IF Alice Arrives, THEN Wonderhome Incites

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Abstract. The science fiction prototype 'Alice's incitements in Wonderhome' introduces an intelligent home for the aged that provide motivational and personalized activities, assistance, and memory support. The prototype is based on two intelligent environment research studies: 1) a study that constructed a do-it-yourself creation and configuring tool into a nursing home environment, and 2) a study that aimed at finding means for seniors to compose their memoirs. The science-fiction prototype highlights important results of both studies by emphasising the motivational aspects of configuring the environment. It further describes new interaction mechanisms afforded by future technologies and novel research opportunities for the cloud of things.

Keywords. Intelligent environment (IE), science fiction prototype (SFP), human-computer interaction (HCI), home for the aged, do-it-yourself (DIY) approach, cloud of things (COT)

Figure 1. Hologram forest – the Cloud of Thoughts.

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Background and Settings

The objective of a science fiction prototype (SFP) in intelligent environment (IE) research context is to illustrate long-term solutions for the technology, and introduce new opportunities and designs applicable in near or distant future. The SFP of this article, 'Alice's incitements in Wonderhome', is based on two inspirational IE research studies. These studies were carried out in the EU-funded DIYSE-program, Do-It-Yourself Smart Experiences (http://dyse.org/), which aimed at enabling ordinary people to easily create, setup and control applications in their smart living environments as well as in public environments. In Do-It-Yourself (DIY) IE the hypothesis is that the smart environments are constructed piecemeal with easily available, controllable and configurable components. Users are expected to be initiative and active constructors of their living environments, who share the responsibility of constructing, configuring and maintaining the technology. The first inspirational study developed a proof-of-concept home control system and a creation and configuring tool to an intelligent nursing ecosystem for elderly [1]. The second study constructed a service for writing, publishing and sharing personal recollections – life stories – for senior citizens [2]. Both studies examined profoundly the user expectations, embedded values and usability issues in relation to the chosen technologies.

The title of this paper introduces a simple rule: IF Alice arrives THEN Wonderhome incites. The title holds privileged humour for all struggling with the philosophical underpinnings of IE research – the "unbearable lightness" of the endless possibilities to encode the ubiquitous and adaptable technology, in contrast to the "heaviness" of the real-world unpredictable and value-saturated decryption and use. The study for developing the configuration system begun by creating scenarios, short stories, to illustrate the opportunities and usage situations of a hypothetical patient of a nursing home, a persona called Alice. The very first rule that was created (relating to the Bluetooth-lock control) begun by "If Alice arrives…" Henceforth, the research group ended up creating large number of potential rules to the system that were evaluated further with users. It was soon remarked, however, that the upmost importance was to find most evocative use cases and stories that illustrated the incitements and motivations to use the systems. Yet, logically, the greatest amount of construction material was gained at the end of the project – and, by the account, the motivation for writing this science fiction prototype becomes obvious.

The SFP is constructed around most important themes of the inspirational research studies. The first study provides substance about the motivations of people configuring, customising and personifying their environments in a do-it-yourself fashion, the inspiring and supporting role of the system, the self-actualizing part of the construction process and the preference to multimodal systems, haptic interfaces and spoken language dialogue interaction. The second study provides inspiration for the configuring activity – the creation and sharing of private memories. The SFP elaborates the findings of the original studies, places them into a concrete environment, and proceeds with what was not accomplished in the projects.

Essentially, the SFP illustrates the social connection between an elder parent and an adult child facing the challenges when moving in to a nursing home. The key philosophy in the construction objective relates to Yi-Fu Tuan's concept of "topophilia", which can be defined broadly "to include all of the human being's affective ties with the material environment" [3]. Transferring Alice's experience of home to the nursing home offers an intriguing opportunity to explore the concept.

Tuan's study of environmental perceptions, attitudes, and values elucidate that topophilia towards a place that is the locus of memories, i.e. home, is more permanent and less easy to express than any other perception. Furthermore, the 70's environment for the SFP has been adapted from Ellen Langer's "counterclockwise" study, in which elderly men lived for a week as though it was 1959, took more control over their lives and seemed to grow younger [4]. Evidently, an intelligent, configurable environment has manifold and specified means for the objective. The side characters' diagnoses are roughly adapted from Oliver Sacks novel "The man who mistook his wife for a hat, and other clinical tales" [5]. The purpose is to exemplify motivations for personifying the environment and define the needs for exclusive interfaces and smart products. Acknowledged by Johnson's concept of SFP [6] the novel technologies – in this case, the use for the cloud of things, advanced interaction mechanisms and new data visualisation techniques – aim to redefine what can be done and how can be interacted in future intelligent environments.

