The Spiritual Machine

Hsuan-Yi WU[a] and Vic CALLAGHAN[b]
aDelta Electronics, Inc., Taiwan
bUniversity of Essex, UK

Abstract. In this Science Fiction Prototype (SFP) we explore the evolving relationship between technology and people. We do this by considering what may seem two irreconcilable aspirations of the human condition; the desire for utilizing ever increasingly sophisticated science based technology in our life whilst at the same time preserving the spiritual values that make us human. Superficially it would seem that these two forces in our life are pulling us in opposite directions. Can the forces of technology and spirituality be balanced in modern life? To investigate this issue we invent a future in which nano-computing technology is available for sale in many forms. One form is smart-paint called "*iSkin*" which, when painted on surfaces, turns them into interactive multi-media mediums. The characters in this story use this "magical" paint to create an immersive reality environment, the "*WonderHome*" in which reality and virtuality become confused in an intoxicating mix of sensory experiences that causes a madness known as "Obsessive-Compulsive Technophilia Disorder (OCTD)". In the story a cure to this emerges in the form of the ancient Chinese practice of Chan, a form of Buddhism.

Keywords. Science fiction prototype, HCI, AI, digital lifestyle, immersive environment, nano-computers, machines, OCD, love, technology and disorders, Buddhism, Chan practice, social innovation, mental health, spirituality, education

"There is always some madness in love.
But there is also always some reason in madness."
- Friedrich Nietzsche, German philosopher
(1844 - 1900)

1. Introduction

Love is a powerful and sometimes mysterious force. It dominates our most important relationships; our friendships, our family bonds and most importantly, whom we chose for the ultimate act of preserving our genetic and spiritual inheritance; who we have children with! What is love? We can feel it, but can we explain it? Poets have written about it, singers have sung about it but what is this force that has such a massive influence on our lives, and even on the existence of humanity itself? Is love restricted to our feelings for other people or can it extend to other entities, animals or more controversially, technology? From our own life we know the consequences of loving the wrong person, as it can bring great misery to our life. If people could love technology, could they love it too much, could they love the wrong technology or in the wrong way, and what are the consequences? This is certainly a topic that has exercised the minds of scientist who have considered technophilia [1], robot love [2] and spirituality [3] [4]. Perhaps, more strangely, some scientists have even likened love to a

mental disorder; obsessive-compulsive disorder (OCD) [5]. In this SFP we explore this enthralling space, where there is a strong symbiosis between people and technology. We do this by considering a fictitious future in which technology has advanced to the point it can engage and stimulate people's senses on par with today's illegal drugs, disabling society to function productively. We consider such technology and its relationship to our own spirituality and how ancient beliefs, far from becoming forgotten, may be an essential counterbalance for preserving our society.

2. Background

2.1. Mental Disorders and ICTs

Studies have addressed mental disorders or problems caused by the Internet and related technologies such as Internet addiction disorder [6], computer anxiety [7] and cybersickness [8]. There are also studies concerning the use of immersive virtual reality technologies to improve mental health [8][9][10]. In this SFP, a central theme is the symbiosis that the character, Deirdre feels with a technology called the *WonderHome,* which results in her mind and that of the machine becoming intertwined. In some respects, it is a case of over stimulation, in other respects it is a case of over absorption; with strong resonances with Obsessive-Compulsive Disorder (OCD), which many psychologists equate to the behaviour of people in love. Indeed there are strong parallels of human love in Deirdre's relationship with her *WonderHome*.

2.2. Chan Practice

Chan in Chinese means meditation. However, its deeper meaning is enlightenment or an enlightened mind. The goal of Chan is to attain enlightenment, realising "the ultimate truth", which means mind, original nature, or Buddha-nature. In about 500 C.E., Bodhidharma transmitted Chan from India to China. His most important work "*The Two Entries and Four Practices*" details what sentient beings must do to realise their true nature. "The '*two entries*' are '*entry through principle*' and '*entry through practice*'. The '*entry through principle*' means directly seeing the first principle, or original nature, without relying on words, descriptions, concepts, experience, or any thinking process. The '*entry through practice*' refers to the gradual training of the mind. The '*four practices*' are '*accepting karmic retribution*', '*adapting to conditions*', '*no seeking*', and '*union with the Dharma*'. Each of them is progressively more advanced and should be followed in order [11]. For practitioners to begin, sitting Chan meditation is the most well-known method. However Chan practice is not limited to meditation and there is no fixed way to practice. A number of studies have proved the benefit of seated meditation and Chan psychologically and physiologically not only in improvement of positive emotions but also in treatment of diseases such as Neurosis, Gastric hyperacidity and hypoacidity, Insomnia, Chronic constipation, and High blood pressure [12]. Though Chan can bring physical and mental stability, joy and health to those who regularly practice it, the practice needs to be undertaken cautiously and methodologically as there are dangers in undertaking such challenging mental feats before practitioners are ready [13]. Clearly, this process involves considerable control of the mind, which contrasts greatly to people with certain mental disorders. More information and training are available from the Dharma Drum Mountain [14].

