

Data Science/A.I.: A Possible Panacea for Refugee Crisis

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ABSTRACT

Data and information are currently the two threads that intertwine to weave the shimmery fabric of modern society. We often use data and information interchangeably, but they differ considerably. For example, information analysis reveals a rationale, and logic, while data analysis, on the other hand, reveals a pattern. Moreover, patterns revealed by data can enable us to create the necessary tools to combat huge problems on our hands. They paint a clear picture so that the decision-making process becomes simple. Moreover, to solve the refugee crisis, we need to leverage that.

The refugee crisis does not have binary answers. Given the emotionally wrenching nature of the ground realities, experts often shy away from realistically stating things as they are. This hesitancy can cost lives. When our decisions are based solely on data, we can remove emotions from our decision-making steps. Data also presents irrefutable evidence and tells whether there is a solution or not. Moreover, it also responds to a nonbinary crisis with a binary answer. Because of all that, it becomes easier to tackle a problem.

Data science and A.I. can predict future refugee crises. With the recent explosion of data due to the rise of social media platforms, data and insight into data has solved many social and political problems. Data science can also help solve many problems refugees face while staying in refugee camps or a new country. This paper looks into various ways data science can help solve refugee problems.

Power Of Data and Data Insight

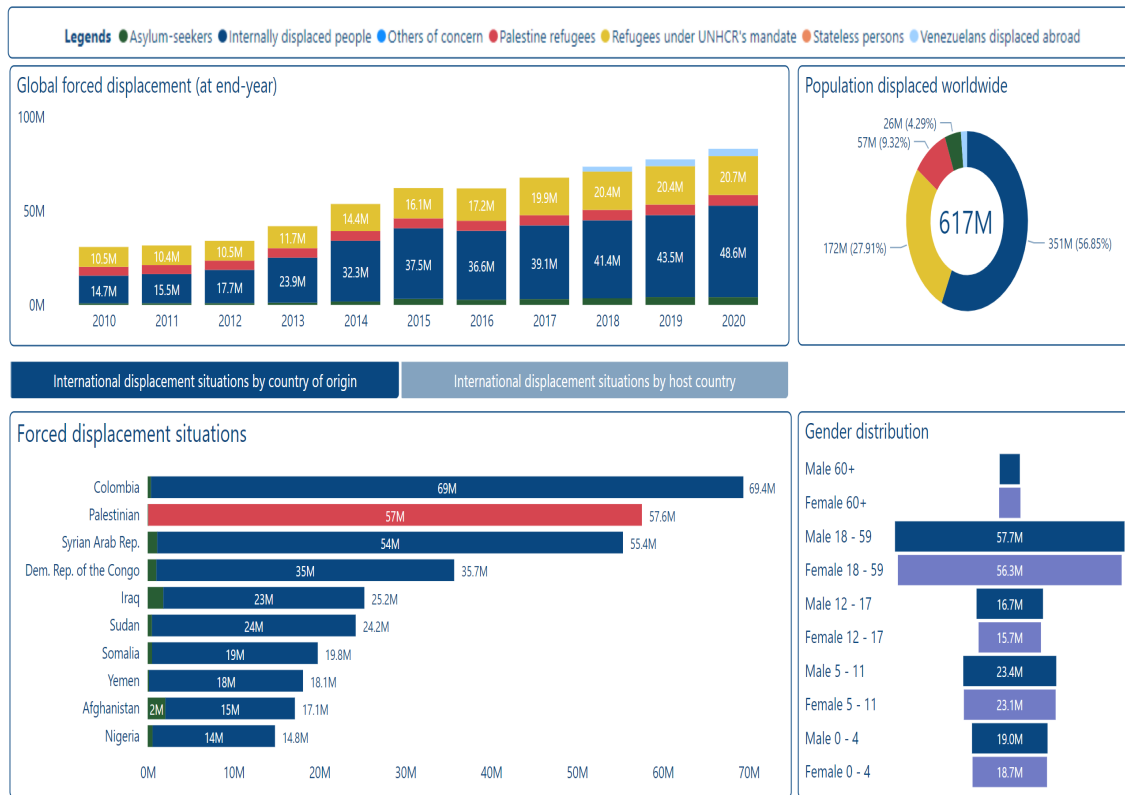
In August 2021, two heart-wrenching scenes, shown live on television screens across countries, painted a grim picture of refugees. One of them was of people clinging onto an airplane's wings in their desperate attempt to flee a war-torn Afghanistan. They ultimately fell to their death. The other scene was that of the U.S. government authorities separating children from their parents or guardians to deter migrants/ refugees from coming to the U.S. No one wants to see such scenes play out in real life again. However, data paints a grave picture of the current refugee situation. It also indicates that a bleak future lies ahead for the refugees across the globe.