1. Alice's incitements in Wonderhome

1.1. She's Leaving Home

During the entire trip to the home for the aged Alice was silent. Kay, her daughter, overtook that to be the final way for her mother to show discontent. But Kay was afraid after Alice had had a stroke and two serious falls with fatal consequences. Alice was afraid, too. Her condition was not getting better: she had astrocytoma, a brain cancer in the star-shaped brain cells, which could not be removed. Now that Frank, Alice's husband, had unexpectedly passed away, Kay was the only one looking after her. And Kay could not be there for Alice all the time. She had two children, husband Sam, her work in the city and a newly renovated house.

When Alice and Kay had visited Wonderhome, a compassionate nurse had introduced the settings. The apartments were furnished with most exclusive technology for monitoring inhabitants, as well as providing assistance, activities and entertainment. One important purpose of the technology, as the nurse had explained, was to encourage inhabitants to take control over their lives and perform simple but vital tasks by themselves – such as taking medicine, preparing tea and meals and dressing up – to the extent that was humanely possible due to distinct physical disorders. Alice didn't like the idea. She had a nurse visiting twice a day, and the arrangement had worked extremely well. Top off the nurse's introduction had been, when she had stressed that the wonder of the Wonderhome was not the fancy technology, but the Wonderfamily that Alice was soon going to be part. Alice didn't appreciate the idea of having housemates either. She was used living by herself – and she loved it. Besides, she had important things to do – important, *private* things – relating to something her husband has said as his last words.

1.2. Wonderhouse, Dull house and Dollhouse

Once Alice had walked into her south-wing apartment, she felt suddenly something she didn't expect. While entering in, she felt vaguely as if coming home. She anticipated that the sensation was the cause of many things: the room was furnished, as expected, with her dearest belongings, photographs and portraits – and even with the custom-

made wallpapers she had at home. But also more profound elements were in their familiar places: sockets, door handles, lamps and light-switches. They even worked as accustomed. Kay saw Alice's well-hidden astonishment when she proudly presented all the configurations she had made for the apartment. She said,

'The idea is that everything in here is as close to the conditions at home, mom.'

'They don't fool me. This not my home,' Alice replied resentfully.

'I know. But there are also so many improvements compared to home,' Kay went on, not minding about Alice's remark,

'For example, if you don't want to get up in the morning, you can just call out all things of the apartment, and they do the morning tasks for you.'

Kay said things like "turn on the TV", "turn on the lights in the living room" and "fill the bathtub", by causing each thing to react. Alice tried to look unimpressed, although it was getting more and more difficult. She also understood that Kay had gone through considerable efforts when making the adjustments to the apartment.

'You may call out the things of the house wherever you are. You can ask, for example, the teakettle to be turned on in the shared kitchen.' Kay elaborated,

'But the most important thing is that the house is observing you, all the time. No harm will pass its surveillance. And it does things for you. The lights will softly turn on in the morning, when its time to get up. And if you wake up at night, the night-lights will turn on, so that you may find your way to the bathroom.'

Kay led Alice to the bedroom. Just when Alice thought that there were no more surprises left, she recognized a familiar dollhouse next to her bed (see Figure 2). Frank had originally made the miniature copy of Alice's house to Kay.

'Do you remember when I moved from home to study? Frank packed the thing with me, once he had made some configurations to it.'

'I remember,' Alice said quietly as she recalled the situation,

'He connected the lights of our home to match the little lamps of the dollhouse. Whenever we turned on a lamp, the matching lamp turned on in the dollhouse. They were supposed to signal you if we were at home, if we were asleep or awake.'

'The lights were a clever way of implying if you were available for a conversation,' Kay said and continued,

'I thought that you might appreciate the dollhouse in turn, Mom. I have adjusted the lamps to match our house in turn. You can see when we are at home and when I have gone to bed. It could be a way of saying "good night".'