2.3. The Science

This Science Fiction Prototype is based on three technology research projects and a business innovation project. The first of these is "*An investigation into using an Amorphous Computer as an Intelligent Surface*", was an MPhil project completed by Adam King which forms the ideas for our "*iSkin* paint". His work considered how ad-hoc arrays of nano (10^{-9}m) sized computers could be used to create "Smart Matter" which, when attached to surfaces of everyday objects (eg tables, walls, floors etc) enables the construction of intelligent surfaces [15]. In our SFP, *iSkin* Paint(and nanotechnology)plays a key role in enabling the construction of the interactive displays in the walls and ceilings of the *WonderHome* and "*Spiritual Machine*" that enable the fully immersive experience. The second research project that inspired this SFP is the iWorld, a PhD project by Marc Davies that explores the potential for artificial intelligence, virtual reality and games technology to create mixed-reality environments inhabited by both human and artificial avatars [16]. In other work we have investigated virtual-reality immersive learning environments [17][18][19] and emotion sensing [20]. In our SFP virtual reality and intelligent agent technology play a key role in providing the means to generate the illusionary environment and the artificial friends that would prove so stimulating and absorbing to the central character Deirdre. Later, in the *Spiritual Machine*, the artificial intelligence based avatars play a key role in providing the artificial Chan Master. The third project that inspired this SFP is the MyRoR(pronounced Mirror) PhD project by Dana Pavel that is investigating the possibility of creating a wearable computer system to collect information about the wearers daily activities, creating an electronic diary of the users life from various sensors (eg physiological, TVs, mobile & phones etc) [21]. The correlated recorded information helps people understand their day (what they did, where they went, who was around, and how they felt etc). It enables people to be more aware of, and even change their behaviours to deal with various mental health aspects. In this SFP, initially this electronic diary heightens Deidre's technophilia but ironically, later in the story, proves to be an important element in her cure, by allowing her to observe the change in her behaviour, under the guidance of the artificial Chan practice masters in the Spiritual Machine. Finally, our inspiration was driven by an MSc thesis in business innovation and entrepreneurship by Hsuan-Yi Wu, which investigated a futuristic business and social innovation concept called Living Labs [22]. These ideas inspired the concepts for the company '*Additive Technology*' featured in the SFP that produce and market the *iSkin* Paint and the *WonderHome* technology. Thus, the science and business visions explored in this SFP are real, and this future may be closer than we all think!

3. The Sci-Fi Prototype

3.1. The World in 2050

"*A child born today in the United Kingdom stands a ten times greater chance of being admitted to a mental hospital than to a university... This can be taken as an indication that we are driving our children mad more effectively than we are genuinely educating them. Perhaps it is our way of educating them that is driving them mad.*" – R.D. Laing, British psychiatrist, 1927-89)

Initially people didn't understand what was the cause of the increasing mental problems of the youth, but during the mid thirties people started to suspect it might be linked to technology. Then in May 2041, a Japanese psychologist indentified this link, giving it the name "Obsessive-Compulsive Technophilia Disorder (OCTD)", more

cynically referred to by laypeople as "*Geekness*"– over exposure to technology! It was very surprising, even shocking, to discover that the generation, now in their fifties, became weak and ill with many dying prematurely! This disorder is blamed on a mental overload due to people's brains being continually over-stimulated by an intoxicating range of electronic gadgets, especially 24/7 social networking. Although there were several hundred studies trying to understand and treat the disease, apart from living without modern technology (which creates its own problems in this high-tech society), none of these were able to prevent people from getting OCTD. The vast majority of OCTD patients are classed as suffering from severe mental or emotional disorders. This situation got steadily worse and by 2050, 10% of all deaths were caused by OCTD related disorders. What made the disease all the more frightening was that the final days of sufferers were marked by feelings of deep depression, such that they frequently welcomed death as an escape from their miserable plight.

