Supplementary Requirements Documentation – Free choice group

HomeDork – Interactive Smart House

Revision History

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Date	Version	Description	Author
10/9/2021	1.0	Initial addition to document	A, B, C, D
06/10/2021	1.1	Discussion and more detailed descriptions of the requirements.	A, B, C, D
14/10/2021	1.2	Organization of order of priority, additions of S2, additional descriptions and connections to real life examples in each requirement.	A, B, C, D
18/10/2021	1.2.1	Changes to the wording in some requirements and addition of S3. Addition of another subtitile ”Measurability”.	A, B, C, D
23/10/2021	1.2.2	Spelling and grammar check	A, B, C, D, E
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
4/12/2021	1.4	Update of completion bar	A, B, C, D, E
5/1/2022	1.5	Update of completion bar, addition of survey responses and final revisions	A, B, C, D, E

Supplementary Requirements List

Supplementary Requirement Name	Priority	Completion
S1. Usability, easy to use	Essential	100%
S2. Adaptability	Essential	100%
S3. Security and data collection	Essential	100%
S4. Compatibility	Desirable	100%
S5. Interactive feedback	Desirable	100%

Supplementary Requirements Descriptions

S1 - Usability, easy to use

The system overall should be easy to use and accessible for people with disabilities. The experience should be that the system eases for the user, not something that takes time and effort to learn or use. These supplementary requirements are connected to all our requirements, especially [R4 - Personalized status commands, R5 - Scheduled commands]. The base of the system should be general but also easy to adapt, personalize and include a large target audience.

Real life connection:
From our conversations with Furuboda Folkhögskola in Yngsjö, the staff and students were clear that the technological tools need to be simple. We discovered that many students tend to use their phone instead of a special assistive tool they received from the physiotherapist. Simplicity is beneficial for anyone using the system, regardless of any constraint.
One of the students we met was visually impaired and only had a small percent of working vision. He had received a special type of camera that was put on his glasses. This camera could read text out loud when he looked at it and it could also recognize people. However, he said that he doesn't use the device much because it works poorly on screens, and it was too complicated to use. He said that he prefers to use Voice Over and Siri for his everyday tasks because they are simple to use and access.

Measurability:
We as a group have already been invited back to Furuboda to test the features with the students. This specific requirement is measured based on the feedback from the students at Furuboda. The students at Furuboda respond by saying the system is either easy or hard to use and how fast they manage to use it without needing any instructions. *Figure 1* is a collection of the survey answers for this specific question.
Another measurability option for this requirement is the Firebase robo test that is more deeply discussed in the test document.

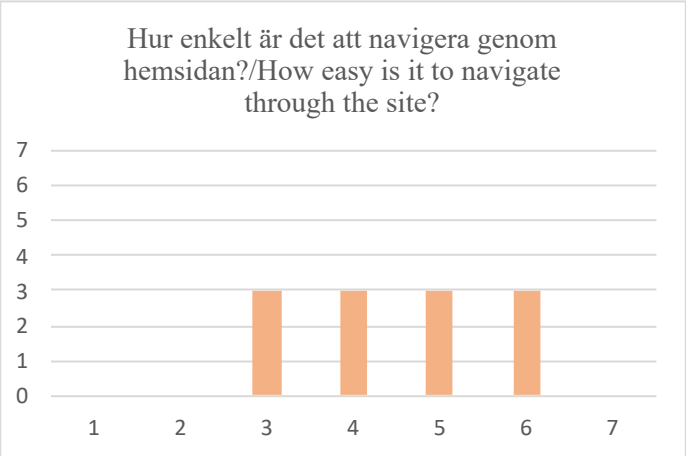

Figure 1 - Survey question about ease to use

S2 - Adaptability

The system should be general enough to be used by anyone, and still adaptable enough for specific individuals with specific needs. Requirements such as [R1 - Haptic vibration], [R2 - Voice commands], [R3 – High contrast], [R7 – Bliss expressions] are customizable in the system so that every user can enable or disable the feature to their specific needs. Other requirements such as [R4 - Personalized status commands] are adaptable in the sense that the user can set any event to a button and personalize the daily schedule in [R5 - Scheduled commands]. The wide domain chosen for this project depends highly on the system's adaptability and customization for the user.

Real life connection:
We met with Håkan, a speech therapist who's involved in development of technical tools for the students at Furuboda. He showed us many different assistive tools for many types of disabilities. One tool was the Bläckfisk, a type of key stroke tool that is accessible through software where the user can pre-set keystrokes. The Bläckfisk works as a middle hand and can be connected to a joystick, big buttons, or any other mechanical tool, and then to a keyboard.

Measurability:
In our implementation tests with the students, we got real-life experience of how adaptable the system is and how much our specific features aid in the use of the system. *Figure 2* is a collection of the survey answers for this specific question. In parallel with the student's feedback, we can also measure the adaptability with other tools such as mentioned in the section. We can measure this by simulating the hardware or by testing the system with different user customizations. The use of different scenarios and people are crucial in this step.