Then Kay pointed towards a night lamp next to Alice's bed, and explained that it had been adjusted to Kay's home lamp in her upstairs corridor. When Alice would turn it off, it would signify when Alice had gone to bed.

Alice watched as Kay did some final fine-tuning to the dollhouse, and thought that Kay was truly her father's girl, all the way down the line. But Alice was careful not to show her appreciation.

Eventually, Kay left. She had said that during the first days, the apartment would learn Alice's preferences and tune the rooms accordingly. But Alice had no preferences! She resentfully practiced with the lights of the apartment by calling each of them in turn. It was strange, but at least she felt she had some control of her environment.

As the day turned into a night, Alice watched how the little lights of the dollhouse begun to turn off. When the last light faded, Alice thought bitterly how her daughter was probably sleeping more peacefully than ever, knowing that Alice was under

constant surveillance and observation. And that was exactly why Alice couldn't sleep. She felt that by moving into the nursing home, nonetheless how wonderful, she had lost her integrity. Alice rebelliously left on the night lamp. She recalled that Kay could see the related corridor lamp from her bed.

Figure 2. The Dollhouse for subtle communication.

Then Alice glanced at Frank's portrait in the bedroom wall. She instinctively tried to rub her wedding ring, which she had lost in the removal. She had been too ashamed to tell Kay about it, but now the situation made her feel twice as frustrated. Oh, how she missed Frank, their home and the life she had been forced to leave behind. But then she remembered Frank's harassing words, his bothering secret, which gave her another reason to stay awake. His exact last words had been,

'Do I still have time? There is the last confession I want to share with you Alice.'

Then, just before he had died, his voice had turned into mumbling,

'The key is… key is, Elise.'

All Alice could think, ever since, was: "Who the heck is Elise?"

1.3. Wicked Witch of the West

The next morning Alice was supposed to be acquainted with the other residents of the floor, but because of her poor night's sleep the circumstances were not most constructive. Still, Alice had to go to the kitchen if she wanted to have breakfast.

Alice met first Tom, the east-wing resident, who was an absentminded man in his eighties. He seemed to look somewhere above Alice while introducing himself and a weird music surrounded him once he focused on his breakfast again. Alfred, the north-wing resident, seemed to be more level headed: he had intelligent eyes, but a coarse, workman's handshake.

Fran, the west-wing resident, entered the kitchen theatrically and didn't introduce herself at all. She grasped idle looking Alice under her wing and forced her to the kitchen corner. The pompous lady pointed a statement in a smart-memo-board and harassed how important it was to encourage inhabitants to make things by themselves. The way Fran presented the goods and the kitchenware, Alice thought that she acted as if she was a nurse. Fran went on with her chattering and warned that Alice shouldn't

think that because there were two men in the room, women should do all the work. Fran, herself, was doing that, but after all, she was hosting the place and, clearly, much younger than Alice. Before Alice could retort, Fran dragged her to the rest of the shared rooms and praised their modernism. The rooms were decorated in 70's style.

Fran disappeared to the hallway, as quickly as she had come, and Alice went back to the unfamiliar kitchen. Bravely she managed to make a decent breakfast for herself, with the help of her assisting avatar that appeared to the smart-memo-board. Alice had chosen the character long time ago to help in real- and virtual world situations such as this – when she did not know the way. Her avatar was a butler-rabbit.

'Such a clever avatar!' Alfred commented and went on,

'Mine resembles of my dog. Oh, how I miss the real thing! It brought such joy to my life: the way it looked at me and the way it appreciated simple things.'

Tom didn't seem to notice Alice's avatar. He replied to Alfred's statement,

'I miss my orchestra. Nothing can fulfil the experience of playing in a concert.' Suddenly, Fran was back to the kitchen. She joined in:

'And I miss work! Not this trivial labour that I am doing here, for the time being, but my true call as an actress!' She added theatrically,

'I am waiting and waiting, but the phone never rings!'

Alfred furrowed, looked Fran and said,

'Fran, you are disturbingly starting to sound like the characters in Beckett's play "Waiting for Godot".' Then he chanced his voice and imitated,

'You divert yourself while waiting for something imaginary to happen *"if not in the evening but surely tomorrow"*.'

