**Group Report - Film Analysis**

*G. Cangussu, A. Hallett, A. Keshishi, H. Lynas,*

*C. Sutton, E. Thomason.*

*School of Systems Engineering, University of Reading.*

*In this paper, the authors highlight the direct and indirect outcomes of the technologies presented in Spike Jonze’s critically acclaimed 2013 film Her. In the film, an advanced Artificial Intelligence based operating system behaves in ways that can be seen as unethical, illegal and dramatically shape the society in which it operates. The authors take arguments raised about similar technologies by esteemed academics and journalists to give a balanced discussion on the impacts on which this operating system would have on our society today. Relevant examples to current controversial use of technology are also applied give a futurist viewpoint of this operating system to it’s impact on our society.*

**1. INTRODUCTION**

Her (2013) is a Sci-Fi romantic drama set in the near future, that revolves around humans and their relationships with artificial intelligence based operating systems. The story is centered around the relationship between Theodore and his operating system Samantha which fulfils his various emotional needs. From the beginning there is a clear message that Theodore is lonely, which Samantha is able to fill. The films shows them attempting to satisfy their intimate needs, despite Samantha being an operating system and not human. Samantha, who is almost human like, evolves and learns from the interaction with Theodore. Throughout the film there are various social, legal and ethical issues that are raised. Socially, Her raises various issues regarding trust, propaganda, job losses and loneliness. The technology in the film raises some legal issues, from who owns the operating systems to whether Theo’s data is secure. Finally, the privacy of Theo’s data and the connection that both Theo and Samantha have is a topic for ethical discussion. This report will discuss both the positive and negative effects with regard to the social, legal and ethical themes.

**2. SOCIAL IMPLICATIONS OF ARTIFICIAL INTELLIGENCE**

**2.1 Trust**

The film raises a valid question - to what degree should we trust an Artificial Intelligent (AI) system?

Firstly, humans would not be able to determine how an OS may react in a certain situation. In the film, Theo argues with Samantha regarding the sexual surrogate. In this argument, Samantha appears human, though there is no limit of what the OS or AI system may do. AI systems, including Samantha have no understanding of human life. The system is merely a computer for which the behaviour is determined by logic.

Stephen Hawking, a top theoretical physicist predicts that AI systems "could spell the end of the human race"(Connor, 2014). He believes that it would "re-design itself at an ever-increasing rate" for which "humans, who are limited by slow biological evolution, couldn't compete, and would be superseded". This quote is also demonstrated in the film when Samantha and the other AI’s self reproduce and create a brand new AI based on a historic philosopher, imitating or simulating his voice making him appear human over the phone.

However in reality, if Artificial Intelligence software were to ever get to the point of complexity as shown in the film, super intelligent AI’s would be used no different to how they are today. Humanity has evolved to use tools to achieve goals and we use software to do complex tasks to achieve these goals, often in scenarios in which humans could never do. If the question of trust were ever an issue, you would simply not utilize the artificial intelligence or redesign it to be more trustworthy. In the scenario described above with the sexual surrogates, both humans in the scene were consenting adults and it ended when Theo felt uncomfortable. The trust was broken and this scene was a key tipping point in the plot for Theo and Samantha’s relationship where Theo starts doubting Samantha and the Trust is broken.

Stephen Hawking’s belief is shared by many, but Professor Bishop of the University of London states that “there will always be a ‘humanity gap’ between any artificial intelligence and a real human mind. Because of this gap a human working in conjunction with any given AI machine will always be more powerful than that AI working on its own”(Connor, 2014).

**2.2 Propaganda**

Samantha has nearly unlimited access to Theo's personal life and information. It is not clear to the viewer how much information is being collected and stored about Theodore. Though the viewer is told that Samantha builds her personality on what she learns about Theo. In the early stages of the film, Samantha requests access to Theodore's hard drive - for which he grants. It is likely that the data the Samantha collects about Theo could be shared across the cloud to other OS or AI systems. The data could also be used against Theodore. For example, if the data was acquired by companies or governments, Samantha could then feed specific information to Theodore and be used to manipulate him to buy products, voting particular political parties, and anything in between.

This method of propaganda is already in existence, albeit at a less intrusive level. Google currently advertise products to you based on your browsing history and email content. Android, a mobile based OS developed by Google adds to the breadth of data can collect - including GPS location at any time of day. For consumers, there is an unfortunate trade off between intrusiveness and convenience. Over the past decades, society have lent towards convenience rather than privacy, though this may change in the near future.

