements and the sensors that we were required to use.  We thought about the different possible uses for the magnetic contact sensor. We eventually made the choice to use the magnetic contact sensor to indicate whether or not the door to enter the toilet is closed.  Additionally, we decided to use the distance sensor for a similar purpose. We wanted to recognize if whether or not the door is closed.  We also made the choice to use the motion sensor as an indicator for the question if the room is actually occupied. For the way we structured our code, we have a timer that checks for how long the room is occupied (which translates to a closed door and lights on regarding our sensor data). We assume there is a possibility that our users leave the light on after their visit, therefore if the timer runs out and we capture motion that would mean that someone just needs a bit more time for their number 2 to finish.  Menu system… |
| Heuristic Evaluation Explain how you carried out the heuristic evaluation and the results you collected from it. You can use a table to list the heuristics and the results of the severity ranking for each according to the experts. Following, summarize the results and discuss potential improvements and ways to address issues. |
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| Reflection on success This section is dedicated to your reflection on the prototype development process and study design. |
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| Appendix: Diagrams and additional material such as dataset and questionnaires. |
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