

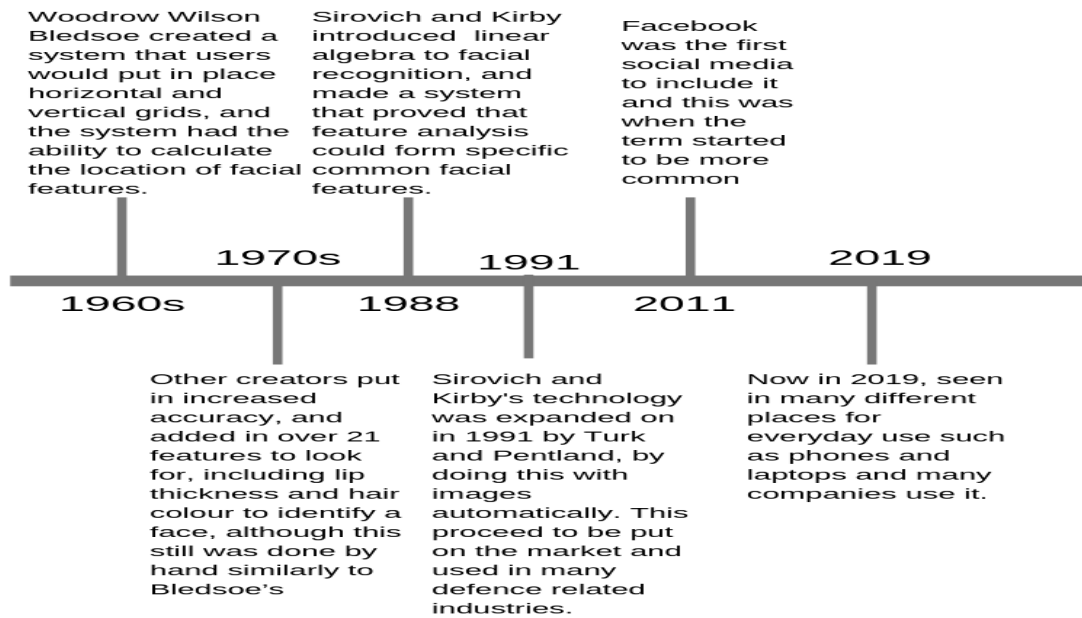
## **IST Case Study**

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### *Introduction*

AI technology is the artificial simulation of human intelligence. The first appearance of the making of facial recognition was in the 1960s, by Woodrow Wilson Bledsoe. He created a system that users would put in place horizontal and vertical grids, and the system had the ability to calculate the location of facial features. In the 1970s, other creators added increased accuracy, including an additional 21 features such as lip thickness and hair colour to identify a face, although this still was done by hand similarly to Bledsoe's. In 1988, Sirovich and Kirby introduced linear algebra to facial recognition, and developed a system that proved that feature analysis could form specific common facial features. This was then expanded into automatic facial recognition in 1991 by Turk and Pentland, though it was constrained by factors relating to the technological context. The Feret Program finally put it on the market, allowing it to be used in many defense related locations, such as at the SuperBowl in 2002 and the Panama's Toucan airport in 2011.

In 2010, Facebook introduced facial recognition into their photos, in which was controversial at first due to the privacy implications. Facebook continues to use this functionality however. Now in 2019, it is implemented in many of the phones and laptops being released, and many companies benefit off it and is being used increasingly.



### *Focus Case*

Facial Biometrics for passport identification is increasingly used in global airports. This technology has numerous names depending on the airport. Examples include 'Smart Gates' and for the UK, 'EPassport Gates' (which is what it will be further referred as), It uses facial recognition AI technology to match the face to the given passport picture, it does this by taking a photo of the user, and then compares it through the chip inside the passport, and using facial biometrics gives a result as to whether or not the person matches the photo. It provides an easier and faster alternative to what can be long immigration queuing for a human to do the job. It greatly improves the experience of those travelling internationally, allowing for significantly shorter check-in and boarding times. It is estimated that what would 4 minutes in customs with this technology has been lowered to approximately 25 seconds. Additionally, most models have a small surface area, to provide space-saving benefits for airports. This technology also hopes to eliminate the ability for people to use genuine passports which aren't their own to illegally enter a country. The creators wanted to achieve this by aiming to create a system that has further precision than the human eye.