Alice looked Alfred curiously. Clearly she had made a misjudgement regarding him, and his workman manners. Fran looked Alfred anxiously, but seemed to miss his point. Her voice turned suddenly chilly as she declared,

'Yet at this moment, in this instant, I miss most my shiny, silvery shoes. And when *the call* comes, I will *need* them.'

After a dramatic pause she turned her gaze towards Alice and continued,

'Shoes do not walk by themselves, which means that someone has taken them. Men hardly have use for ladies' shoes; and thereby the only suspect is *her*!'

Fran was pointing at Alice and accused stealing her shoes the very first time they met! Alice was appalled. She didn't know how to respond to such impulsiveness, such arrogance. And she thought she was too old for the compulsory games of defining the pecking order of a new company. She looked first at Tom, who didn't seem to realise what was going on, and then Alfred, who winked his eye to Alice. He turned to Fran and retorted, as dramatically as Fran,

'You wicked witch of the west! Why don't you use the smart-memo-board to find the lost things and stop harassing our newcomer!

Then he was more smoothing,

'I will help you with your shoes, but before we do that, Fran dear, you might as well tell something about yourself to our Dorothy here. For example, how old are you?'

Alice's assessment of Fran's age was a bit over eighty.

'Why, you should know better than that, not to ask the age of a lady! But I might as well tell you – if you promise you don't tell my agent. I am thirty-nine.'

Alfred gave an evocative glance to Alice and continued,

'Well, for such a young person, you probably don't have any trouble in remembering what year it is?'

Fran looked baffled for a moment. Then she smiled,

'Poor old thing, you must be getting quite senile. The year is, of course, 1976!'

Alice glanced her pocket-watch-display just to make sure. In the display the butler-rabbit was proactively presenting needed information: the year was 2018. Alfred was not a bit discomfited about Fran's retort, but went on by taking a magazine from the kitchen table. He presented Fran an article of a famous actress, Meryl Streep, and asked,

'Fran, you are an actress. Can you tell me who the person in the picture is?'

'Never seen in my life! Must be some shooting star, they come and they go. Oh, she looks so skinny. A bit like Audrey, but not as sophisticated, you know what I mean.'

Then Fran stood up, collected empty cups and plates, and went by the kitchen sink. Alfred noticed Alice's confused expression. He lowered his voice and explained,

'Fran really was an actress. She has an unusual version of Korsakov syndrome, and it causes her to think that time has frozen into 1976. That is why all the rooms are decorated in 70's style, although there is more to it. It is for all our well-being; to make us feel younger. You probably noticed all the trouble that they had seen to make you feel at home, as well? But you should see Fran's apartment! Her room is an exact copy of her apartment – in 1976. There are extreme details there in place: stains in the carpet, thresholds measured of exact height, force feedback in the doors and a broken thermostat that works improperly but which has obvious logic to Fran.'

'Why?' Asked puzzled Alice.

'To make her feel comfortable. Not to confuse her. There is no time capsule to retrieve her back from the 70's, Alfred said and continued,

'But there is one thing missing from her apartment, though.'

'What is that?'

'A mirror. If she saw her reflection, that would break the illusion. She resembles Dorian Gray in that part.' Alfred quoted the play melodramatically,

'If it were I who was to be always young, and the picture that was to grow old! For that-for that-I would give everything!' Then he whispered quietly,

'So Alice, don't ever show her a mirror, unless you truly want to upset her.' Alice saw no reason to do that. Alfred concluded by saying:

'Fran thinks that she is looking after us, but in fact, it is the other way around. The truth is Alice; that we are here looking after each other.'

After saying that Alfred went to help Fran. His assisting avatar dog led them to the lost shoes by barking louder when discovered.

1.4. BeQuest Drawer-Chest

Alice withdrew to her south-wing apartment, whilst she thought she had enough social life for a day. Alice had an important mission – a mission that required her undivided attention. Alice sat beside a huge, solid oak cabinet, which Frank had called the BeQuest drawer-chest (see Figure 3). Alice was hoping that the chest, with its forty-eight drawers, could help to reveal Frank's mysterious secret.