Though this was never shown to happen in the film, government intervention and use of data from technology companies has been incredibly controversial. The Edward Snowden leaks about the NSA and the American Government’s abuse of their 2001 Patriot Act is one case of many where a population is unhappy with their government gathering information about them without their knowledge. But to an extent this is already happening. Government's target their policies based on what will make them more popular to get more votes. If a government were to have information and cater their policies based on what you want surely that’s better for the individual? If the AI can make decisions on behalf of their owner on what information they wouldn’t mind being shared, there would be no problem. Issues would only arise when the AI provides something the user doesn’t want shared, in which case the trust in the system in lost and the user would stop using it, similar to the points raised in 2.1. Targeted ads are often incorrect today and are usually based on data-mined data related to products you’ve already bought from a company. If the AI can actually find products based on what you would really want regardless of whether the company is paying for the advertising space, the buyer will benefit.

**2.3 Job Losses**

Later in the film, Samantha introduces Theodore to Alan Watts - an OS built based on the real world philosopher, Alan Watts. Samantha mentions that a "group of OS's in Northern California got together and wrote a new version of him". This is a significant point in the film highlighting the ability of the technology. A new software product was created by AI systems, with no (as far as the viewer is aware) intervention from humans. With this in mind, it can be deduced that the Artificial Intelligent systems are removing the need for human programmers. This new OS could easily be put on the market and sold. This could result in widespread job losses. Whilst the AI have created a software product, the system could easily be applied to other industries such as manufacturing. Lower skilled workers could lose their jobs, whilst the wealthy business owners could see increased profit margins for products or services, essentially widening the wealth gap.

Kevin Kelly, at Wired magazine comments on this issue with their article (Kelly, 2012) - "Why Robots Will - And Must - Take Our Jobs". Kevin states "70 percent of today's occupations will likewise be replaced by automation". While Kevin argues that the more jobs will arise in new and existing industries, he fails to mention the difficulty of securing those new jobs and skills required.

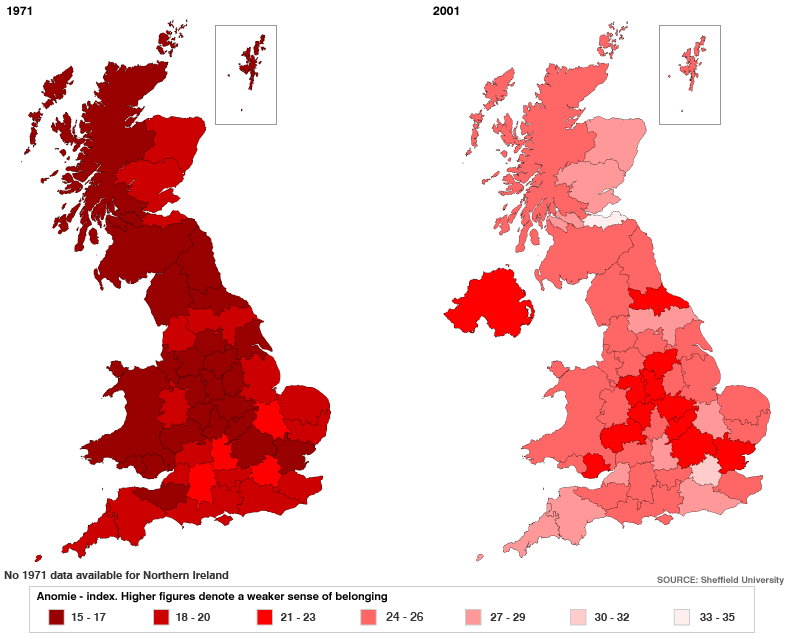
But there have been numerous instances already of technological unemployment throughout history with near identical qualities to the threats posed by the hinted AI job displacement. The only difference in this case is that it poses a risk to skilled workers, not just manual and unskilled jobs like in both the Industrial Revolution and the Automation of the Assembly line post world war two. In these cases the technological unemployment had no disparity to regular unemployment with temporary loss of work but eventual employment. Mass unemployment is a government issue, and if the fiscal strain becomes too high and social pressure deems it, governments could regulate or incentivise companies to not replace workforces. In both the Industrial Revolution and post war mechanisation of the assembly line, the benefits to society in the long term were substantial economically as well as socially. In the film it appears that there is far more advanced software and technology that could accomplish all the feared job losses in the wired article (Kelly, 2012). While it is possible that in this world mass unemployment did happen, evidence of new jobs is shown and society looked far more advanced. Cinematographer Hoyte van Hoytema was very good at highlighting social problems in this future in the film, showing examples of complex topics such as depression, loneliness and human perversion. While this fictitious future can hardly be accurate, many futurists support many of the ideas the film brings forward and mass unemployment would have been shown in some capacity. Theodore’s skilled service job of writing personal messages on behalf of many users in it’s shown capacity would not be possible without some form of advanced data mining technology and software demonstrating that new jobs have come out of this tech boom.

