Vision Documentation – Free choice group

HomeDork – Interactive Smart House

Revision History

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Date	Version	Description	Author
21/09/2021	1.0	Initial vision layout	Wills Ekanem, A
01/10/2021	1.1.0	Branching out to our sub-group visions	A, B, C, D
06/10/2021	1.1.1	Defining specific visions for our group	A, B, C, D
14/10/2021	1.2.0	Editing overall document based on input from Furuboda	A, B, C, D
19/10/2021	1.2.1	Change of sub titles, addition of text, references, and explanation of the responsibilities and role of this subgroup.	A
27/10/2021	1.3.0	Grammar revised	E
14/11/2021	1.3.1	Changes in document formatting such as versioning, tables, and titles according to group standards.	A

Product Overview

1.   Smart house concept

1.1 Introduction

The smart house concept is a technical system for everyone, including people who might struggle using generic technical features. This system is, in that sense, accessible for many types of disabilities and will in all stages of production keep in mind the accessibility and ease of use for its users.

This group has started a collaboration with Furuboda Folkhögskola in Yngsjö which is a school and home for people with different disabilities. The school takes on both people with neurological and physical disabilities, either chronical or from injuries. We base many of our requirements on the input from the students and teachers on the school. We as a group are also keen to inform other subgroups of our research and findings, as every part of the system should be involved in the integration of assistive technology.

1.2 Main vision and goals

This group will strive for accessibility for all, independent of their circumstances and environment. The system will be inclusive in its every feature. This group will also focus on the connection to the real world and its people and aim to test the prototypes on people who will be the users of the system. The goal is to work closely together with Furuboda and get opinions on the system, and to run real-life tests on focus groups.

One main vision of the system is that it should be easy to use, as referenced in [S1 – "Usability, easy to use"]. Every student and teacher pointed out that any type of assistive technology should be simple for the user, or else it is more inconvenient than without it. That to us is our most important supplementary requirement and should be a priority in every feature designed for the users. The goal is to be transparent enabling full usage but limited so that the user does not feel overwhelmed. We strive for transparency according to the code of ethics and our requirement [S3 - Security and data collection]. The system should not take advantage of the user and perform actions that the user is not aware of. We also strive for simplicity to ensure that there aren't too many buttons or home pages for the user. The overall feel and experience of the system should be smooth and simple. The balance between these two attributes can be difficult, as we want the system to be adaptable and customizable [S2 – Adaptability], but not have too many customization options as that could make the system feel difficult to use. The goal is to find this balance and develop a system that is both smooth, safe, and adaptable.

2.   Basic technical features

The smart house project will be filled with numerous features such as:

- Haptic vibration [R1]
- Voice commands [R2]
- High contrast [R3]
- Personalized status commands [R4]
- Scheduled commands [R5]

The mentioned features are all set as essential to our system and are more explained in our Requirements document. Many of these requirements are also based on findings from Furuboda and research about assistive technology. All essential requirements are also connected to at least one supplementary requirement, each supplementary requirement relates to a non-functional feature in our system.

3.   Smart house technicalities

The system consists of a server connected to its units which in turn controls the devices. The server will handle all communication to and from the devices/units. The units will consist of a native app and a web interface. The server is Java based and connected to a SQL database which contains all unit, device, and user information. The devices will be controlled using an Arduino Hub which gets commands from all units via the server.

3.1 Free choice group technical responsibilities

Our group have decided to develop a mock environment for the implementation of the technical features mentioned above and in our requirements document. This mock environment is a simple interpretation of the two clients that the Units group work with. In this environment, we are free to develop our features and test them. Then they can be implemented and ready for when the Units group are in development stage and ready to put the features place. This gives us as a group the freedom to develop features in our own pace and not have to match it to the pace of other subgroups.

One example of usage developed for this environment is our feature [R3 – High contrast]. Our group can calmly develop this feature within our mock environment and simply export it to a setting by a button which then calls the method that changes the whole system into high contract for visually impaired. This setting can then be put into the actual system by the Units group when they have developed the rest of the surrounding settings in the client apps.

Another technical responsibility for the free choice group is the simulation of devices that are not provided for us in physical hardware. One example of this is our requirement [R9 - Disco mode], which changes the color of the lights in the room. We do not have colored lightbulbs to append to the system, but we can simulate this with a simple web site.

However, this requirement is set as optional as the demand for it is not as high as other requirements and we do not want to spend too much time on features that are not meaningful to the users. This requirement can also be integrated in [R4 - Personalized status commands] or [R5 - Scheduled commands] and act as a feature in another feature. The requirement [R4 - Personalized status commands] is also discussed further in our Design document.

One requirement that is set as desirable is [R7 – Bliss expressions]. None of the group members had heard about Bliss before we went to Furuboda but realized quickly that it is a language crucial for some students at Furuboda. Bliss is a way for people with speech impairment, autistsm, or other neurological disabilities to communicate. Bliss has been used in Sweden since the 1970's and a few years later around 800 people use it as a main form of communication (Hunnicutt, 1984). We have decided to use the Bliss language in the system in some extent.

4.   Additional features of the smart house

In addition to the basic features of the smart house, it will also have functionalities that are not required for it to function, but for the useability and appeal to its user. Some of those features are:
-    Usability, easy to use Future compatibility [S1]
-    Adaptability [S2]
-    Security and data collection [S3]

The mentioned features are all set as essential to our system and are more explained in our Supplementary requirements document. Many of these requirements are based on findings from Furuboda and research about the use of assistive technology. These requirements are also closely connected to real life examples from Furuboda which is closely documented in the Supplementary requirements document. All essential supplementary requirements are also connected to our technical features as mentioned in chapter 2 and in our Requirements document.

4.1 Free choice group non-technical responsibilities

Our group will work on a higher abstraction level and not deal with the development of the physical devices or the API development. Instead, we will work more in depth with the usages of the system. We will always work with the users in mind and work as a task force for every other subgroup.

The main responsibility of this group will change more rapidly over the sprints than the other groups. One week we might work solely on the collaboration with Furuboda and another week we might work solely with the development of the technical features. This puts lot of pressure on the team members to be flexible and adaptable in their work style and it is therefore crucial for us as a team to be transparent and clear in our communication.

This flexible work style also requires planning over a bigger time-period than one or two sprints. A task force cannot be idle just because all components of the system work as intended. We must plan for tasks to do if no other subgroup needs help or is able to integrate our features yet.

One main responsibility for the free choice group is the security of the system. This is more discussed in [S3 - Security and data collection] in our supplementary requirements document. We have an opportunity to come in as an external entity and test the implementation from a black box perspective (BlackHat, n.d.).

5. Bibliography

Hunnicutt, S. (1984). Bliss symbol-to-speech conversion: ”Bliss-talk". *STL-QPSR*, 058-077.