Frank, her philosophical handyman, had spent most of his spare time devoted in renovating Alice's house, but this new project had been his latest, his last, passion. Frank had been extremely proud of the cabinet and called it "the foundation of the human mind". According to him, it had space to hold an entire well-classified world of a person, and once one had put something in it, it could never be lost. Frank had begun the project soon after Alice's tumour had been discovered, and after, according to Frank's judgment, Alice started to forget things. Frank had said that Alice needed more memory-exercises and the drawer-chest provided plenty of those.
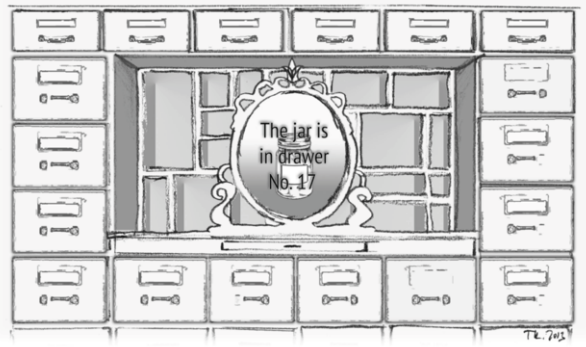
Figure 3. BeQuest drawer-chest.

The significance of the drawer had become clear after an incident. Alice was a keen conserver, and she was in trouble each autumn when it was time to store the pickles. Alice noticed some large, empty drawers in Frank's cabinet, which she wouldn't ever have dreamed of using, if it hadn't been an emergency. Alice had put the pickle jars in the drawers, and thought nothing of them, until Frank had found her cache. He had been shocked and accused her of "abusing the foundation of the human mind" and "turning his reasoning cabinet into a larder".

After calming down, he had used a pickle jar as an example how the cabinet worked. He enclosed a label into the jar, put it in front of a looking-glass display and asked Alice to explain the content. Confused Alice had done as asked, and Frank put the jar to one of the drawers. Then Frank smiled to her and requested for the jar. Alice witnessed how the looking glass required more specific details and Frank replied with roughly something that Alice told about the content. The looking glass revealed the number of the requested drawer. Frank put the container in front of the looking-glass reader and there was Alice's voice explaining the content with a supplementary pickle recipe drawn from the cloud.

Then Frank opened up another drawer, took his father's medal of honour and to Alice's surprise, exposed detailed wartime stories from many sources relating to the medal. From that time on, Frank stored all their most important things into the cabinet, and asked Alice to help him to save their shared recollections. Later, Frank had told that the drawer did not open up to just anyone. There were secret compartments that opened only to him, Alice and Kay – and they requested secret, articulated passwords.

Alice was convinced now that Frank's gloomy secret was encapsulated in the drawer. She said aloud "Elise", but the looking-glass display didn't react. Then Alice tried the backdoor that Frank had created in case of problems. She asked,

'Magic mirror in the chest, I request: who is Elise?'

The looking glass remained silent.

1.5. Hologram Forest

The day after, Alice decided to take another approach for finding out the secret. With a word 'forest' she asked for a hologram woods to ignite itself into her living room (see Figure 1). The hologram forest was a place for all the digital traces of Alice's life: all the things she had done, all the places she'd been, and all the communication she had

ever had. In other words: the hologram forest was the outsourcing of Alice's memory. The forest emerged as a garden of diverse trees, with various shapes, colours and sizes. The trees held braches, which held leaves, which held memories and reminiscences. The information had been implanted into the forest according to Alice's preferences; a tree was bigger if it held a significant amount of memories; it was taller if it was older and a tree had a specific gloom if it had been browsed recently. Regularly, Alice mostly browsed the maples, because they held all her dearest photographs. She practically never browsed the willows that held her regularly updating medical information or sprouts of junipers that was the new sensor data of the Wonderhome.

In addition with her own part of the forest, Alice had partial access to other people's grounds. Now that Frank was dead, with his authorisation, she had inherited his entire forest. Up until this moment Alice hadn't had time to visit there.

Now Alice crossed over the border, and visited the parts she had been able to visit before. Then she came to an unfamiliar meadow. Alice had a feeling that this could be the place to start her search. She inhaled and called out "Elise". The word echoed back. At first nothing seemed to happen, but then she heard how the branches rustled, and a tiny, familiar face peeked out from the shrubbery. It was the butler-rabbit again, who gave her a rude glance, turned around, and headed deeper into Frank's forest. Alice followed him, as usual.

