

Artificial Intelligence as a Tool of Public Diplomacy:

# Communication between the United States and Iran

By Robyn Williams and Lisa Otto | Peer Reviewed

## Abstract

Iran and the United States (U.S.) have had a volatile relationship for decades, with continuous threats of violence, sanctions, and internet blocks. In the last decade, we have seen a third force at play as technology becomes an integral aspect of diplomatic relations. The last three U.S. administrations have displayed mixed attempts at salvaging diplomatic relations with Iran. This article explores how artificial intelligence driven communication can be a critical tool in improving the relationship between the two states. Utilising a desktop research approach, exploring primary and secondary

literature, this article explores possible artificial intelligence solutions to improve the communicational aspect in the public diplomacy between Iran and the U.S. It is evident that artificial intelligence has had negative implications on the public diplomacy between the two states as we witness the increasing use of deep-fakes and website blocks. However, processes such as natural language understanding allows governments to have more targeted foreign policy objectives and language translation creates a direct and enhanced line of communication between the state and foreign audience.

## Introduction

Public diplomacy (PD), understood as communication made by governments and other diplomatic entities towards a general audience (Pigman, 2010), has become increasingly popular over the last five decades as governments attempt to influence foreign audiences, particularly through the mode of communication. Making a sudden emergence in 1965, public diplomacy has encountered numerous shifts, often influenced by technological developments, such as the establishment of the Internet, radio and the introduction of social media platforms. Now, it stands on the brink of yet another reawakening as artificial intelligence (AI) threatens to penetrate every sphere of life, presenting itself as an indefinite by-product of the Fourth Industrial Revolution (4IR). Not in itself new, AI can yield both positive and negative outcomes, many of which are yet to become clear, and this is likely to also be the case in the world of diplomacy.

This paper aims to explore how AI may impact public diplomacy and offer opportunities to improve communication in public diplomacy. Given that the U.S. has presented itself as a frontrunner of its use since the dawn of public diplomacy, it is a useful case study, notably also because it has a track record of employing new technologies in its diplomatic endeavours. Specifically, this article draws on the bilateral relationship between the U.S. and Iran, where such technologies have been used.

Using the method of comparative analysis and exploring qualitative literature such as official policy documents, journal articles, conference proceedings and newspaper articles, it may be established whether AI has already improved communication in public diplomacy and, if not, how it may do so in the future. Public diplomacy is discussed in reference to the two states, examining the relationship between them to answer questions around the role of AI as a public diplomacy tool. The limitations to the study are the fact that at the time, there is very little implementation of AI into communication processes for public diplomacy, in addition to the increasing hostility between the two states that sees their relations grow even further apart. In addition, most of the article focuses on

Trump's administration as it coincides with the emergence of 4IR, and having served a full term, it is possibly to wholly focus and critique his use of PD.

This article draws on the concept of political communication, which Dahlgren (2004: 7) explains is 'a vast, sprawling social field of almost infinite variety, crisscrossed by the media and encompassing many different forms of associations and networks, actors, communicative contexts and styles, cultural frameworks, and power relationships.' The goal of the actor that produces the content is to influence, inform or persuade citizens. Debray (2007: 3) indicates that political communication encompasses 'tools of transmission', now extending far beyond traditional media to include social media and other such emerging tools. Finlayson (2019: 78) explores the continuous development of digital technologies altering the nature and idea of both political communication and political culture. This has resulted in the way people receive, interpret, and respond to information, ultimately intensifying 'culture war(s)' (Rensmann, 2017: 127).

Unfortunately, three major issues arise in the digital public sphere when it comes to political communication: 1) resource-rich individuals, or states, often have significant power and undue influence on the public sphere or foreign audiences; 2) fake news [1] that misleads public perception; and 3) the unregulated aspect of online platforms that inadvertently allow for harassment and abuse (Finlayson, 2019: 79).

Solgado (2019: 671) explains the dire imperative of avoiding generalisations in reference to studies of political communication and carefully selecting variables for comparative case studies. Therefore, the U.S. was selected as it is a developed Western country whilst Iran, a developing state, represents the Middle East and North African (MENA) region. Both states have been particularly welcoming to adopting new technologies in various spheres of society. Rubin (2019) states that although Iran has evenly partaken in the arms race within the MENA region, Iran has been the most progressive by integrating new technologies into society. In 2019, then-U.S. President Donald Trump announced that

the U.S. was a frontrunner of AI implementation and would aim to continue pursuing that status, ensuring economic and military security (White House, 2019). Another element that makes the case interesting to explore is that U.S.-Iran relations have been both tense and terse since 1979, when roughly 400 Americans were held hostage for 444 days at the U.S. embassy in Iran's capital, Tehran (Kinzer, 2008). Since then, the bilateral relationship between the states has ebbed and flowed, resulting in the dynamic use of public diplomacy from both sides.

### *Understanding Public Diplomacy*

Berridge (2015: 198) describes PD as 'white propaganda', where a government attempts to indirectly influence foreign audiences and governments. Newspapers and photographs, in addition to radio and television broadcasting, are all historical tools of public diplomacy. However, more recently, the internet and social media applications such as Facebook and Twitter have become the typical tools of exerting public diplomacy on foreign audiences.

Pigman (2010) explains that the term public diplomacy was conceptualised by Edmund Gullion in 1965, who noted the increasing importance of public opinion to a government, not only domestically but also that of audiences abroad. Gullion further understood that the role of the media would come to mean more in diplomacy, and the relationship between journalists and diplomats would become more significant over time.

As stated by Bjola and Kornprobst (2018), the ultimate goal of public diplomacy is to influence a state's foreign policy and/or domestic politics and policies. Diplomacy is a tool used by states to execute its foreign policy (Williams, 2021). According to Zhang (2006), social influence is an integral aspect of public diplomacy, highlighting that it plays a critical role in government portraying a particular image. It requires a government in having some extent of power that is required to influence engaging citizens of a foreign state.

Pigman (2010) outlines the key factors for successful public diplomacy to occur, beginning with trust.

Foreign governments deemed deceiving will be able to successfully and adequately engage in public diplomacy with a foreign audience, presently or in the future. Furthermore, he points out the importance of cultural diplomacy for effective public diplomacy. This may occur through sporting, educational and cultural exchange. Lastly, Pigman (2010) highlights the media, participation and hosting of events as integral aspects of public diplomacy. Leguey-Feilleux (2009) explores the rising forms of diplomacy that may be utilised by embassies, emphasising public diplomacy as one such mode, with the responsibility of extending the culture of its home state.

### *Understanding Artificial Intelligence*

AI, sometimes also referred to as robotic technology, can process and analyse large amounts of information and data sets. Using robotics, it can imitate human behaviour and thought processes, aid actors in problem-solving scenarios and decision-making processes, and provide more accurate information at a far greater speed than the human brain is able to (Shabbir and Anwer, 2015). This can take place on a spectrum where on one end there is human assistance in task performance, and on the other where task performance is entirely automated.