3.2. The 50th International Conference on Intelligent Environments - IE'54

To celebrate the 50th anniversary of the IE conferences, Professor Karsin, one of the founders of the conference now aged 100, had been invited as an honoured guest to introduce the keynote speaker!

Figure 1. A label advertising the Additive Technology *iSkin* paint

Professor Karsin's voice rang out across the hall; "*During the last 50 years, we have been putting enormous efforts to make our technology more intelligent, more exciting, more supportive, more engaging, more addictive and so indispensible that we couldn't live without it. I think without doubt we have succeed in that aim which was, in no small measure, thanks to our next speaker, the legendary Dr Chang Shin, CEO of Additive Technology, who took the concept of iSkin technology and turned it into a*

multi-billion pound industry changing forever the way people engaged with technology; producing the most exciting and fulfilling experience ever; the Additive Technology 'WonderHome'." Dr Chang Shin stepped to the centre of the stage, and with a somewhat sombre look began, "*As you must all know, our world is inflicted by a silent scourge that dims the light which guides the minds of our youth and extinguishes the flames in their hearts; "Obsessive-Compulsive Technophilia Disorder (OCTD). Sadly, the research I commissioned to investigate this disorder has now confirmed that the cause of this disabling mental condition is over exposure to information and communication via the technology that all of us here have provided; the so-called "techitus" mental disorder, a type of OCTD.*"A voice from the audience rang out "*geekness you mean*" ... followed by a chorus of shouts "*we are all geeks*" ... "*yes, and we are now officially diagnosed as mentally disturbed*" … "*well, I always thought you were*" …some laughter followed but quick died away under the stare of very grim looking Dr Chang Shin. She continued "*We have created a world where our minds know no tranquil space, where pressure to achieve abounds, where technology fills our lives, where technology is loved and enjoyed by us on a par with our friends and families but where it makes us observed and contactable 24/7 and, for some, is becoming an oppressive master bring unbearable stresses to our minds*". The audience was now silent, realising this was a grave matter. "*However*," she continued, "*I didn't come here today to tell you technology is the damnation of our age, rather the reverse as I have come to explain that my company has discovered a cure for this menacing disorder that is a combination of old beliefs and new technology. Before I explain the*

Master Sheng Yen (1930-2009)
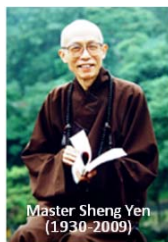
technology, let me tell you that the theory is built on an idea first raised some 58 years ago, by a spiritual leader, Master Sheng Yen, who proposed the need to "protect the spiritual environment" and believed that "only by purifying our minds can we purify our actions, and only by purifying our actions can we purify society". I recall being moved by this vision, but at that time I did not realise it could offer a cure for OCTD but, amazingly, in combination with the very technology that may be contributing to the problem it caused. The solution is simple; we have converted our Additive Technology WonderHome so that, instead of being programmed to excite and bombard the mind with an almost infinite stream of entertainment and information, we have re-programmed it to provide an environment that nurtures the soul, heart and body with the ideals of Chan Practice; we call this the "Spiritual Machine". Later, some of my researchers from Additive Technology will present the technical details of this machine, and show you some videos of it in operation, so for now, I will stop. Thank you for inviting me to address your conference, and thank you for listening."

People were overwhelmed by the talk from Dr Chang Shin and especially one person in particular, Frederick Bennett, a professor from MIT, who had listened reverently whilst immersed in thoughts of his daughter. Thirty years ago, Deirdre had been a beautiful young girl with so much love and admiration from her family and school friends. She was the envy of everyone having received, from her generous and loving family, all manner of gadgets, such as digital music players, video players, phones, cameras, eBook readers, game machines, photo-frames, and instant printers etc. However, all these could not guarantee a perfect life without illness.