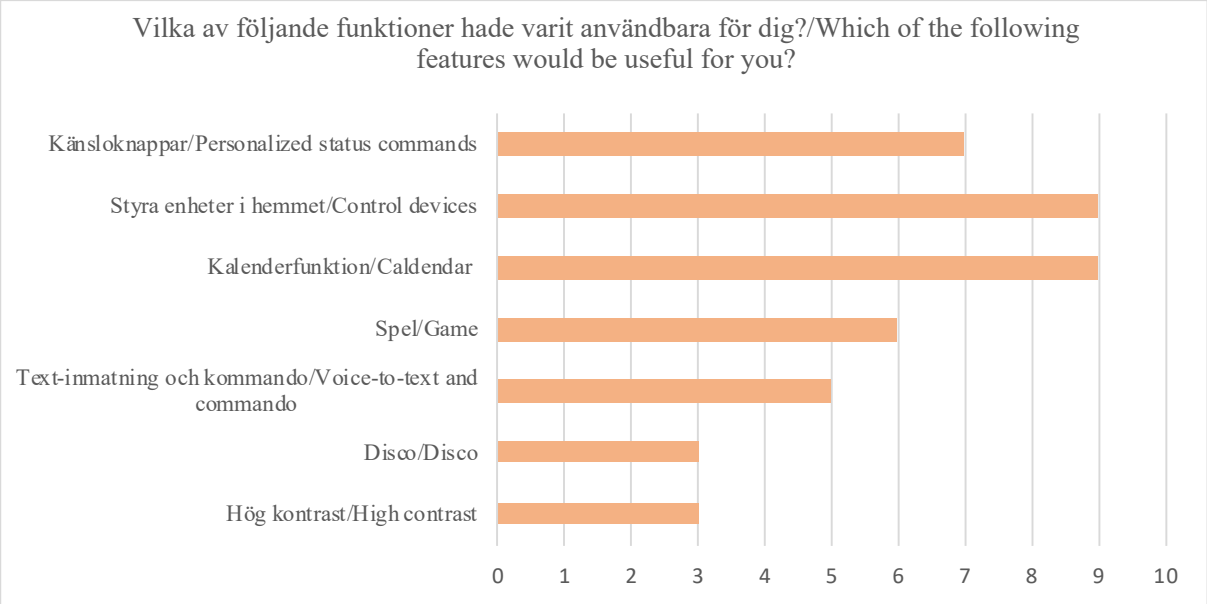

Figure 2 - Survey question about adaptability

S3 - Security and data collection

The system shall be secure in the way that it is safe for any user to use. It should not be possible for unauthorized people to gain user access to the system, maliciously or by mistake. The system will collect information about the user such as passwords, email, names etc., and this information should be stored safely and with care. The passwords should not be visible to the system admins. From requirement [R5 - Scheduled commands], the user will enter daily routines like when to get up in the morning or when to go to school. This information should be safely stored in a database that we have complete ownership and control of. This information should not be sold or displayed to anyone but the user himself. Information like this could also be used to improve the system in the future and is more discussed in [S4].

Real life connection:
As a user, the security of a system should be transparent. There should be no collection of data from devices or apps. For example, if a malicious entity gains access the system and sees the daily routine of the user, that entity could take advantage of when the user leaves his home, when he sleeps or when he showers. This would be devastating for the user and could even put the user in danger.

Measurability:
Testing is the main method of measuring this requirement. The system should be able to defend itself towards both poor usage and malicious attempts to access it. System administration should be divided between multiple administrators so that no single person has the means to independently change any crucial part of the system or to claim data that is not his to manage. System logs should be kept and backed up throughout all events of the development and usage. These logs could then be used in any case of a system breach or update.

S4 - Compatibility

The system should be compatible for upgrades both in devices, server, and units. It should also have backwards compatibility and not limited to one type of device, browser, or operating system. For the future use of the system, data such as how users use the system, how often etc., can be used for improvements of the system. However, this is not currently the plan for the current development, but as a possible usage in the future.

Real life connection:
As previously mentioned in [S2], the Bläckfisk tool is compatible in the way that you as an administrator can set the keystrokes for the user instead of contacting the manufacturer or getting another tool for other keystrokes. Another tool used from Furuboda is the Windows adaptive controller, which is a big hand controller for different game consoles such as Wii, Xbox, and PlayStation. Instead of the small hand controller for the games, students with poor motor skills can still play the generic games.

Measurability:
A good measure for this requirement is to keep up to date with the most used browsers, OS's, and devices. We should stay compatible with the majority of prerequisites set by the users. Research and user feedback is used to measure this. *Figure 3* is a collection of the survey answers for this specific question.

Finns det någon annan enhet som du skulle vilja koppla till systemet?/Is there any other device you would like to be connected to the system?
- Dörr/Door
- Dörr/Door
- TV och dator/TV and computer
- Högtalare/Speaker
- TV, TV kanaler och olika appar/TV, channels and other apps

Figure 3 - Suvery question about compatibility

S5 – Interactive feedback

The system should be interactive to the extent that when the user performs an action, that action should be recognized. This is to apply to a bigger group of users and needs. This requirement is also connected to [R1 - Haptic vibration] and to some extent, [R2 - Voice commands].

Real life connection:
Some students at Furuboda said that they already make use of haptic vibration on their phone and when using voice to text, the phone reads back to them what has been typed. The students also use an application called TimeStock which is a visual timer which helps those who have poor time perception to limit their everyday time-consuming tasks such as showering or brushing teeth. They all said they appreciate more feedback from their technological tools to ensure that the system works as intended and to help them every day.

Measurability:
To measure the interactive feedback, we will test the feature in a beta version on a focus group. Functional tests will give important feedback to us as developers to make the system interactive. *Figure 2* shows this feedback.