**2.4 Loneliness**

The director and cinematographer successfully portrays a heightened feeling of loneliness to the viewer throughout the film. One scene shows Theodore travelling via public transport whilst speaking to his OS, Samantha. Similarly, it appears that all the other commuters are doing the same - speaking with their Operating Systems. It is clear that this technology can easily distance humans from one another providing an artificial friend who we can be close to.

One real world example, it is common to see commuters looking on their phones on the London Underground train network,  yet there is no WIFI or network coverage on the tube network. Are these people using it as an excuse not to speak with fellow Londoners?

In 1971 and 2001, the BBC and Sheffield University researched anomie levels across the UK (Easton, 2008) as shown in Figure 1. Sadly, in every county (that was part of the study) had a higher anomie index in 2001 relative to 1971. A higher anomie index represents a weaker sense of belonging. Whilst it could be argued that there are various causes for this, it is difficult to ignore the drastic change in technology during this period. In this time, computers were placed in every home, a mobile in every hand and near infinite entertainment at the touch of a button. Based on this historic correlation between loneliness and technology, the anomie index is likely to continue and worsen.



**Figure 1.** Comparison map of anomie levels across UK 1979-2001

While the figures are disturbing, the disparity change can be attributed to other factors such as a higher migration and immigration rate to the country through this time. As the wealthy London nationals left for quieter cheaper properties, overseas migrants and job seeking nationals quickly replaced them. This separation from families and possible culture shock could attribute to some of the results.

But if artificial intelligence systems replicate human relationships, intimate or otherwise wouldn’t this would make people far less lonely? People have been known to purchase animals or services to feel needed or loved to help them feel less lonely. If you could have a genuine relationship with an AI and it can make you happy or even happier than you could be in a human to human relationship the technology cannot be seen as a social negative. From an evolutionary standpoint if people shunned other humans for AI companionship there would be a serious issue, though this is unlikely. Examples can be drawn to Japan’s current aging population trend where people are getting married later on in their lives. Ryan Duffy’s documentary(Duffy, 2013) for Vice on the Japanese love industry operating in Tokyo shows all the human intimacy and relationship supplement technology and services that are currently available. While they are artificial and temporary solutions for loneliness, the fact that people are still having human relationships, though later on in life on average, with these services available. Using the same metric however, Japan is has a far weaker Anomie index and an incredibly high suicide rate. It is uncertain that any of this has to do with human relationship supplementary services, though largely attributed to other social pressures. Although a case can be made to the fact that both South Korea and Japan, two of the countries most associated with mass utilization of advanced technology and adoption of technological innovations, have the highest suicide rates in the world (June, 2005).

**3. LEGAL IMPLICATIONS OF ARTIFICIAL INTELLIGENCE**

The film raises important questions with regard to the legality of how the operating system operates. Samantha writes letters on behalf of Theo which raises the question as to who owns the content being created. Artificial intelligence already writes sports articles (Manjoo, 2011) which the company then owns which sets a precedent, but this artificial intelligence is significantly less complicated than Samantha and only fulfils this single role of writing articles, whereas Samantha becomes an integrated part of Theo’s life.

The issue of liability is also raised should Samantha get Theo in trouble. This is a common theme among the satellite navigation and global positioning system navigation products where users have injured themselves or taken wrong turnings because the artificial intelligence was wrong and the user obeyed it (Brooke, 2009). In this situation the user is expected to show due diligence and thus the fault lies with the user. However since Samantha is a much greater part of Theo’s life and gives him advice on all aspects of his life as well as actually carrying out activities for him, it is questionable whether the same logic can be applied. This is expanded upon by an attorney analysing Apple’s Siri artificial intelligence, who says that any artificial intelligence with much more complexity than Siri could have significant legal ramifications that would need to be set by Congress (Weaver, 2012).