Pagliarini and Lund (2017: 271) state that the implementation of robotics, through AI, is already demonstrated in several fields. In healthcare, for example, robotics is already playing a major role in the safe delivery of medical supplies and assisting the medical practitioner in unique cases. A further well-documented and heavily debated area of its use is in the military sector, which has steadily increased in recent years using drones, spyware, autonomous vehicles, and so on.

Whilst AI technologies are mostly praised for their expansive capabilities, Wisskerchen, Biacabe, Bormann, Muntz, Niehaus, Soler and von Brauhitsh (et al., 2017: 8) differentiate between 'weak' and 'strong' AI, by explaining that strong AI can learn from its experiences. It acts and thinks like a human and may formulate a reaction according to a specific scenario and is the variant of AI that has inspired much science fiction. On the other hand, weak AI can

merely perform as it has been programmed to do. Questions over which form of AI states should choose to integrate have also been rife due to the widespread implications for decision-making, legality based on where that decision-making lies (i.e., with humans or computers), job losses, and a plethora of other concerns.

### **The use of technologies in public diplomacy: the case of the contemporary US-Iran bilateral relationship**

*Looking back: reviewing the bilateral relationship*

Public diplomacy is not at all unfamiliar in Iran. Amin (2015: 269) claims that one can trace the use of public diplomacy there to the late 1700s in the predecessor state of Qajar, where media of the time was used as a diplomatic tool, alongside the integration of new technologies, such as the radio, into diplomatic protocol. Fast-forwarding to the contemporary era, foreign governments, Iran and the U.S. included, began to use technologies, such as the radio, to persuasively project their image in the state. Radio has been a prolific tool employed in public diplomacy with McMahon (2010: 26) noting that the U.S. continued to use the radio as a method for propaganda as late as 2010, funding two popular radio stations, which were in turn often jammed by the Iranian government.

When it comes to new and emerging technologies, Iran illustrates promising prospects, ranking 14th in global AI-focused research (Pargoo, 2019). The state understands the possibilities of AI, perhaps even powerful enough to end a longstanding economic drought, with its government even considering the establishment of a Ministry of AI. The U.S., for its part, prides itself in being a leader of technological advancements and implementations, flaunting the work of Silicon Valley, which is often at the forefront of technological innovation.

The diplomatic relationship between Iran and the U.S. stems back multiple decades but was amplified following the 9/11 attacks in 2001. The brutal terrorist attacks of 9/11 saw 2,977 lives lost and rendered relations between the U.S. and Islamic states tense (CNN Editorial Research, 2019). Fitzpatrick (2011: 7) highlights that the events have required the U.S.

to move from a 'message approach' to a 'relational approach' of public diplomacy. This would become a task for future administrations.

President George W. Bush, who held office between 2001 and 2009, faced dealing with the event and its aftermath. In his 2002 State of the Union address, Bush labelled Iran as a regime part of the 'axis of evil', thus implying their alignment to terrorist organisations (Bush, cited in Hamedani, 2008: pg). Their mutual disregard of the Taliban proved insufficient to restore friendly relations and served as a single point of collaboration.

Bush's public diplomacy towards Iran was mostly limited to promoting democracy in Iran, particularly due to its uranium reserves and moves toward developing nuclear capabilities (Akbarzadeh, 2011: 472). Friendly interaction with the Iranian people on the part of the U.S. was limited to congratulatory messages on the occasion of Persian New Year (Bush, 2008), but, on the whole, Bush's messaging read as conflicting given a narrative of disenchantment with the Iranian government yet deep respect for the Iranian people. Ultimately, the success of his public diplomacy may be best understood by perceptions of the Iranian people towards him, which were hardly ever fond (World Public Opinion Organisation, 2007).

Elected in 2009, President Barack Obama signified a sense of hope that friendly bilateral relations between the U.S. and Iran may be revived under his leadership. Obama infamously announced that if Iran eased its approaches, the U.S. would extend a hand and attempt to persuade Western counterparts that Iran was not building a nuclear bomb, thus demonstrating a willingness to move the relationship to new ground (Landler and Cooper, 2009). From the onset, Obama's public diplomacy differed from that of Bush as Obama halted the promotion of public diplomacy and intervention in Iran's internal affairs. However, Obama was sure to demonstrate that he should not be considered a walkover and that if Iran failed to comply, military force remained an option before shifting his attention to sanctions (Obama, 2013). Furthermore, in several addresses Obama subtly addressed Iran and called out successive governments for their human rights offences but at all times ensured he emphasised mutual respect (Obama, 2009).

In 2011, in an attempt for the U.S. to illustrate their willingness to directly engage with the Iranian audience, it launched its first virtual embassy that remains active. The virtual embassy symbolised a rather progressive act of public diplomacy, allowing citizens to apply for visas, be notified of study and employment opportunities, in addition to it serving many diplomatic functions (Slavin, 2013). The site includes links to official U.S. social media web pages, ensuring a direct line of communication between the U.S. government and the domestic Iranian audience. However, this bold move was not received well by the Iranian government, which blocked the site just days after it launched (Reuters, 2011). Internet censorship is extremely common in Iran, with the government often blocking websites or shutting down the internet in its entirety, thus acting in rebellion towards a state or its own citizens. This was highlighted in November 2019 when Iran shut down internet services during anti-government protests (Fassihi, 2019).

The 45th U.S. President, Donald Trump, made his position on Islamic states and members of the Islamic community clear since he was elected in 2016, ordering widespread bans on Muslim people entering the U.S. (Holland and Mason, 2017). Trump has also labelled Iran as a state responsible for global extremism and, in 2018, imposed sanctions on the state and abandoned their nuclear deal (Landler, 2018).

However, Duncombe (2017: 546) states that the instantaneous nature of digital applications has allowed Iran and the U.S. to swiftly solve conflict areas and communicate the resolutions that they have reached to foreign audiences within hours of the conflict arising. Illustrated in 2016, U.S. navy patrollers were illegally patrolling in Iranian waters, where they were soon caught and detained. Then-U.S. Secretary of State John Kerry, along with Javad Zarif, Iranian Minister of Foreign Relations, swiftly addressed the conflict and later confirmed on Twitter that all was resolved, and the U.S. patrollers were released. While many argue that if any single actor had a direct influence in the swift release, perhaps multiple actors and years of relations characterised by vacillating tensions between the two states were significant contributors to the progressively quick release.