Image 1

### *Analysis*

EPassport Gates provide a variety of benefits for many different parties, however that isn't to say that there aren't issues and concerns regarding use of facial recognition using technology.

There are many positive impacts that take place for travellers. One of these is faster passport processing times, as the often careful checks done by humans is very time-consuming and usually results in there being long waiting times in lines. Instead, with these automated gates they take a very short amount of time to do their checks, saving not only the travellers time, but also saves time for the people that do the passport checks manually. Additionally, EPassport Gates allow for enhanced border security resultant of their comprehensive biometric scan, and therefore allow for a safer environment as this AI makes it easier to assess risks. This also makes it harder for people to use a false identity to cross borders, due to the detail the technology goes into, reducing the likelihood of fraud being successful. To continue, from an airport standpoint, many models of this technology allows for the saving of space as the technology takes up less room than the room needed for the manual inspection. This reduces the need for airlines to expand the building, or build new ones.

Alongside the many benefits, there are also issues that arise with this AI. Firstly, EPassport Gates don't include everyone. They don't work on children under the age of 12, and hasn't worked as well on some ethnicities. This has brought up questions regarding if some of the population should have the ability to use it, but others not. Not to mention, it is never 100% accurate, there have been many reports of people trying this machine, and it saying their passport doesn't match their face, forcing them to have to get someone to check for them. This is very impractical, and the repetitiveness of this causes disliking towards the gates. Another issue with the EPassport Gates include that they are very expensive to implement, although it is to be considered that the overall cost of this technology will be less that paying

workers to do the job. One of the largest concerns however, is the lack of precautions in place to protect these systems against third parties. There is doubt arising that this technology at the moment does not have the protection implemented to restrict the chance of it being hacked. This would cause many implications, as passports are unique to each person and the data that they contain if accessed by those who aren't authorised, could be used inappropriately and threatens the safety of the holder, therefore being an issue not just for the airport but also the users.



Image 2

### *Conclusion/Justification - Iron Man*

Passport Identification, using facial biometrics, is an emerging AI that should definitely be used and further developed in the near-future. This technology would significantly impact the Marvel World, in which Iron Man lives in. This is because the number of criminals that roam the cities makes it increasingly difficult for the Avengers to efficiently watch over all the issues that take place and take care of these accordingly. There is the possibility that these criminals could travel away with a false passport, and cross countries to get away from those who are trying to catch them. However, the EPassport Gates will allow for the Avengers and the police to have an increasingly accurate representation of the travelling patterns of criminals, and will therefore reduce the offender's chances of entering and leaving countries which they aren't authorised to be in. Iron Man, accompanied by the rest of the Avengers, will also have the ability to catch these criminals on the spot due to the fast and accurate response of the technology identifying fraud, and therefore, can take immediate action to keep people in the community safe, whether this be inside the airport, or other neighbouring countries.

This technology could be implemented into Iron Man's towers, in order to reduce the amount of attacks that they receive internally. It will improve the of security inside them, as he will easily be able to track who enters and exits the premises. This concept could be applied to

various different places in the Marvel Universe that required strict security, using not a passport photo but other types of unique protected photo identities. It could be implemented in locations like The Cube for further protection, or in the Avengers Mansion.

On the other hand, from an efficiency point of view, it allows for the general public to travel with further ease. This point may not apply to Iron Man resultantly of his ability to fly, however, it does align with his belief that the Marvel Universe will greatly benefit society with easier, faster transportation systems, as it can have an impact on the safety of the travelers and airport staff.