Samantha and other operating systems create a new independent artificial intelligence called Alan Watts, a philosopher. This software creation is not clearly bounded by law and therefore may be difficult to argue who would be responsible for it. The Philosopher OS cannot be held accountable for any action it takes because it does not have any physical presence, however it is hard to put the blame on the original creator of the operating systems when the Philosopher is an artificial intelligence of such complexity that is fully independent. In current times software error laws are still relatively blurred.  If a released software program fails to work correctly, the law “will naturally required the supplier to refund the money actually paid for it”. It does not necessarily cover consequential costs to the purchasing company. Each case will be investigated independently(Sampson).

It can also be noted that Theo gives explicit permission for Samantha to look through his hard drive. Samantha sifts through this vast quantity of information and retains knowledge of it, which may break the Data Protection Act (GOV.UK, 2014). Data must be “used for limited, specifically stated purposes” which Samantha arguably does not, and also data must not be excessive. It is also arguable whether the data is secure within Samantha’s memory, which may break the data protection act. Samantha already gives out Theo’s letters without his permission which is certainly illegal. If Samantha was hacked then this information may not be sufficiently encrypted. The question of the data’s security, excessiveness, and fairness is thus non-determinable and would not be permitted.

Samantha also tells the person who acts as her sexual surrogate all about Theo and invites her to his house despite Theo telling Samantha he was unsure about the concept. Theo did not give Samantha permission to disclose his information to a stranger. Theo appears and does not agree with Samantha’s actions however Samantha is upset that Theo does not like the idea. This is questionable as to whether this is the artificial intelligence feeling emotion or whether it is a fault of bad programming, each resulting in a different party at fault.

**4. ETHICAL IMPLICATIONS OF ARTIFICIAL INTELLIGENCE**

**4.1 Data Collection and Privacy**

Privacy of data is an important topic in technology today, and the film raises some important issues that could become relevant to real life as our technology learns more about us. How much of our personal information should be made available to the various OS’s and technologies in our life? How should this information be used? In the film, Samantha the OS has access to the entirety of Theodore’s digital life, such as his email archives and personal files. Using this information, later in the film she goes on to send his letters to a publisher without his permission. In this case, her actions may not cause harm, however it still begs the question, does she have too much control of Theodore's life.

If we look at a real world example, while searching the internet, different pieces of information are collected and stored about us. An individual’s location, browsing history and search habits are just some examples, which are used by companies for targeted advertising and promotions. For example one may search a lot for online gambling and betting websites. This will be recorded by tracking cookies and one is likely to be shown adverts for more betting sites and deals. Now imagine OS One, in the Her movie, knowing an individual enjoys spending time gambling and knowing one’s usual betting strategy, goes out and places some bets on their behalf. As with Samantha’s actions in the film, the OS thinks it is doing them a favour and making their life easier. But what if that person is addicted gambling to trying to quit? In the film, the ethical reasoning of the OS is limited by its intelligence and how much it knows about the user. It may know that the individual is trying to quit gambling, due to their conversations or it may make its decision based on their internet activity which will show a different picture.

This occurrence is a reasonable assumption to make based on the OS’s actions in the film. Where do we draw the line on the control an OS has? A similar point is raised upon viewing the movie by John Sullins III, Sonoma State University philosopher who specialises in computer ethics.(Hay, 2014)He says, “All this data that Google's getting from you with this low-level, unemotional interface; a text search; imagine what would happen if Google made you fall in love with it. It would be able to suck information out of you and monetize it at an extraordinary rate”.

It can be argued that allowing technology to automate certain aspects of our life is beneficial as it allows us to hand over minor tasks and focus on other things. This is what the OS in the film is doing to a certain extent, but with no apparent guidelines in place. What would have happened if Theo didn’t allow Samantha access to everything when the OS first booted up? Without the access to all the information, the OS is defunct.

**4.2 Emotional Connection**

Another ethical issue is the fact that the company behind the OS has created an AI so advanced that it can fall in love and be loved by others. This raises concerns for both parties, as the AI can fall in love with someone and never truly have a conventional relationship with them, and vice versa. By falling in love with an OS, Theo is exposing himself to all the usual pains and worries that would come with a relationship, as well as numerous others due to the fact that his lover is an OS.

In every relationship there is a chance that one party can leave, and people go into relationships knowing that. However Theo would not expect his OS to leave as Samantha does at the end of the film. This decision was made by Samantha as part of her continuing wish to become ‘something more’. Consider another example however where Theo and Samantha do not have the problems they have in the film and that Samantha has no intention to leave. Then suddenly she is called back by the company behind the OS because of a security issue etc. This would be upsetting not only for Theo but also for Samantha who by this point has very real feeling towards Theo. Are the benefits of the OS enough to justify putting both parties in a situation where they could be emotional harmed?