These tensions more recently came to a head after Trump ordered an airstrike on 3 January 2020 to assassinate a commander of the Islamic Revolutionary Guard Corps (IRGS), Qassem Soleimani (CRS Report, 2020), after having labelled the corps a terrorist organisation in April 2019 (Trump, 2019). Whilst Trump followed the correct protocol ahead of the 'precision drone strike' that he had ordered by notifying Congress, his actions shocked the world and resulted in a large-scale fallout between the two states (Yeung, Alfonso, Kottasova and Vera, 2020).

According to Macais and Breuninger (2020), U.S. intelligence believed that Qassem Soleimani was preparing to attack the U.S., therefore, Trump's use of public diplomacy following the strike was direct and open. Trump assured that the strike on Soleimani was not intended to start a war with Iran but rather prevent it from happening. Graff (2020) reports that after days of hostility and global tension, President Trump and Foreign Minister of Iran, Javad Zarif, turned to Twitter to ease the tensions. Both attempted to reassure their counterparts and the global audience that neither country wanted to go to war but would defend itself if necessary. This modern display of public diplomacy highlights the power of instant communication in solving real-time conflict.

Whilst technologies have come to play a critical role in communication and public diplomacy at large, the U.S.-Iran relationship demonstrates that better solutions are required. Integrating AI into public diplomacy for the improvement of communication may reduce false propaganda in the media and bring forth greater coherence and understanding between Iranian and U.S. leaders.

### *Breakthrough technologies*

AI-driven technologies offer endless possibilities and are accessible virtually in every corner of the globe to public citizens, government officials and non-state actors such as terrorist groups. Whilst Iran and the U.S. have had a strained relationship over the years, there is yet the possibility that it could be improved through public diplomacy. Communication evolves with technological trends and AI could be the key component to such

“ AI-driven technologies offer endless possibilities and are accessible virtually in every corner of the globe to public citizens, government officials and non-state actors such as terrorist groups. Whilst Iran and the U.S. have had a strained relationship over the years, there is yet the possibility that it could be improved through public diplomacy. ”

an improvement. Whilst communication may concern a range of subtopics, the aspects that will be discussed relevant to public diplomacy are limited to propaganda, deep-fakes [2], sentiment analysis [3], and virtual assistants. It should be noted that Natural Language Processing (NLP) is a key driver in the evolution of communication in the 21st century and is discussed in reference to all subtopics.

Verspoor and Cohen (2013) explain Natural Language Processing (NLP) as the manipulation of unstructured input texts through an integrated system of components. It can instinctively extract the relevant information from expansive datasets and draw conclusions. Each component is responsible for various aspects of the language process, such as adding structure and analysing concepts and relationships. Marr (2019) provides examples of NLP, with those particularly relevant to the field of public diplomacy including instant language translation, and the extraction and summarisation of information.

Gracie, Egger and Malik (2019) explain that it is difficult to establish patterns and draw conclusions in NLP given the unstructured nature of the data. Sorting through an unstructured dataset is time-consuming and can delay governments in finding potential threats and acting promptly. NLP comprises several tools and consists of two subsets: Natural Language Generation (NLG) and Natural Language Understanding (NLU). The tools

of NLP include the recognition of human speech, understanding and interpreting natural language, and generating interpretable texts (Gracie, Egger and Malik, 2019).

According to IBM (2019), NLU includes a ‘set of analytics features’ that extracts meaning from unstructured data. Information can be extracted from different types of data such as emotions, relations, and entities. With NLU, users may learn the purpose of a sentence and once the NLU process is complete, NLG takes place by formulating a response. Sentiment analysis, information extraction and topic modelling [4] are all considered integral aspects of NLU. Latent Dirichlet Allocation (LDA), a type of topic modelling, establishes latent patterns in unstructured data. Drawing themes or topics from a vast field of information allows users to note particular patterns taking place and draw conclusions from such patterns (Li, 2018). Gracie et al. (2019) note that the U.K. government has begun utilising LDA to better understand public opinion.

Heron (2016) claims that for LDA to operate at its maximum efficiency, it should begin the process by cleaning the dataset. Unnecessary words like ‘it’, ‘and’ and ‘the’ are removed from the dataset, along with punctuation. All words are lemmatised [5] and normalised to ensure there are no minor spelling errors and ‘probabilistic spelling correction’ is applied.

Once NLU is complete and a dataset is structured, NLG can take place. Reiter and Dale (1995) describe NLG as a subset of AI, a constructed computational process that transfers non-linguistic information to interpretable texts. According to Greyling (2019), NLG transitions the structured data to a new unstructured dataset, formulating a human-like response, which he refers to as a ‘conversational output in human language.’ Sciforce (2019) explains NLG as a three-part process: 1) document planning, 2) microplanning, and 3) realisation. Two and a half decades ago, Reiter and Dale (1995) provided examples of applied NLG, referring to accounting spreadsheets and airline schedule databases. Today, however, the possibilities of applied NLG span much further than previously imaginable. Automated Insights (2017) recaps examples of NLG that humans may interact with daily such as

automatically generated summaries on mobile gym-related applications and virtual assistants.

Graefe (2016) expresses the possibilities and pitfalls of automated journalism, which is briefly summarised as news generated from structured data, a process used by infamous news sources like Forbes and The New York Times. Whilst automated journalism is only possible when algorithms consist of clean and structured datasets referring to repetitive topics, expanding the available information each time, it is hardly ever possible with limited or no information on a new topic and may result in poor results. Algorithms for automated journalism can produce multiple news reports, in different languages, focusing on varied angles and tailored to the reader's preference. In addition, automated journalism is a fast-paced process with minimal potential for error.

Graefe (2016) notes that the quality of automated news produced by algorithms may be below par compared to news produced by human writers, but may improve over time. Automated news also cannot ask questions or explain new information, illustrating a lack of journalistic support. Knight (2019) too states that concerns about the threat of fake news by automated journalism are legitimate. Jardine (2019) explains how fake news and fake accounts are used in attempts to mislead or influence a targeted group's behaviour or attitudes, recalling a similar use of fake accounts during the election period to shift voter preference. Algorithms work by being fed inordinate amounts of information and after releasing outputs they are either positively or negatively rewarded. A programme is trained over time and may produce better outputs as it learns. However, it is trained to learn what is considered right and wrong, making it difficult for the algorithm to establish fake information from authentic information, especially if targeted for misuse. Ultimately, an algorithm mimics the news source that it is fed, be this fake or not.

Sentiment analysis is a process best used to judge human opinions, attitudes and feelings towards a particular topic, commonly used in social media analytics. According to Chakraborty, Battacharyya and Hassanien (2019), sentiment analysis is a five-step algorithmic process: the reviews or gathering of information followed by the recognition of sentiments; feature selection occurs, and sentiment

categorisation takes place; and lastly, sentiment dissipation is calculated.