Deirdre was born on 10th March 2000, right on the day the NASDAQ stock index peaked at 5132.52 in intra-day trading before closing at 5048.62. This was the famed day that the Internet bubble burst sending share prices spiralling downwards. It was

also memorable because, Deirdre's father Frederick Bennett lost his company during that crisis and made a decision what changed his and Deirdre's life forever; he went back to the university studying for a PhD in intelligent environments; working his way up the system to eventually become a professor. During his career he had witnessed massive changes in technology, but all with one thing in common, bringing an increasing amount of connectivity, blurring of the real and virtual worlds (high fidelity mixed reality meant it was often difficult to tell the real and virtual worlds apart) and an ever-increasing symbiosis between people and technology. This was the era in which Deirdre grew up; the smart home was not a dream; rather it was her everyday life. Foremost in Deirdre's recollections of her childhood were memories of non-stop dialogue with people but, as her family was small, this was frequently via technology with avatars (computer generated worlds and characters were now difficult to tell from reality) or with real friends but mostly through 'clouds'. Her home and childhood was comfortable, maintained by a mass of unseen embedded agents that tended to her every need.

3.3. The WonderHome

It was Deirdre's 18th birthday, her dad woke her, kissed her on the forehead, and pointed towards the floor to a large box shaped object adorned with brightly coloured paper on which she noticed the words, *happy birthday*; her heart raced with anticipation of some wonderful surprise; maybe a new gadget! "*Dad, dad, what is it*" … "*open it and see*". Deidre quickly ripped off the wrapping paper only to discover a somewhat plain cardboard box. Peering inside there appeared to be a large, but plain looking paintbrush and a very large pot of paint! With a voice, which was impossible to disguise her disappointment, she exclaimed "*so, now that I am 18 you are expecting me to paint my room* (hardly the most exciting present she thought to herself)". "*Yes, that's exactly what I had in mind*" … "*but daaad, it's my birthday, my 18th birthday*". Her dad picked up the tin, pointed at the label (see figure 1) and started reading aloud, "Real Love 4.2, Tender Touch 4.2, Spirit 8, My Eyes 6.1 …..", before he could get further Deirdre had snatched the paint from his hands with her eyes shining "*Oh dad! I love you so much. This is the amazing Additive Technology 'WonderHome 3' DIY kit. I was just reading about it. It can turn...* (too eager and excited to speak fluently) *can turn rooms into the most stimulating and engaging experience in the world ..... THANK YOU!!* (kissed on Frederick's face)". Sure enough, Deirdre was right, it was the '*WonderHome 3' DIY kit* that consisted of a very large pot *iSkin* paint, an innovative technology from Additive Technology that allowed Frederick to paint Deirdre's walls with millions of light emitting, touch and light sensitive communicating nano-computers. With millions of nano-computers painted on to Deidre's bedroom walls, her room became an immersive interactive reality experience that, for her, became a deeply stimulating 24/7 experience that totally absorbed her senses and attention. In her *WonderHome* room, Deirdre could make interactive 3D animations and play with the vast array of gadgets that came with the '*WonderHome 3*' kit. As Deidre was coming to the age where she would go to University, by way of an extra present her dad had purchased an account for Deirdre to participate in the '*Essex University ePod Programme*' which used a mix of artificial intelligent tutors and advanced 3D modelling to enable her to learn Mandarin, with the illusion of being in Shanghai. The '*WonderHome3*' kit included an emotional awareness system to sense and communicate learning emotions (eg confusion, understanding etc) from remotely

located eLearning students to their teachers (and vice-versa) making the experience closer to natural interaction. Deirdre had her friends coming for a party that night, and the exhilarating immersive experience caused them all to immediately fall in love with the 3D "Immersive Interactive (I^2)" experience the space offered, especially the new generation of interactive films. In these films, the interaction extended to being able to alter the storylines and even assume roles in the film.
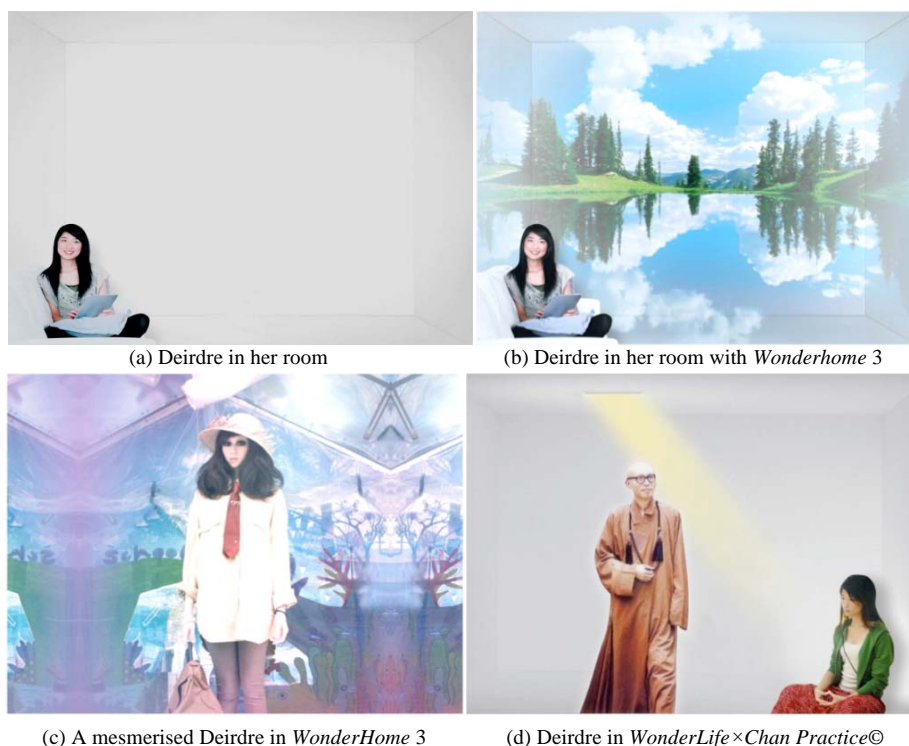