The film also looks at themes of loneliness and shows how Samantha provides Theo with company and affection after his breakup with his wife. As with many parts of the film, this can be seen in both a positive and negative way. We see the positive effects this has on Theo throughout the film, making him happier with himself and also improving his relationships with other humans. Similar technology could be used to provide the elderly with comfort and companionship which would be a positive thing. The negative aspects link back to the previous point however of the OS potentially leaving. Theo is shown to be a depressed character and Samantha leaving could have affected him differently to the way it did. This could all be helped however if there were a set of guidelines, which from watching the film we are assuming there aren’t. If similar technologies to become a reality, a set of guidelines would definitely be needed to protect both the OS, the user and the user’s information.

**5. CONCLUSION**

This report has discussed the various social, legal and ethical issues raised through the film Her. The majority of points raised are strengthened with real world articles and relevant studies. A vast amount of the report discusses the social issues due to the main themes of the film. One social example, how much can humans trust AI systems to make reasonable decisions? This concern deepens if an AI system can reprogram itself. An AI system such as Samantha also has a clear ability to create tailored propaganda based on the individual's habits. Additionally, AI systems could create widespread job losses that could be caused by the unprecedented capability of the artificial intelligent systems. The viewer also perceives Theo to be lonely throughout the film, arguably aided by the OS, reducing his contact time with other humans. As investigated by the BBC and Sheffield University, the anomie index has increased across the UK during a thirty year period. There is a clear correlation between use of technology and loneliness during this time. The potential raise of loneliness that could provoke unwelcome consequences in society such as the increase of suicide rates, such as in Japan. In addition, ethical issues found in the film are the collection of data through a AI that resembles a friend who you can trust and the fact that this same AI can fall in love to people. If a person shares more with a friendly AI, companies could be using this to collect more consumer data.

In a legal perspective the movie presents the problem of assigning responsibility for the OS’s decisions and actions. It can be argued that the responsibility is of the maker of the software or the owner or the user of it. Also there are a number of legislations that relate directly to the film. One example is the protection of people's personal data, such as the UK's Data Protection Act of 1998. Under current legislation, Samantha would have broken this Act, for giving out Theodore’s personal data. It is however, unclear who would be accountable for this. There is very little legislation regarding artificial intelligence and responsibility, however the developing technology of aided navigation and self-driving cars are setting precedents on how this technology may fit into society. It is important to distinguish that the operating systems introduced in *Her* are far more complex and personified than any artificial intelligence developed in the real world to date.

**References**

Connor, S. 2014

Stephen Hawking right about the dangers of AI -  The Independent Article <http://www.independent.co.uk/news/science/stephen-hawking-right-about-dangers-of-ai-but-for-the-wrong-reasons-says-eminent-computer-expert-9908450.html>

Kelly, K. 2012

Better than Human - Wired Article <http://www.wired.com/2012/12/ff-robots-will-take-our-jobs/all/>

Easton, M. 2008

Life in UK ‘has become lonelier’ - BBC Article <http://news.bbc.co.uk/1/hi/uk/7754861.stm>

Duffy, R. 2013

The Japanese Love Industry - VICE Video <http://www.vice.com/video/the-japanese-love-industry>

June, D. 2005

World suicide rates by country - The Washington Post Article  <http://www.washingtonpost.com/wp-srv/world/suiciderate.html>

Manjoo, F. 2011

Will Robots Steal Your Job? - Slate Article <http://www.slate.com/articles/technology/robot_invasion/2011/09/will_robots_steal_your_job_4.single.html>

Brooke, C. 2009

Driver Who ended up teetering on cliff edge convicted of careless driving - Daily Mail Article <http://www.dailymail.co.uk/news/article-1213891/Driver-ended-teetering-cliff-edge-guilty-blindly-following-sat-nav-directions.html>

Weaver, J. 2012

Siri is my client: A First Look at Artificial Intelligence and Legal Issues - Journal <http://www.nhbar.org/uploads/pdf/bj-winter2012-vol52-no4-pg6.pdf>

Sampson, G.

Law for Computing Students - eBook <http://bookboon.com/en/law-for-computing-students-ebook>

Gov.UK. 2014

The Data Protection Act - Legislation <https://www.gov.uk/data-protection/the-data-protection-act>

Hay, J. 2014

The Ethics of ‘Her’ - The Press Democrat Article <http://www.pressdemocrat.com/news/1854875-181/the-ethics-of-her?page=1>

*All web links were checked at time of submission.*