While the terms 'sentiment analysis' and 'intent analysis' are often regarded as similar concepts, Gupta (2018) argues that intent analysis goes a step further by exploring the intent behind the user's message and distinguishes if it is a query, complaint, opinion, news or any other kind of message. Challenges that arise in sentiment analysis include identifying sarcasm and compound sentences (Farhadloo and Rolland, 2016). However, the rapid growth and continuous improvement of AI and machine learning suggests that solutions to overcome such challenges are possible.

Baldwin (2019) describes AI-driven machine translation as a 'game-changer'. While instant language translation is certainly not new and has been continuously evolving, the rapid development of AI has led to a point where it may remove the hindrance of language barriers and improve international relations as we know it.

In January 2019, Google launched its own language translator that Titcomb (2019) describes as a turning point for instant language translation. At the time of launch, the application could translate 27 languages instantly, only requiring the user to speak their native language and select the language into which translation is needed.

#### *AI meets public diplomacy*

Deep-fakes are digital audio or visual content that have been purposely manipulated to falsely portray an object, environment or individual and may take the form of facial replacement, re-enactment, generation or speech synthesis (Centre for Data Ethics and Innovation, 2019).

The Congressional Research Service Report (2019) states that with AI, deep-fakes are becoming increasingly realistic and are often used as a tool by rebellious individuals or groups against the U.S. and its allies to influence public perception, manipulate diplomats and destroy public trust. Although the U.S. Department of Defense has made continuous efforts in creating new and up-to-date technologies to combat deep-fakes, deep-fake technology has

become increasingly advanced, often outsmarting forensic tools.

Venkataramakrishnan (2019) recalls the concerns expressed by Mutale Nkonde of Harvard University, stating that Iran may utilise deep-fakes as a tool against the U.S. Whilst algorithmic advances are continuously occurring, it makes it increasingly difficult to distinguish deep-fakes from true and valid information. Stanton (2019) too expresses the implications that deep-fakes may have on international relations, potentially damaging diplomatic relations with the possibility of inciting political violence – an already visible reality for U.S.-Iran relations. Johnson (2019) cited deep-fakes as a major concern for the 2020 U.S. election, regarding Iran as a ‘top threat’ of deep-fakes against the U.S. government, which would naturally lead to further future hostility between Washington and Tehran. Despite those concerns, Mak and Temple-Raston (2020) state that deep-fakes were not present in the 2020 elections due to small deceptions. However, as deep-fake technologies continue to advance, it may prove to be a threat in future elections.

An example of a deep-fake is the image spread by a group named ‘Iran Cyber Security Group Hackers’, which depicted Trump with a bloody mouth and a bruised face, along with a message pledging the group’s support for states in the MENA region. Intending to illustrate the possibilities that Trump would face if he did not stop targeting Iran, this deep-fake was only a partial indication of Iran’s AI capabilities. The deep-fake illustrates how far Iran is willing to go to protect the state and the lack of concern for any potential preserved diplomatic relations between the U.S. and Iran (BBC News, 2020).

Perhaps in response to an awareness of the opportunity AI provides to manipulate content, Iran is commonly known to employ what is known as ‘digital authoritarianism’, where it censors websites and content around particular topics, as it did when it censored the U.S. virtual embassy in 2011 (Shahbaz, 2018). Tajdin (2019) concurs, noting that independent foreign news sources and citizens have often been censored, notably blocked from popular social media platforms like Twitter and YouTube. For U.S. public diplomacy, social media has become an

increasingly crucial means of communication and it is becoming tougher for the U.S. government to directly engage with the Iranian audience. This comes partly due to Iran’s government building domestic internet services and strictly securing a ‘national internet’ (Tajdin, 2019).

AI could, however, be used to overcome some of the hurdles to public diplomacy in this bilateral relationship, with sentiment analysis in particular showing promise. Understanding the public opinion of foreign audiences may assist the U.S. in nurturing more beneficial sentiments among the Iranian people. Thrall (2011) states that, at the time of publication, Iranians’ attitudes towards the U.S. were distrustful. If the U.S. utilises sentiment analysis, it may understand a deeper reasoning as to why Iranians do not trust their government and thus tailor public diplomacy to shift such sentiment.

Elson and Nader (2011) conducted a survey via telephone with Iranians in an attempt to establish Iranian attitudes towards the U.S., among other things. The survey interviewed 1,002 citizens over an 18-day period in December 2009. It was, however, restricted to only those who have landline telephones and were willing to participate. Although 1,002 individuals participated, roughly nine per cent were comfortable with the survey. External parties were invited as the interviewers and underwent rigorous training. It was concluded that a vast majority of Iranians, mostly women and those who were less educated, were opposed to U.S.-Iran diplomatic relations but men and those of a higher social status with a greater level of education were welcoming of the revived relations. While the study provided a somewhat satisfactory outcome and allowed the U.S. to better focus their public diplomacy towards particular groups to improve foreign public perception, it remained flawed. The survey was time-consuming and excluded homeless citizens, cell phone users, and a large group due to their unwillingness to participate. In addition, telephone interviews were abruptly concluded due to Iranian lines being cut and the events at the time (the death of nine Iranians during protest clashes with the Iranian military (Tait, 2009)) may have resulted in skewed results.

Elson and Nader (2011) agree that social media observations may provide more accurate results, and that sentiment analysis may be better employed here. Senno (2018) elucidates two major benefits of sentiment analysis that may be relevant to governments. Firstly, sentiment analysis may be a measurement of the effectiveness of a campaign by the U.S. towards Iranian citizens or vice versa; secondly, it may assist in improved crisis control, by identifying negative perceptions on social media ahead of time, allowing government to respond accordingly before it escalates.

While the findings of Thrall (2011) and Elson and Nader (2011) highlight the attitudes of Iranians during Obama's administration, which mostly reflect a hardly successful display of public diplomacy, Thrilling (2017) provides a more recent idea of Iranian public perception with 72% of Iranians stating that their standard of living has not improved under the nuclear deal with the U.S. and simultaneously indicating a declining support for it. Knox, Dekeyser and Christia (2019) offer more optimistic results, highlighting that most conservative Iranians yearn to have greater ties with the U.S.

While Fouts (2006) boasts about the expansive dataset the U.S. possesses in terms of public opinion in the Middle Eastern region through survey research, he emphasises that the data is not rich enough to highlight causes for particular sentiment. Intent analysis may thus be a small step toward better understanding what lies behind sentiment or public opinion.

As stated, virtual assistants are becoming increasingly popular and may improve communication channels between governments and citizens, creating a direct communication channel with an immediate response. According to Borfitz (2019), the U.S. government illustrates a growing fondness for virtual assistants, given that they present minimal risks and low chances of failure. NLP technologies are central to the ever-improving conversation between virtual assistant and human user, becoming more personalised with each improvement and as datasets grow. The U.S. has implemented virtual assistants in the U.S. Citizenship and Immigrations Services and the U.S. General Services Administration. However, it comes

as a surprise that as recently as August 2021, the U.S. is yet to add a chatbot to its virtual embassy website with Iran, a site to maintain direct contact between Iranian citizens and the U.S. government (Virtual Embassy, 2020). A chatbot feature would allow for an Iranian citizen and a U.S. staff member to have an easier and more direct channel of communication, in which one would be free to ask questions and would be able to receive information that may not be freely available on the website.