### *Reflections*

### *Research Process*

I found that an aspect of my research project that I found to be of good use to me throughout this task is the search strategies I used to narrow down the results I received on Google. My chosen technology had lots of information on it, however an issue I found was that different websites would look at the same topic I was, however it was slightly different because they looked at one specific to a country, and was looking too much at potential things it could do, not what it can currently do. I found that the quotation marks (“”) to allow me to find words in a specific order allowed me to tailor my searches towards the area of EPassport Gates. Another search strategy I used was to find similar websites to the AI based ones I found, I did this by writing *related:website.com* and from there I was able to find many websites with content relevant to my topic.

### *Project Management Process*

I believe that my project management during this task wasn't as effective as perhaps it could have been. In the beginning, I was on task for the suggested time frames shown in the AI Milestones page, however as I progressed through the group presentation for AI World, I found that I started to slip back slightly on the individual factors and this had an impact on how my weeks were structured. In hindsight, this meant that I was rushing to finalise some editing, even though other elements were on track, such as the group work I did and Part A of my case study. If I was to do this again however, I would follow the suggested time plots and organise what parts to have done when personally and also organise it around my timetable and prepare for setbacks. Additionally, I would also update my AI Milestones as I didn't update them frequently enough.

## **Bibliography**

5 Applications of Facial Recognition Technology - Disruption Hub. (2017). Disruption Hub. Retrieved 13 February 2019, from <https://disruptionhub.com/5-applications-facial-recognition-technology/>

Bandakkanavar, R. (2017). Applications of Speech Recognition and Examples - Krazytech. Krazytech. Retrieved 12 February 2019, from <https://krazytech.com/technical-papers/speech-recognition>

Geer, D. (2017). 5 impacts of speech recognition system in various fields. The Next Web. Retrieved 12 February 2019, from <https://thenextweb.com/contributors/2017/09/05/5-impacts-speech-recognition-system-various-fields/>

History of Face Recognition - Facial recognition software. (2017). FaceFirst Face Recognition Software. Retrieved 26 February 2019, from <https://www.facefirst.com/blog/brief-history-of-face-recognition-software/>

Instead of the boarding pass, bring your smile to the airport. (2018). CNN Travel. Retrieved 13 February 2019, from <https://edition.cnn.com/travel/article/cbp-facial-recognition/index.html>

Is Facial Scanning the Future of Passports? | Passport Health. (2019). Passporthealthusa.com. Retrieved 9 March 2019, from <https://www.passporthealthusa.com/passports-and-visas/blog/2018-3-could-facial-scanning-be-the-future-of-passports/>

Marriott breach: Here's the risk of a compromised passport number. (2018). CNBC. Retrieved 9 March 2019, from <https://www.cnbc.com/2018/11/30/passports-compromised-in-the-marriott-breach-could-lead-to-fraud.html>

Nearly three quarters of airlines and airports investing in biometrics. (2018). Biometric Update. (Image 1) Retrieved 15 March 2019, from <https://www.biometricupdate.com/201809/nearly-three-quarters-of-airlines-and-airports-investing-in-biometrics>

New facial recognition technology caught 'imposter' using someone else's passport, US officials say. (2018). The Independent. Retrieved 8 March 2019, from <https://www.independent.co.uk/news/world/americas/facial-recognition-technology-man-intercepted-passport-airport-us-customs-border-protection-a8507186.html>

Not Just China Anymore: "Facial Biometrics" Scan Used To Catch Imposter At D.C. Airport. (2019). Zero Hedge. (Image 2) Retrieved 20 March 2019, from

<https://www.zerohedge.com/news/2018-08-25/facial-biometrics-scan-used-catch-imposter-dc-airport-unprecedented-case>

The Many Faces Of Today's Facial Recognition Technology. (2019). Securityinformed.com. Retrieved 16 March 2019, from <https://www.securityinformed.com/insights/faces-today-facial-recognition-technology-co-7121-ga.1546968388.html>

Using ePassport gates at airport border control | nidirect. (2015). nidirect. Retrieved 9 March 2019, from <https://www.nidirect.gov.uk/articles/using-epassport-gates-airport-border-control>