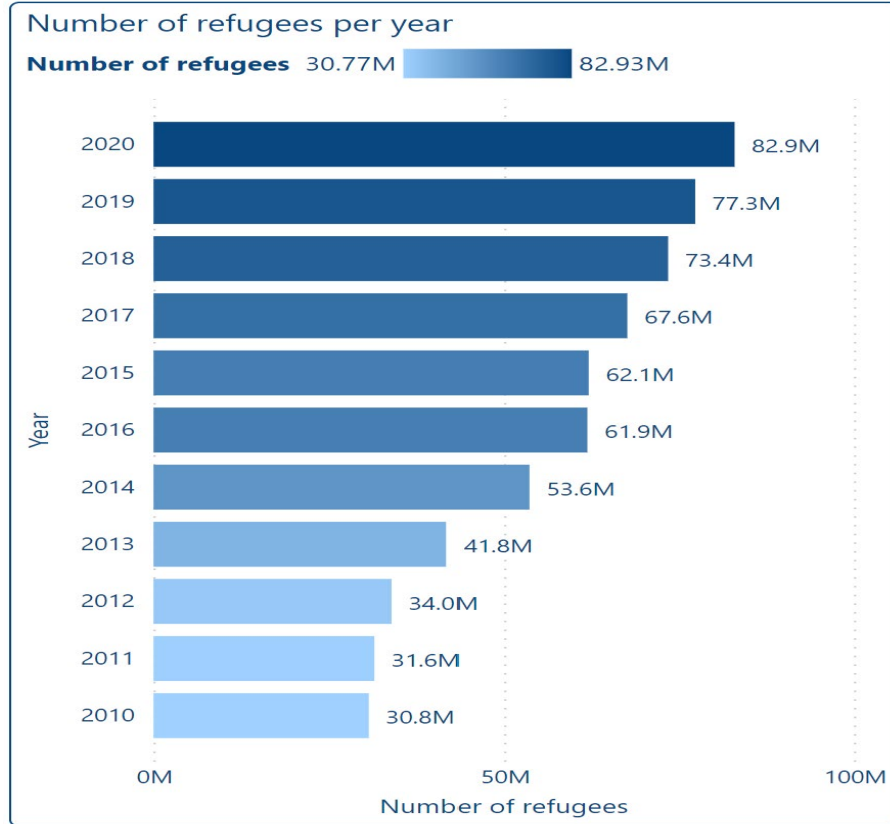
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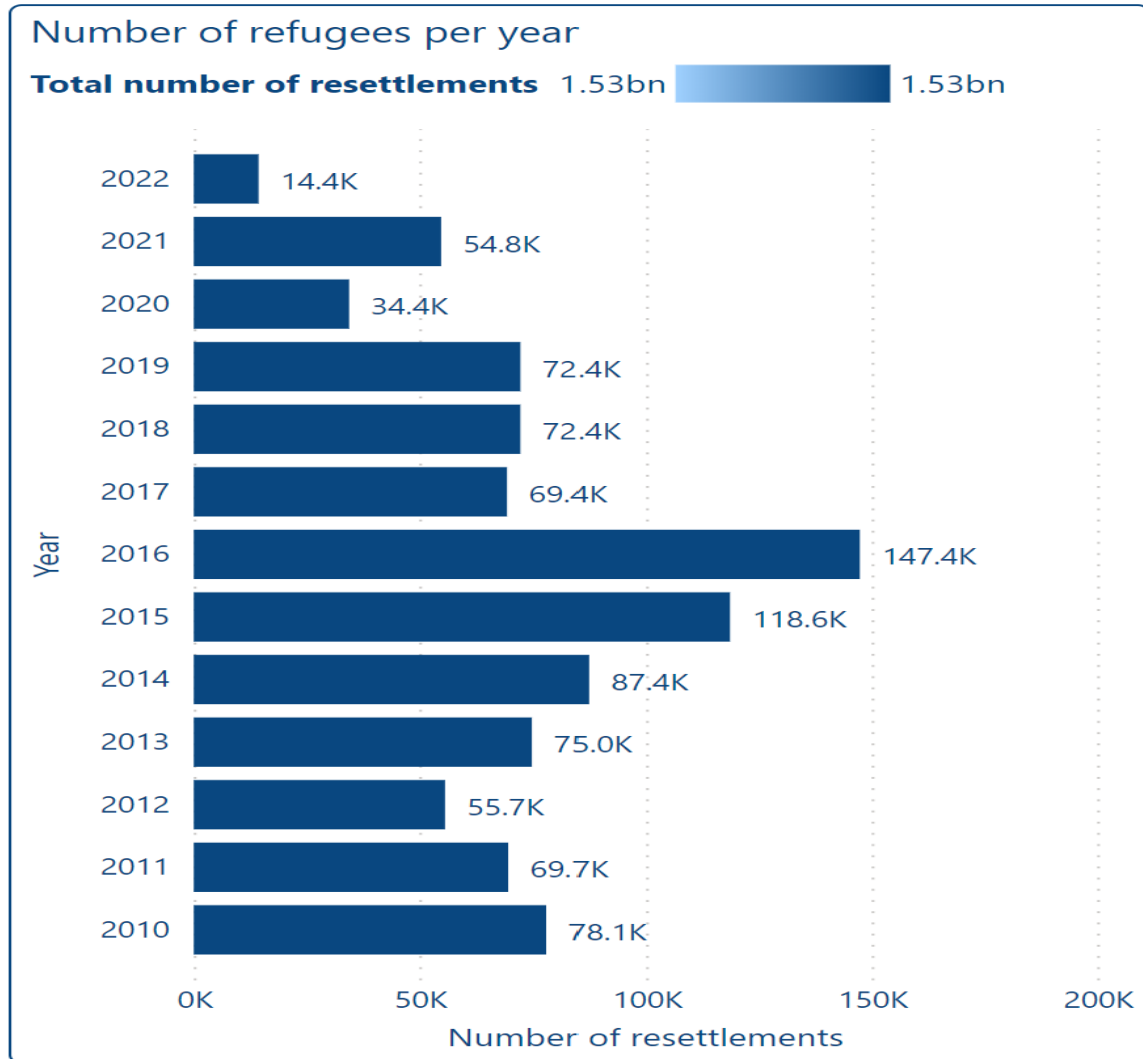
The refugee crisis does not have binary answers. Given the emotionally wrenching nature of the ground realities, experts often shy away from realistically stating things as they are. This hesitancy can cost lives. When our decisions are based solely on data, we can remove emotions from our decision-making steps. Data also presents irrefutable evidence and tells whether there is a solution or not. Moreover, it also responds to a nonbinary crisis with a binary answer. Because of all that, it becomes easier to tackle a problem.