The rabbit led her to a tense willow growth that seemed to contain Frank's old lecturing files. It shook a tree, and dropped a leaf to Alice's hands. It was an essay from a girl named Therese, apparently tagged with label of her nickname Elise. Alice browsed the content by moving her eyes. As she was not satisfied, the rabbit led her to a non-glooming large oak and dropped some leaves that contained photographs of an old family friend, Elisabeth. Alice knew she wasn't the one she was looking for either. Then the rabbit shook his head and bounced over to Kay's forest, but Alice felt weary and did not follow. She thought she was now totally, utterly lost with the secret.

1.6. Come Together

The homecoming party for Alice was in the following evening. Alice had invited all her new roommates to see her apartment. Alfred sat next to Alice in the sofa, looked at her warmly and said:

'I am glad you moved to live with us, Alice. It is so pleasant to have someone with some sense and sensibility.'

'I admit I had some prejudice towards Wonderhome's endless observing, self-help demands and especially, the housemates. But I have swallowed my pride and know now that this was the best thing that could've had happened to me.'

Alfred was looking at Fran and Tom, who were browsing the BeQuest drawer-chest. Alice had adjusted the looking glass *not* to show the camera reflection, and there were only few drawers open to satisfy the curiosity of the occasional browsers. Accordingly, there was only the exhibit garden accessible in Alice's forest. Alfred sighed,

'Those two don't have much use for the hologram forest.'

'How come? I couldn't live without it.'

'Fran has not any digitalized recollections before 1976, and as her memory endures only about fifteen minutes, she quickly looses interest to browsing.'

'What about Tom, then?'

'He is another story. Tom has no visual memory or imagination. The world presents itself quite absurd to him. He cannot understand the hologram forest at all. In fact, he doesn't comprehend any faces, images or objects around him.'

'But he recognized me this morning, called me by the name!'

'He has a device that he carries with him for the purpose. In the device his Dormouse avatar acts as a prompter and whispers the names. It recognises people's faces, voices and walking-styles. And the labelled objects around Wonderhome obviously know Tom.'

'And is there some reason why he is surrounded by music all the time?'

'Indeed! Tom used to be a distinguished musician. Now that he does not understand things around him and what they are for, the world has been constructed according to something he understand very well – music. He has identifiable songs for every act and procedure. He has songs for dining, dressing up, even for taking a bath.'

As they were speaking, Tom came to sit next to Alice. He appraised,

'Your cabinet seems extremely interesting, Alice. But what do you do with the hologram thing, the forest? The Dormouse told me that it is for tracing back memories, but I don't understand. What kind of memories?'

Alice sighed. She was feeling too comfortable to conceive a lie to her new friends.

'I might as well tell you, since I have come to a dead-end with my investigations. For the last few days, I have been trying to solve my late husband's secret. Something he said to me in his deathbed.'

Both men leaned attentively closer to Alice. They said in unison:

'What did he say?'

'He said: "I have a last confession. And: the key is Elise." Alice said and sighed,

'I am convinced that the secret is hidden in the drawer-chest.'

To Alice's great surprise Tom chuckled and said,

'That is a catching tune! I have used it myself for remembering how to prepare tea and madeleine cookies.'

'I beg your pardon?' astounded Alice sighed.

'I mean the most famous Elise of all: "Für Elise" by Beethoven. Now that I think of it, of course the notes could be used as a secret key. The letters that spell Elise can be decoded as the first three notes of the piece. Because an E♭ is called an Es in German and is pronounced as "S", that makes E–(L)–(I)–S–E: E–(L)–(I)–E♭–E…'

Alice wasn't listening anymore. Intuitively she understood that Tom had solved the mystery. She asked gingerly:

'Could you please play it for me, with my old piano in the corner?'

Tom graciously did as asked. All listened to the scenic music that Tom played effortlessly without any hesitation or absent-mindlessness. Alice sat by the drawer-chest and observed the lockers. Then the music stopped, but nothing happened.

1.7. Last Note

After a good night's sleep, the answer came to Alice. It came to her in a flashback memory. She had heard Frank's last words as a mumbling: "The key is… key is, Elise", but, in fact, she understood now, he had said: "The key is Kay's Elise".