<table>
<tr><td>(a) Deirdre in her room</td><td>(b) Deirdre in her room with *Wonderhome* 3</td></tr>
<tr><td>(c) A mesmerised Deirdre in *WonderHome* 3</td><td>(d) Deirdre in *WonderLife×Chan Practice*©</td></tr>
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Figure 2. The Scenarios of Deirdre in the *WonderHome* intelligent environments

From the day Deirdre's *WonderHome* was created, her life had changed (see Figure 2). She spent most of her time in that special environment with her gadgets and inventions. She created a magic mirror that allowed all her clothes, including those from online shops, to be visualised on her. She loved her *WonderHome* so much that she buried herself into its virtual worlds. She seldom came out to talk with families and friends. That was the time when she started her online degree in Mandarin and Chinese Literature. It was unusual for a freshman not to attend any of the welcome party and activities. She attended the courses (virtually) but was invisible to the other students because she was always immersed in her own personal *WonderHome* activities. She never went shopping on the street but rather purchased everything she needed online. Her classmates referred to her as "*Invisible*" or "*Geekgirl*" although, if you met Deirdre in person, it would be difficult to understand how she got that name as she was a pretty and fashionable girl, although it had to be said that she didn't talk much. Besides her school life, Deirdre was the top fan of Additive Technology and found a new product *WonderLife-Diary*© on Additive Technology website. The software was so powerful could be used to construct a personalised story-like diary with events presented to as to

reveal a timeline of her daily experiences in a way that allowed her to reflect upon her life. It was an ingenious system that allowed key sequences of her life to be acted out by realistic agent based avatars that replicated people and experiences in her life. The system was amazing, not only were the graphics and agent representations of her stunning, but the system was also able to condense twenty years of life into an hour, as though she was watching a dedicated Hollywood film of her life. However, the *WonderHome* was capable of so much more. For instance it could also switch into an Aurora-liked effect which stimulated her senses and drew her into a hypnotic like trance in which her senses feasted on an extravaganza of exotic mind blowing experience that were more memorising than any chemical drug. It was almost like 'Alice falling into the Wonderland'; Deirdre became motionless in her *WonderHome*, absorbed by the intoxicating mix of visual, audio and haptic sensations. Deirdre was in a state of bliss, as though a person in love. Her college friend's voice echoed through Deidre's brain *"Deirdre, what are you doing? You should have been in class one hour ago. Where are you now?"; "I am in Rome. Have you been there before? The Colosseum is magnificent. I climbed up to the top level looking down the ancient arena and hypogeum. I then slipped into the arena where there seemed to be animals hunting each other..."; "Are you crazy, you are just roaming in your illusionary WonderHome?"; "No. I am really in Rome. I've been here for three days. I was admiring all those aesthetics in the Vatican Museum for two days."; "Gosh, Deirdre, you should stop it. You were in class with me just yesterday afternoon. How come you could be there for three days?"; "Oh~ Sorry I got to go."* It was not the first time. Last week, Deirdre told her friend she was in Paris. In the last two weeks, she had been skipping from courses and immersed herself in the *WonderHome*. She did not sleep much nor eat regularly. The more she engaged with her *WonderHome*, the less she felt like sleeping. However nobody, including Deirdre, knew she had been suffering from a manic disorder, an extreme version of OCTD. The day before her 21st birthday, she had collapsed in the *WonderHome*. When her father found her, he was shocked and saddened to see his beautiful daughter being taken to hospital; as her stretcher passed him, he was shocked by her motionless body and glazed eyes; she was a cross between a zombie and a patient under aesthetic; perhaps zombie was a fitting description for someone that was only half in this world!