The U.S. has continually kept the virtual embassy up-to-date, providing travel warnings during hostile periods. On 10 August 2021, the embassy issued a stage four warning of American citizens to avoid travel to Iran following the kidnappings and arrests of U.S. citizens (Virtual Embassy, 2021).

While Trump illustrated minimal-to-no-use of AI to improve communication between the U.S. government and Iranian citizens, the president has used his Twitter account threatening to hack 52 Iranian websites regarded as 'important to Iran and Iranian culture' if the Iranian capital acted on their threats of airstrikes on the U.S. (BBC News, 2020: 4). Trump's firm, and public, stance displays little concern for the Iranian people and their culture and would thus do little to assuage public opinion in Iran.

Instant language translation may be extremely beneficial for public diplomacy to overcome language barriers (Baldwin, 2019). However, as

---

“ Instant language translation may be extremely beneficial for public diplomacy to overcome language barriers (Baldwin, 2019). However, as useful as instant language translation may be, these may often be literal and lose the value and meaning of the intended message, thus subtracting the personal touch from diplomacy. ”

---

useful as instant language translation may be, these may often be literal and lose the value and meaning of the intended message, thus subtracting the personal touch from diplomacy. Trump often chose to utilise Twitter as a form of public diplomacy, which is a less personal alternative, albeit quick and far-reaching. Two months into President Joe Biden's administration, the newly elected president illustrated no rush in going back to the nuclear deal with Iran. In addition, the new administration continued to utilise social media to extend their public diplomacy, tweeting that 'Iran is moving in the wrong direction' and reverting back to a state of compliance (Rad and Mortazavi, 2021: 4).

The virtual embassy website of the U.S. in Iran offers a 'translation' option where it speedily translates the entire website to Persian, the official language of Iran (Virtual Embassy, 2020). Whilst it may seem like a minimal feature, it illustrates the willingness of the U.S. to have a direct and understanding relationship with Iranian citizens.

On 17 November 2021, the U.S and U.K. accused Iran of ongoing government-sponsored ransomware attacks beginning March 2021, targeting critical U.S infrastructure such as transportation, healthcare and public health sectors (Murphy and Manson, 2021). The Joint Statement released by the Cybersecurity and Infrastructure Security Network (CISA, 2021) details the activities and list of malicious tools including FileZilla for file transferrals and MimiKatz for credential theft. The report and expansive list of activities illustrate the sophistication of the Iranian government and its people, further making a bold statement about how far it is willing to go to inflict damage on U.S infrastructure and further taint the diplomatic relations between the two states.

#### *Looking forward*

Over time, as AI evolves and its complexity is learned in multiple fields, it may be adapted in different forms within diplomacy. It is imperative to note that AI is considered a moving target as it continuously adapts, develops, and quickly evolves. Furthermore, it may be considered as an umbrella term for a pool of other technologies which also continue to develop over time. Moreover, this expansive set of technologies may be applied differently depending

on the context and the user's intention. Therefore, the inclusion of AI into public diplomacy may yield both positive and negative implications.

States have begun integrating AI into foreign policy and international relations, utilising autonomous weapon systems, for international security and military power. As governments acknowledge the power that AI possesses and states attempt to lead in their AI capabilities, Russia has expressed that, one day, AI will rule the world (Amaresh, 2020). China, on the other hand, has applied the advanced technology to decision-making processes within foreign policy, illustrated by China's application of AI to the decision-making process of the country's Belt and Road Initiative Strategy. Choi (2019) highlights that a plethora of possibilities lay ahead as AI and diplomacy continue to intersect, citing the possible prediction of future international events, impacting geopolitics, and monitoring warfare and hostile environments.

The U.S. and Iran have often illustrated their expansive AI capabilities and intelligence but have not yet come to implement it for the betterment of communication for public diplomacy purposes. Notable trends between U.S. and Iran public diplomacy include the use of deep-fakes; the U.S. virtual embassy to Iran; censorship; and heavy reliance on social media. Deep-fakes have had indefinite implications for public diplomacy between the U.S. and Iran, demonstrating that it has the power to create a tense international environment and further becoming increasingly laborious to detect.

Over the last decade, the U.S. has continuously relied on its virtual embassy as its primary tool for public diplomacy with Iranians. Whilst its success cannot be measured, the Iranian government has been quick to block the site in times of anger or dispute. While the website offers language translation and is often up to date, it lacks a chatbot feature that can further bridge the gap between the U.S. government and Iranian citizens. Iran's continuous censorship of Western media is harmful to U.S. public diplomacy and with advanced AI capabilities, it is an easy alternative for a displeased Iranian government. Lastly, social media, and more specifically Twitter, has found a home in U.S./Iran

public diplomacy. It is now commonly used by governments to understand the general attitude of a foreign audience, using sentiment analysis, and may tailor its public diplomacy accordingly.

Moreover, President Trump often turned to Twitter to share his opinion and the stance of the U.S. and optimistically, it aids leaders in having real-time communication to solve conflict and ease tensions, an act that may comfort and reassure foreign audiences in times of hostile bilateral relations. Neither Iran nor the U.S. lack AI technologies or cyber capabilities and in fact pride themselves in being the front runners of AI advances in their respective regions and globally. However, perhaps the longstanding disdain between the U.S. and Iran illustrates little efforts of public diplomacy in recent years, apart from a desire to win over the hearts of each state's foreign audience.

Whilst the Obama administration poured a significant effort into public diplomacy with Iran, keeping it as up-to-date as possible, the Trump administration demonstrated little willingness to do the same, perhaps even tarnishing the previous administration's efforts. U.S. President Joe Biden, inaugurated in January 2021, has explicitly expressed his willingness to get the nuclear deal with Iran back on track (Rafati, 2021). The Joint Comprehensive Plan of Action (JCPOA) swindled during the Trump administration as the U.S. imposed strict sanctions on Iran, but Biden has opted for the diplomatic route. Future study may be built on from here, with the possibility of seeing a greater integration of AI into the communicational aspect of public diplomacy. It illustrates that it has the likelihood to improve communication in public diplomacy, irrespective of minimal AI-related concerns.

## Notes

[1] Automated news generated by algorithmic processing from large datasets, that may be untrue and result in the spread of disinformation (Knight, 2019).

[2] Content that is purposely manipulated to falsely portray an individual, environment or object (Centre for Data Ethics and Innovation, 2019).