When Kay had practiced the tune, as a child, she had persistently always misplayed the third note. Alice called Kay; who came and played the piece. As she hit the magical note, she simultaneously looked at her mother in a way that made Alice

understand that she had plotted this whole thing with Frank. A locker opened up – not in the drawer-chest, but in the dollhouse. It notified about the event by continuing to play "Für Elise" and guiding the source of the sound to the tiny living room. Alice picked her missing wedding ring from a small chest. Intuitively, she took the ring next to the looking-glass reader of the drawer-chest. The mirror informed that the ring contained Frank's last confession to Alice – his confession of love.

Frank's confession was revealed as a story of the most important things in his life, spoken in his own philosophical, earthly manner. He told about the rainy day in July they had met with Alice, the marriage, Alice's blue house, Kay's birth and the birth of Kay's daughters. All the happy moments came tangible to Alice as Frank led her to the drawers, one by one, which held the souvenirs of their life together. Alice was grateful of the elongated memory. There were so many things that she had forgotten, so many things buried under some ridiculous misgiving. She was also grateful that the shared chore brought her back in peace with Kay.

2. Reflection

The first objective for the SFP was to consider what motives people would have to construct their intelligent environments and what kind of configurations they would make. These objectives were considered throughout the prototype when Alice familiarized herself with the Wonderhome and her apartment, and when she interacted with the dollhouse. The multiuse environment was augmented with referenced ubiquitous computing technology for everyday activities, such as used e.g. in the Aware Home, Easy Living and iDorm [7-9]: sensing and person tracking technologies; vision techniques, sensitive floor, and voice recognition; spatial audio cues, wearable computers and unobtrusive centralized computing services. The system for finding frequently lost objects detected Fran's silvery shoes, conceivably, with small radio-frequency tags and a long-range indoor positioning system. The smart-memo-boards were touchscreens placed strategically throughout the Wonderhome, used for presenting all the smart- and context-aware services. As a side character, the prototype introduced an electronic butler [10], the white rabbit avatar, which was an autonomous, personal agent that operated on Alice's behalf in the virtual world [9].

The second objective of the prototype related to the storing, retrieval and sharing of personal recollections. The BeQuest drawer-chest (exploiting the Cloud of Things) and the Hologram forest (organizing the Cloud of Thoughts) exemplified innovations that could be applicable in (near or distant) future for organizing and augmenting private data and memories. The idea for the BeQuest drawer-chest came from a personal heritage cupboard and had further inspiration from a novel by Henri Bosco written in 1947 [11]. The prototype deliberately neglected to specify in detail what the technology behind the "looking-glass reader" and the "labeling" were, as in the case, the presently available magnetic and optical data storage technologies could easily be replaced, for example, by future holographic data storage technology [12]. In that case, the "looking-glass" would play more important role in creating and reading through the hologram. In essence, the drawer-chest was a computational artefact on top of which anyone can build their life stories, complemented creatively with rhymes and chords.

The hologram forest was inspired by Mark Weiser's concluding statement in his widely quoted article [13]: "Machines that fit the human environment instead of forcing humans to enter theirs will make using a computer as refreshing as taking a

walk in the woods". Essentially, the hologram forest was a personal map of all the digital things traceable in Alice's life. The forest introduced a novel data visualization technique to present the ambiguous, personal digital data stored in the cloud. Another novelty was the haptic feedback and the use of gaze-contingent technique for browsing the holographic projection.

The core testimony of the prototype was that in ubiquitous world the language has enormous significance. It defines how people interact with the technology, how devices communicate between themselves, but also how the information is retrieved. Humans are successful at communicating complex ideas to each other, but there is still a lot of work to be done with the human-computer interaction. Animated characters were mentioned by Chin et al. [14] as one option for the interaction. In the home control system evaluations, the prominence of the spoken language dialogue became evident, and hence it was chosen as the key interaction mechanism in the SFP for triggering actions and subtly securing private information.

The prototype 'Alice's incitements in Wonderhome' used narrative means in bridging the gap between "the unbearable lightness" of encoding ubiquitous technology and relating "heaviness" of nondeterministic users decrypting the code. It introduced enchanting technology that aging Alice would presumably be motivated to use in an intelligent nursing home. As technology becomes physical, the motivations and values, such as creativity and control [14], are fundamentally things that have the utmost importance. The quest for the IE opportunities is an on-going cycle; this SFP aimed at ending one cycle and, hopefully, provide incitements to begin another.

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