3.4. The Obsessive-Compulsive Technophilia Disorder (OCTD)

Deirdre, a beautiful young girl, now was exhausted, empty and could not focus anymore. She looked at into Frederick's eyes as if she did not know him. She could not recognise him as her dad although deep in her mind she knew he was someone familiar and very close to her. She just could not recall his name. As a result, she had to stay in the hospital for treatment. The process was not easy for Deirdre and her family. Deirdre became irritated. She resisted examination and treatment from the doctors and nurses, and only cooperated if she was tranquilized by medicine. Many weeks passed before her body got its nutrition and energy levels rebalanced; she finally started to recover and her impulse and resistance reduced. After months of observation, she was discharged from hospital and was sent home to be with her family.

Deirdre stood in the middle of her *WonderHome*. A sound was calling her deep in her mind. It was cheers rising from her heart! All of a sudden, she found herself back in *WonderHome*. However, she was 'not normal'; she was and remained even more distant and isolated. Although she seemed less depressed, oddly, she acted very active and

enthusiastic whilst in her *WonderHome,* but became relatively gloomy and quiet in real world. It was a big contrast and worried Frederick greatly as he knew Deirdre was far from well, and in no way able to cope with the real world. It was at that moment that Frederick realised he need to do so something about this plague, which was not just effecting Deirdre, but countless other children who seemed to be immersed and mesmerised by modern technology. The moment he called Dr Chang Shin would be forever imprinted in his mind.

3.5. The Spiritual Machine is born

He recalled how, his conversation with Dr Chang Shin and how, as he recounted the sad story of his beloved daughter Deirdre, he wept as he explained her tragic but beautiful life. He remembered being touched by Dr Chang Shin's compassionate response, and how joyous he felt when she promised to help Deidre. Despite of Dr Chang Shin's extraordinary achievements in academia and business, she was a reverent Buddhist and Chan practitioner. She has seen people stressed from life, suffering from serious problem of sleeplessness, anxiety or depression that had been cured successfully by Chan practice. However, it was the first time she encountered such an extremely serious case. Dr Chang Shin smiled at Frederick and began, "*Em...I have an idea. Since Deidre only expresses herself in the virtual world, why don't we join her world and interact with her in the way she is used to! Why don't we create a WonderHome avatar to do this for us!*". Dr Chang Shin explained how 'Chan Practice' could play a key role in Deirdre's recovery and then explained how, on hearing about Deirdre's plight, she had asked the Additive Technology AI team to develop a new Software App called '*WonderLife-ChanPractice©*'. She explained to Frederick "*it's aimed at helping Deirdre and other people who feel addicted or over-connected to the virtual world, by using a reprogrammed WonderHome, to rebalance their psyche and lifestyles. In more formal terms, it works by cognitive-behavioural intervention using the methods of Chan practice.*"

3.6. The Spiritual Machine Awakens

The *WonderLife-ChanPractice©,* application was installed and activated. A scene opened up in which Deirdre was in a group of people before what seemed to be Master Sheng Yen. She was still staring around at the other people when the tender and soft voice of Master Sheng Yen said, "*Close your eyes, lean back in your chair, and relax your muscles. Completely relax your eyes. It is very important that your eyelids are relaxed and do not move*". The advanced electronics was able to monitor and track her mental state and realising she had not entirely relaxed; the voice softly continued, "*Release the tension around your eyeballs. Do not apply any force or tension anywhere. Relax your facial muscles, shoulders, and arms*". Deirdre continued to follow the instructions but the "*Spiritual Machine*" sensed she was still not fully relaxed. "*Relax your abdomen and put your hands in your lap. If you feel the weight of your body, it should be at your seat. Do not think of anything. Ignore what other people are doing. If thoughts come, recognize them and pay attention to the inhaling and exhaling of your breath through your nostrils*". It was the first time Deirdre was aware of her breathing and to experience what it was really like. She thought to herself, "*I am breathing! How amazing! I never experienced an inner awareness of that feeling before, yes, I am alive and I am breathing*". The Machine sensed her mental state and continued.