[3] An algorithmic process that attempts to interpret and understand the feelings or attitudes of individuals towards a particular topic (Chakraborty, Battacharyya and Hassanien, 2019).

[4] A statistical model utilised to sort through large datasets, such as a 'collection of documents' to locate particular topics (Li, 2018).

[5] Lemmatisation is a machine-learning process whereby words are grouped together to be analysed as a singular item (Srinidhi, 2020).

---

## References

- Amaresh, P. (2020). 'Artificial Intelligence: A New driving horse in International Relations and Diplomacy.' *Extraordinary and Plenipotentiary Diplomatist* [online]. Available at: <https://diplomatist.com/2020/05/13/artificial-intelligence-a-new-driving-horse-in-international-relations-and-diplomacy/>
- Automated Insights. (2017). 'Natural Language Generation in Your Daily Life.' *Medium* [online]. Available at: <https://medium.com/@AutomatedInsights/natural-language-generation-in-your-daily-life-53c90c54bef0>.
- Baldwin, R. (2018). 'Machine learning is tearing down language barriers. What does this mean for trade?' *World Economic Forum* [online]. Available at: <https://www.weforum.org/agenda/2018/09/machine-translators-are-about-to-revolutionize-world-trade/>.
- BBC News. (2020). 'Trump says U.S. ready to strike 52 Iranian websites if Tehran attacks.' *BBC News* [online]. Available at: <https://www.bbc.com/news/world-middle-east-50996602>
- Berridge, G.R. (2015). *Diplomacy: Theory and Practice*. 5th Edition. United Kingdom: Palgrave Macmillan.
- Bjola, C., & Kornprobst, M. (2018). *Understanding International Diplomacy: Theory, Practice and Ethics*. 2nd Edition. New York: Routledge. <https://doi.org/10.4324/9781315196367>
- Bortfit, D. (2019). 'Digital Assistants Transforming Public Service.' *A.I. Trends* [online]. Available at: <https://www.aitrends.com/ai-world-government/digital-assistants-transforming-public-service/>.
- Bush, G.W. (2008). 'Message on the Observance of Nowruz' (Statement, March 19). Curated by Gerhard Peters and John T. Wooley, *The American Presidency Project* [online]. Available at: <http://www.presidency.ucsb.edu/ws/index.php?pid=76841>
- Chakraborty, K. Hassanien, A.H., and Bhattacharyya, R.J. (2019). 'Sentiment Analysis on a Set of Movie Reviews using Deep Learning Techniques.' Edited by Dey, N., Borah, S., Babo, R., and Ashour, AS in *Social Network Analytics*. [online] Available at: <https://doi.org/10.1016/B978-0-12-815458-8.00007-4>. <https://doi.org/10.1016/B978-0-12-815458-8.00007-4>
- Choi, EC. (2019). 'Will algorithms make safe decisions in foreign affairs?' *Diplo Foundation* [online]. Available at: <https://www.diplomacy.edu/blog/will-algorithms-make-safe-decisions-for-foreign-affairs>
- Christian. (2014). 'What is political communication?' *Association of Public Policy Advocates to the European Unions* [online]. Available at: <http://www.aalep.eu/what-political-communication>.
- CNN Editorial Research. (2019). 'September 11 Terror Attack Fast Facts.' *CNN* [online]. Available at: <https://edition.cnn.com/2013/07/27/us/september-11-anniversary-fast-facts/index.html>

