# Knowledge Collection

| Date | Activity | Source | Main Outcome |
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| 12/12/15 | CHU Limoges meeting Discussion with Prof. Dantoine about geriatric assessment: protocols, needs, requirements and how the technology could help | Prof. Dantoine, geriatrician at CHU in Limoges | 1. Prof. Dantoine was very interested by the possibility of visualizing and measuring the physical and cognitive degradation of the patients in a time frame. He said that the geriatrics can not remember accurately the health state of the patients that they saw 6/12 months before. So, having access to their recorded data it's a big added value.<br>2. He highlighted the interest of performing CGA more frequently. Actually, in some cases, the patients are assessed just once per year and this is not enough to make a preventive diagnosis of the autonomy loss. He was very concerned by the prevention issue and he mentioned that a technological solution that can be used for carry out CGA at patients' homes could help for prevention of autonomy loss in elderly.<br>3. Another point that was mentioned was the importance of the detection of depression/apathy symptoms during the tests through facial expression and voice analysis. According to him, the possibility of detecting this kind of mental impairments is a very important issue for geriatrics.<br>4. He found the possibility of proposing the standard tests, such as the Barthel, in a more interactive and stimulating way (e.g. as games) is a very good idea.<br>5. He proposed that the system could be able to group information (both from cognitive and physical points of view) common to different tests. Some tests proposed during CGA contain the same or very similar questions. Avoiding this redundancy could make the medical staff and the patients save a lot of time and energy.<br>6. He is available to allow us assisting to geriatric tests that are made at Limoges hospital or during home consultations. |
| March-June 2016 | Design of interfaces for elderly: a psychologist point of view | Laurence Chaby, psychologist at Pitié-Salpétripere hospital (Paris)<br>Thomas Gargot, psychiatrist trainee at Pitié-Salpétrière hospital (Paris)<br>Both collaborators are specialized in troubles related to | Barthel and MMSE tests interfaces were designed following a user-centered iterative process in close collaboration with psychologists and psychiatrists from Pitié-Salpétrière hospital (Paris).<br><br>They helped us to define interaction guidelines for the most appropriate design of the GUIs from a psychological point of view. The most relevant points tackled were:<br>- Basic usability/accesibility questions: |

| | | | aging. | elements and colors to be used, fonts and their size. |
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| | | | | - Design of the virtual character: they advised us to use a male embodied virtual character, dressed with clinician clothes (white coat), as it would result more reassuring and trustworthy to the user. |
| | | | | - Sentences formulation: they checked every test question formulation, in order to reduce as much as possible any possible feeling of stress or being judged. E.g. for Barthel test questions, they proposed to replace the formulation "I am capable of [e.g. using the toilet]" by "I can [e.g. use the toilet]". |
| | | | | - Voice interaction: for every test question and situation, they helped us to define the most appropriate timeline for voice interaction. E.g. what has to be said by the virtual character at each moment, how much time to wait for the user answer, how many times to repeat an instruction for some questions, etc. |
| 07/06/2016 | Design of interfaces for elderly: a geriatrician point of view | Prof. Dantoine, geriatrician at CHU in Limoges | | The interfaces defined with the psychologist have been discussed with Prof. Dantoine in order to have a feedback from a geriatrician point of view. He made the following remarks: |
| | | | | - The virtual character's voice has to be deep enough (male voice), as low frequencies are easier to be understood by people with hearing impairments. |
| | | | | - The use of an embodied virtual character with synchronized lips movements is an added value because often the elderly compensate the hearing problems by reading the lips. |
| | | | | - The virtual character has to cheer-up the patient in several moments of the MMSE test to make him/her feel more confident and reduce stress factor. |
| | | | | - The questions of the tests have to be structured in such a way that only one task at the time is required to the patient. This requirement is mandatory to avoid an unnecessary cognitive load that could alter the tests results. |
| | | | | - The speed of the virtual character's voice has to be slow enough to ensure the clear understanding of the sentences. |
| | | | | We also discussed with Prof. Dantoine some specific questions of the Barthel and MMSE tests and some respective tricks that the health professionals use when they perform the tests with the patients. For example, the question "count backward from 100 by 7" seems to be particularly confusing for most patients, so the health professionals tend to split the question |

| | | | by asking: ''How much is 100-7'' and then: "How much is 93-7" and so on. |
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| 15/06/2016 | Design of interfaces for health professionals: a end-user point of view | Prof. Dantoine, geriatrician at CHU in Limoges | We discussed step by step with Prof. Dantoine the interfaces designed to display the tests results, to customize the tests sequence and to create new tests. The doctor validated some aspects and gave feedback to improve others. For instance, he proposed some modification for the charts about the joints movements, the tables with the performance details and the videos disposition. The proposed graphics aspects, the code colors to track the patient evolution and the edit system was considered ideal. This work session ended with an interesting general discussion about the kind of information that the robot should provide and how the use of technology can help and assist the health professionals for CGA. |
| June 2016 | Barthel test with end-users | CHU Limoges team with 15 patients | The Barthel test was proposed to a total of 15 older adults aged from 71 and 94 years from the geriatric hospital in Prof. Dantoine service during a "Comprehensive Geriatric Assessment". All participants volunteered for the study. First, an health professional described the purpose of the study. Individuals who expressed interest in participation signed a written informed consent form. The patients were asked to use the tool without the intervention of a geriatrician. The behavior of the patients facing the tool and test execution time were observed by the geriatrician and a neuropsychologist. To assess the degree of anxiety induced by the use of the device, two anxiety scales were used: a one-dimensional self-perceived stress scale on self-measurement by graduated visual scale and an anxiety Spielberger self-assessment questionnaire including T-Anxiety scale (usual level of anxiety of the person) and S-Anxiety scale (current anxiety following the use of the device). Comprehensive data were analyzed on the 15 patients and observations were collected by the geriatrician and a neuropsychologist. Regarding the acceptability, 100% of respondents agreed to pass the test as digital version and 93.3% were able to achieve the test (6.7% were limited due to visual and auditory deficits). In our sample, 42.9% of people had a level of anxiety equal to their normal state and 50% of them had a reduction in their anxiety level compared to their usual state. However only 7.1% had elevated levels of anxiety after testing. |
| June 2016 | MMSE test with end-users | CHU Limoges team with 15 patients | The MMSE was proposed to 15 patients with cognitive impairment came for consultation in Prof. Dantoine service. The |

| | | | test was carried out as for the Barthel test but paying particular attention to transitions (encouragement to continue). For a patient a film was made to illustrate how the patient behaves during to the usage of the tool. The tests results are similar to the Barthel test outcomes. |
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