"*Concentrate on your practice, forget about your body, and relax. Do not entertain doubts about whether what you are doing is useful*."

Frederick gazed on as Deidre immersed herself in the spiritual healing process. He reflected on the many fascinating conversations he had had with Dr Chang Shin, how she had explained that some people saw the Spiritual Machine as somewhat of an oxymoron, and puzzled over how problems created by technology could be cured by technology but how she explained it was analogous to a vaccine that typically contains an agent which resembles a disease-causing microorganism. She also explained that whilst it was widely accepted that the ultimate way to undertake Chan practice was with a real master, but for people of Deirdre's disposition, who had significant peoplephobia and large amounts of technophilia, the Spiritual Machine was their salvation. She pointed out that the advantages of conducting Chan practice in the "*Spiritual Machine*" were that the relationship between the master and the follower were effectively one-to-one, with the guidance being regulated by sensors monitoring emotional and mental state very precisely, so optimising the pace of the sessions to move as quickly as the person was able but with rigid safeguards in place (thanks to the physiological sensing) that guarded against the dangers of unguided meditation. Eventually, after some 6 months Deirdre recovered fully and rediscovered the balance in her wonderful life with her beloved family. The story of *Spiritual Machine* did not end with Deirdre; it was produced as stand-alone machines in modern spiritual health centres that helped hundreds of people across the world suffering from OCTD.

3.7. Epilogue - Back to the IE'54 conference

…..Dr Chang Shin continued… "*Thank you for inviting me to address your conference, and thank you for listening.*" …"*Oh, before I go, let me introduce you to our final guest*"… A huge silence descended as the audience looked on in eager anticipation of whom the final guest might be; then out of the shadows of the edge of the stage appeared… Deirdre; a healthy smiling woman! She was met with a huge round of spontaneous applause with people joyous to see her. Her sad story had been reported so extensively that people were visibly shocked to see her in such good physical and mental health. She smiled at the assembled audience and said, "*I know you have a long day ahead, so I won't delay you. However, I am just so thankful to* Dr Chang Shin*, and the Additive Technology team that I felt I have to come here in person to support them, and to tell you that the "Spiritual Machine" really does work, as you can see from me. However, there is one final twist to my story of the "Spiritual Machine". If you recall from* Dr Chang Shin*'s description the Spiritual Machine is built to break the unnatural bonds of love between people and technology! Well, the most extraordinary thing happened to me; it helped me find my perfect "soul mate". Spiritual Machines make 'spiritual signatures' of all users, which matched me to someone that was spiritually (and even physically) perfect for me – I am in love but, no longer with a machine but a wonderful real person. Thus I must thank Dr Wu for her incredible machine that broke my unnatural love for technology and replaced it with a natural love*" – the audience are ecstatic and rose to their feet cheering, whistling and stamping their feet. In the shadows at the side of the stage Dr Chang Shin was quiet, in deep thought; a smile comes across her face as she thought "*the machine that broke technophilia was perfect for peoplephilia - how mad is that*" she thought, "*but then as my favourite saying states -There is always some madness in love. But there is also always some reason in madness.*"!

4. Summary

This science fiction prototype has two complementary threads; a fictional story and current scientific research. In presenting this SFP we took an imaginary voyage into the future where we found themselves in an era where technology had become so exciting, so intoxicating, that people literally fell in love with the experiences it provided. It stimulated their senses and excited their minds, providing a feeling of ecstasy that, today, only illegal chemical drugs can provide! This world, where technology became an intimate part of people's lives, brought both great benefits and huge dangers. In this story we explored the mismatch between the remorseless ability of technology to provide 24/7 synthetic experiences, and people's mental ability to cope with it. In doing this we fantasise that this mismatch has lead to the proliferation of a terrible mental disorder; Obsessive-Compulsive-Technophilia Disorder (OCTD) that rendered people akin to zombies, or the living dead. People's love and obsession for technology in this extreme form had created an overly deep symbiosis with technologies ending up with a type of madness. But how could this be treated? In our story we turned inwards and looked towards the essence of our human condition. We journeyed to an ancient time, before technology, when people believed in a spiritual existence that was in itself the purpose of their life. In this spiritual domain, the mind is all-powerful and purifying one's mind to achieve enlightenment and awakening is the key to changing one's internal destiny. In our story, the unlikely marriage between the future (mind blowing nano-technology) and the past (ancient Buddhism) emerge as allies to save the world. It did this by heeding the words from *Master Sheng Yen* and created a machine, that could open the doors to our spiritual mind using '*entry through practice*' via a gradual training of the mind and leading to the '*four practices*' that bring inner peace and harmony to our lives by '*accepting karmic retribution*', '*adapting to conditions*', '*no seeking*', and '*union with the Dharma*'. We postulated that even though new technology can empower to people, there are dangers that too much dependence on it could undermine human wisdom and people's ability to deal with their relationships and personal affairs in life. Thus, we ask, will humans be able to balance the irresistible forces from technologies? In our story we have likened our Spiritual Machine to a '*technology vaccine*'; using technology to cure technology induced problems (in a similar way that using biological variations of an infecting disease can cure a disease)! However, from the teachings of Chan practice it seems that, in the end, human beings should still count on the spiritual power from within themselves, and that such mediation will always best be conducted by people.