- Cooper, H., and Landler, M. (2009). 'On Iran, Obama Plans Talk and Some Toughness.' *The New York Times* [online]. Available at: <https://www.nytimes.com/2009/02/04/washington/04dipl.html>.
- Crowley, M., Hassan, F., and Schmitt, E. (2020). 'U.S. Strike in Iraq Kills Qassim Suleimani, Commander of Iranian Forces.' *The New York Times* [online]. Available at: <https://www.nytimes.com/2020/01/02/world/middleeast/qassem-soleimani-iraq-iran-attack.html>.
- Cybersecurity and Critical Infrastructure Security Agency. (2021). 'Alert (AA21-321A) Iranian Government-Sponsored APT Cyber Actors Exploiting Microsoft Exchange and Fortinet Vulnerabilities in Furtherance of Malicious Activities.' [online] Available at: <https://us-cert.cisa.gov/ncas/alerts/aa21-321a>
- Dahlgren, P. (2004). 'Theory, Boundaries and Political Communication: The Uses of Disparity.' *European Journal of Communication*, 19 (1): 7-18. DOI: 10.1177/026732310404069. <https://doi.org/10.1177/0267323104040691>
- Debray, R. (2007). 'Socialism: a life cycle.' *New Left Review*: 46. Republished in Finlayson, A. 2019. *Political Quarterly: Rethinking Political Communication*. Oxford: Political Quarterly Publishing.
- Duncombe, C. (2017). 'Twitter and transformative diplomacy: social media and Iran-US relations', *International Affairs*, 93(3): 545-562. doi: 10.1093/ia/iix048. <https://doi.org/10.1093/ia/iix048>
- Elson, S.B., and Nader, A. (2011). *National Defense Research Institute: 'What Do Iranians Think? A Survey of Attitudes on the United States, the Nuclear Program, and the Economy.'* [online] Available at: [www.rand.org](http://www.rand.org).
- Farhadloo, M., and Rolland, E. (2016). *Fundamentals of Sentiment Analysis and Its Applications*. 10.1007/978-3-319-30319-2\_1. [online] Available at: [https://www.researchgate.net/publication/300965436\\_Fundamentals\\_of\\_Sentiment\\_Analysis\\_and\\_Its\\_Applications/citation/download](https://www.researchgate.net/publication/300965436_Fundamentals_of_Sentiment_Analysis_and_Its_Applications/citation/download) [https://doi.org/10.1007/978-3-319-30319-2\\_1](https://doi.org/10.1007/978-3-319-30319-2_1)
- Fasshi, F. (2019). 'Iran Blocks Nearly All Internet Access.' *The New York Times* [online]. Available at: <https://www.nytimes.com/2019/11/17/world/middleeast/iran-protest-rouhani.html>
- Finlayson, A. (2019). *Political Quarterly: Rethinking Political Communication*. Oxford: Political Quarterly Publishing. <https://doi.org/10.1111/1467-923X.12571>
- Fitzpatrick, K.R. (2011). *U.S. Public Diplomacy in a Post-9/11 World: From Messaging to Mutuality*. USC Centre on Public Diplomacy: CPD Perspectives on Public Diplomacy: Paper 6. Los Angeles: Figueoa Publishing.
- Fouts, J.S. (2006). *Public Diplomacy: Practitioners, Policy Makers and Public Opinion*. USC Center on Public Diplomacy: United States of America. [online] Available at: <https://www.uscpubdiplomacy.org/sites/uscpubdiplomacy.org/files/useruploads/u22281/PublicDiplomacyandPublicOpinion2006.pdf>.
- Gracie, M., Eggers, W.D., and Malik, N. (2019). 'Using A.I. to unleash the power of unstructured government data.' *Deloitte Insights* [online]. Available at: <https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/natural-language-processing-examples-in-government-data.html>.
- Graefe, A. (2016) 'Guide to Automated Journalism', *Tow Center for Digital Journalism Report*: 1-48. doi: 10.1002/ejoc.201200111.
- Graff, GM. (2020). 'Did Twitter Help Stop War With Iran?' *Wired* [online]. Available at: <https://www.wired.com/story/donald-trump-iran-twitter-war/>.
- Greyling, C. (2019) 'Chatbots: Natural Language Generation In 7 Easy Steps.' *Medium* [online]. Available at: <https://medium.com/@CobusGreyling/chatbots-natural-language-generation-in-7-easy-steps-77887a6de249>.
- Gupta, S. (2019). 'Sentiment Analysis: Concept, Analysis and Applications.' *Towards Data Science* [online]. Available at: <https://towardsdatascience.com/sentiment-analysis-concept-analysis-and-applications-6c94d6f58c17>.
- Hamedani, N. (2008). 'Will 2008 Bring a Welcome New Perspective on Iran?', *Washington Report on Middle East Affairs*, 27(2): 31-39. <https://doi.org/10.1080/03068370802017962>
- Heron, D. (2016). 'Understanding more from user feedback.' *Data in Government* [online]. Available at: <https://dataingovernment.blog.gov.uk/2016/11/09/understanding-more-from-user-feedback/>
- Holland, S. and Mason, J. (2017). 'Trump tells Middle East to 'drive out' Islamist extremists.' *Reuters* [online]. Available at: <https://www.reuters.com/article/us-usa-trump-saudi-idUSKCN18H00U>
- IBM. (2020). 'Watson Natural Language Understanding.' IBM [online]. Available at: <https://www.ibm.com/cloud/watson-natural-language-understanding>
- Jardine, E. (2019). 'Beware Fake News: How Influence Operations Challenge Liberal Democratic Governments.' *Centre for International Governance Innovation* [online]. Available at: <https://www.cigionline.org/articles/beware-fake-news>
- Johnson, K. (2019). 'Deepfake concerns ahead of 2020 election include Iran, China, Instagram and Whatsapp.' *Venture Beat* [online]. Available at: <https://venturebeat.com/2019/09/03/deepfake-concerns-ahead-of-2020-election-include-iran-china-instagram-and-whatsapp/>
- Kinzer, S. (2008). 'Inside Iran's Fury: Scholars Trace the Nation's Antagonism to its History of Domination by Foreign Powers.' *Smithsonian Magazine* [online]. Available at: <http://www.smithsonianmag.com/people-places/insideirans-fury-11823881/?page=1>.
- Knight, T. (2019). 'Who's afraid of robots? Fake news in the age of A.I.' *Daily Maverick* [online]. Available at: <https://www.dailymaverick.co.za/article/2019-03-05-whos-afraid-of-robots-fake-news-in-the-age-of-ai/>
- Knox, D., Dekeyser, E., and Christia, F. (2019). 'Even Conservative Iranians Want Closer Ties to the United States.' *Foreign Policy* [online]. Available at: <https://foreignpolicy.com/2019/05/23/even-conservative-iranians-want-closer-ties-to-the-united-states/>.
- Landler, M. (2018). 'Trump Abandons Nuclear Deal He Long Scorned.' *The New York Times* [online]. Available at: <https://www.nytimes.com/2018/05/08/world/middleeast/trump-iran-nuclear-deal.html>.
- Leaguey-Feilleux, J.R. (2007). *The Dynamics of Diplomacy*. United States of America: Lynne Reinner Publishers.
- Li, S. (2018). 'Topic Modeling and Latent Dirichlet Allocation (LDA) in Python.' *Towards Data Science* [online]. Available at: <https://towardsdatascience.com/topic-modeling-and-latent-dirichlet-allocation-in-python-9bf156893c24>
- Macais, A. and Breuninger, K. (2020). 'Trump says U.S. does not seek war or regime change in Iran, but is still ready to act if 'necessary.' *CNBC* [online]. Available at: <https://www.cnbc.com/2020/01/03/trump-to-make-a-statement-following-fatal-strike-on-iran-general.html>.
- Mak, T., and Temple-Raton, D. (2020). 'Where Are the Deepfakes in This Presidential Election?' *NPR* [online]. Available at: <https://www.npr.org/2020/10/01/918223033/where-are-the-deepfakes-in-this-presidential-election>
- Marr, B. (2019). '5 Amazing Examples of Natural Language Processing (NLP) In Practice.' *Forbes* [online]. Available at: <https://www.forbes.com/sites/bernardmarr/2019/06/03/5-amazing-examples-of-natural-language-processing-nlp-in-practice/#1b-ca39ac1b30>.
- Murphy, H., and Manson, K. (2021). 'US and UK agencies say Iran is behind 'ongoing' ransomware campaign'. *The Financial Times* [online]. Available at: <https://www.ft.com/content/22b323e0-b781-4eba-9d0b-dc62a0aad235>
- Nick, S. (2001). 'Use of Language in Diplomacy'. Edited by Kurbali-

ja, J., and Slavik, H in *Language and Diplomacy*. [online] Available at: <https://www.diplomacy.edu/resources/general/use-language-diplomacy>.

Obama, B. (2009). 'Remarks by the President on A New Bginning.' (Speech, Cairo, June 4). Offi e of the Press Secretary, Whitehouse.gov [online]. Available at: [http://www.whitehouse.gov/the\\_press\\_offi\\_e/Remarks-by-the-President-at-CairoUniversity-6-04-09](http://www.whitehouse.gov/the_press_offi_e/Remarks-by-the-President-at-CairoUniversity-6-04-09).

Obama, B. (2013). 'Remarks by President Obama in Address to the United Nations General Assembly.' (Speech, New York, September 24). Offi e of the Press Secretary, Whitehouse.gov [online]. Available at: [http://www.whitehouse.gov/the-press-offi\\_e/2013/09/24/remarks-president-obamaaddress-united-nations-general-assembly](http://www.whitehouse.gov/the-press-offi_e/2013/09/24/remarks-president-obamaaddress-united-nations-general-assembly).

Paglieriani, L., and Lund, H.H. (2017). 'The Future of Robotics Technologies.' *Journal of Robotics, Networking and Artificial Li e*, 3(4): 270-273. <https://doi.org/10.2991/jrnal.2017.3.4.12>

Pigman, G.A. (2010). *Contemporary Diplomacy*. United Kingdom: Polity Press.