Finally, in the ultimate marriage of technology and spirituality, our machines (robots, avatars etc) may deliver consciousness, emotions and physical looks that are indistinguishable from people. Its conceivable that such future technology could lead to people literally falling in love with humanoid robots (ie technology), in the same way as people from different races fall in love with each other. Of course love feeds our spiritual being, taking us to the heights of bliss when it works, but dragging us down to depths of despair when it fails. As a parting thought we ask, will the day ever come to pass when advanced robots would need to use our Spiritual Machine? If it did then, on the one hand, it would be a huge triumph for our scientific achievement, but, on the other hand, it would pose us with profound questions about our unique place in this existence! In that sense, maybe the methods and ideas arising in Chan Practice (and, indeed, other religions) are the ultimate test for science and AI.

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Meet the Authors

As anyone that has ever watched such films as "*Sliding doors*" or "*The Adjustment Bureau*" will know, it is difficult to say what leads any of us to a particular situation in life! So what led us to writing this SFP together, was it fate, chance or a mix of these? Well, without having met during the early summer of 2010, this story would never have happened. A key element of that was the decision by Hsuan-Yi Wu to come to the UK in the fall of 2009, to complete an MSc in Innovation Management and Entrepreneurship at Manchester Business School. Her thesis was based on the "Social Innovation of Living Labs" and one of her case studies was the "iSpace" at the University of Essex, run by Vic Callaghan. A chance discussion about films such as "*Blade Runner*", "*Cyborg She*" and the "*Thirteenth Floor*" (to name but some) and a collaboration on reviewing Johnson's book "*Science Fiction prototyping: A Framework for Design*" ended up in many hours of fascinating conversations and an instant and enduring friendship – the beginning of this SFP!

So that's how the authors met and became friends, but where did the story form. It was actually the idea of Hsuan-Yi Wu, and draws on a number of inspirations. Firstly, she has long been motivated by, and drawn to, understanding how to balance the material and spiritual life to achieve human and social well-being. Secondly, from her unique research background in technology, business, and innovation studies, she argues that the driving force of modern technology is taking people into a new era where there are hidden risks for long-term mental health. In part, this view is inspired from her own experience of suffering from over-exposure to information technologies, where the pace and volume of social and business activites, enabled by these new technologies can easily overwhelm the senses. This SFP sought to combine Hsuan-Yi Wu's ideas with Vic Callaghan's technology research to write this imaginative and speculative story, '*The Spiritual Machine*', which we hope readers will find enjoyable, thought provoking and bring forth introspection and reflections on their lives.

Hsuan-Yi Wu holds an MSc Innovation Management and Entrepreneurship from Manchester Business School and a BAA in International Business from the National Taiwan University. She is currently employed by Delta Electronics in the Renewable Energy and UPS Business Unit. She is passionate about travel, cooking and friendship. Her ambition is to have the chance to spread the values she holds dearly, to improve people's quality of life. How this will happen, she has yet to discover, but that journey of discovery is part of what motivates and encourages her.

Vic Callaghan is a professor of computer science at the University of Essex, an active researcher in AmI environments and a founder of the ongoing series of International Conference of Intelligent Environments. For Vic, science is a tool that helps to unravel the mysteries of this life, perhaps the greatest being the fact we exist; thus combining with Hsuan-Yi Wu, and her deeply thoughtful ideas on life and spiritualty was the perfect union of interests.