Rad, A., and Mortazavi, N. (2021). 'President Biden Must Follow the Advice of Candidate Biden on Iran'. *Foreign Policy* [online]. Available at: <https://foreignpolicy.com/2021/03/10/president-biden-must-follow-the-advice-of-candidate-biden-on-iran/>

Rafati, N. (2021). 'The Nuclear Deal's Fate Lies in Politics-in the U.S. and Iran.' *World Politics Review* [online]. Available at: <https://www.worldpoliticsreview.com/articles/29396/where-politics-meets-diplomacy-the-nuclear-deal-iran-and-the-u-s>

Reiter, E., and Dale, R. (1995). 'Building Natural Language Generation Systems.' *Natural Language Engineering*, 1(1). [online] Available at: <https://pdfs.semanticscholar.org/728e/18fbf-00f5a80e9a070db4f4416d66c7b28f4.pdf>

Rensmann, L. (2017). 'The noisy counter-revolution: understanding the cultural conditions and dynamics of populist politics in Europe in the digital age'. *Politics and Governance*, 5(4): 123-135 <https://doi.org/10.17645/pag.v5i4.1123>

Rubin, M. (2019). 'Iran's Military is Making Strides Into Twenty-First Century Technology.' *National Interest* [online]. Available at: <https://nationalinterest.org/blog/middle-east-watch/irans-military-making-strides-twenty-fi-st-century-technology-72191>

Sciforce. (2019). 'A Comprehensive Guide to Natural Language Generation.' *Medium* [online]. Available at: <https://medium.com/sciforce/a-comprehensive-guide-to-natural-language-generation-dd63a4b6e548>.

Senno. (2018). '7 Benefits of Senti ent Analysis You Can't Overlook.' *Medium* [online]. Available at: <https://medium.com/senno/7-benefits-of-sentiment-analysis-you-cant-overlook-c139b-4d9ace7>.

Shabbir, J., and Anwer, T. (2015). 'Artificial In elligence and its Role in Near Future.' *Journal of Latex Class Files*, 14(8): 1-11.

Shahbaz, A. (2018). 'Freedom on the Net 2018: The Rise of Digital Authoritarianism.' *Freedom House* [online]. Available at: <https://freedomhouse.org/report/freedom-net/freedom-net-2018/rise-digital-authoritarianism>.

Slavin, B.A. (2013). 'Year Old Virtual U.S. Embassy in Iran Tallies Its Hits, Misses.' *Al Monitor* [online]. Available at: <http://www.almonitor.com/pulse/originals/2013/01/embassy-us-iran-khamenei.html#>.

Srinidhi, S. (2020). 'Lemmatization in Natural Language Processing (NLP) and Machine Learning'. *Towards Data Science* [online]. Available at: <https://towardsdatascience.com/lemmatization-in-natural-language-processing-nlp-and-machine-learning-a4416f69a7b6>

Stanton, C. (2019). 'How Should Countries Tackle Deepfakes?' *Carnegie Endowment for International Peace* [online]. Available at: <https://carnegieendowment.org/2019/01/28/how-should-countries-tackle-deepfakes-pub-78221>.

Tait, R. (2009). 'Iran protests leave nine dead, reports claim'. *The Guardian* [online]. Available at: <https://www.theguardian.com/world/2009/dec/27/nine-dead-iran-protests>

Tajdin, B. (2019). 'Iran letter raises prospect of 'white list' internet clampdown.' *BBC News* [online]. Available at: <https://www.bbc.com/news/technology-50563917>

Thrall, T. (2011). 'On Deaf Ears: U.S. Public Diplomacy and Iran.' *The National Interest* [online]. Available at: <https://nationalinterest.org/blog/the-skeptics/deaf-ears-us-public-diplomacy-iran-6247>.

Thrilling, D. (2017). 'Polling Iran: What do Iranians think?' *Journalist's Resource* [online]. Available at: <https://journalistsresource.org/studies/politics/ads-public-opinion/polling-iran-iranians-public-opinion-data/>.

Titcomb, J. (2019). 'Hands on: Is Google's instant language translator a game changer for tourists?' *The Telegraph* [online]. Available at: <https://www.telegraph.co.uk/technology/2019/01/10/hands-goo-gles-instant-language-translator-game-changer-tourists/>.

Venkataramakrishnan, S. (2019). 'Can you believe your eyes? How deepfakes are coming for politics.' *Financial Times* [online]. Available at: <https://www.ft.com/content/4bf4277c-f527-11e9-a79c-bc9acae3b654>.

Verspoor, K., and Cohen, K. (2013). 'Natural Language Processing'. 10.1007/978-1-4419-9863-7\_158. [online] Available at: [https://www.researchgate.net/publication/291179558\\_Natural\\_Language\\_Processing](https://www.researchgate.net/publication/291179558_Natural_Language_Processing) [https://doi.org/10.1007/978-1-4419-9863-7\\_158](https://doi.org/10.1007/978-1-4419-9863-7_158)

Virtual Embassy. (2020). 'Why Virtual Embassy Tehran?' *Virtual Embassy* [online]. Available at: <https://ir.usembassy.gov/tehran/>

Williams, R. (2021). *The implications of the fourth industrial revolution on diplomacy* (Masters Dissertation). Johannesburg: University of Johannesburg. ProQuest Dissertations & Theses Database [online] Available at: [https://ujcontent.uj.ac.za/vital/%20access/manager/Repository?view=list&f0=sm\\_identi-er%3A%22http%3A%2F%2Fhdl.handle.net%2F10210%2F477811%22&sort=null](https://ujcontent.uj.ac.za/vital/%20access/manager/Repository?view=list&f0=sm_identi-er%3A%22http%3A%2F%2Fhdl.handle.net%2F10210%2F477811%22&sort=null)

Wisskerchen, G., Biacabe, BT., Bormann, U., Muntz, A., Niehaus, G., Soler, C.J., and Von Brauhitsh, B. (2017). *Artificial In elligence and Their Impact on the Workplace*. International Bar Association (IBA) Global Employment Institute.

World Public Opinion Organization (WPOO). (2007). 'Public Opinion in Iran and America on Key International Issues.' *Principal Investigator Steven Kull*. *World Public Opinion* [online]. Available at: [http://www.worldpublicopinion.org/pipa/pdf/jan07/Iran\\_Jan07\\_rpt.pdf](http://www.worldpublicopinion.org/pipa/pdf/jan07/Iran_Jan07_rpt.pdf)

Yeung, J., Alfonso, F., Kottasova, I., and Vera, A. (2020). 'Crowds swarm Tehran to mourn slain Iran military leader Soleimani.' *CNN World* [online]. Available at: <https://edition.cnn.com/middleeast/live-news/us-iran-soleimani-tensions-live-intl-01-05-20/index.html>.