The private sector recognizes the benefits of leveraging data systems, and hence, it is already reaping the rewards. Why should the public or welfare sector not do that? With data, we can uncover even more data. We will be closer to a solution with the least amount of collateral damage sooner than later.

Now the question that we need to answer: “can we let Machine Learning, Artificial Intelligence, and efficient data systems help us work out a solution for the refugee crisis?” This paper tries to answer that question.







Refugees as Data Points

“Data is the new oil,” Clive Humby, British mathematician and Tesco marketing mastermind, said. Let us go further and call it the new gold. However, unlike oil and gold, Data is limitless. The more we collect and analyze, we see newer sources emerge. Moreover, data science has allowed us to solve many social and political issues of the last decade.

The refugee crisis has become direr in the last few years. When we hear about an unfortunate incident involving refugees, we all express sorrow and solidarity online. However, no company, aid organization, or government has come up with a concrete solution that helps deal with the refugee crisis proactively. Maybe companies are not interested because finding a solution for a displaced population might be a nonprofit endeavor. At Safehaven4kids[1], we are determined to build a data-science-based solution platform to help refugees worldwide, especially refugee kids.

We have seen how data science has helped solve major sociopolitical issues in the last decade. Data generation and collection have exploded due to the widespread use of social media and other associated technology. A massive amount of data has allowed scientists to gain insight into sociopolitical issues. Maybe, just maybe, we can eventually solve many of these issues because of that.

Take the example of the current crisis in Ukraine, which is currently unfolding in front of our eyes. Suppose if we had predicted the number of people who would flee their homes, we could have been better prepared to deal with the situation. The analysis of the geopolitical data would have enabled us to make that prediction. Moreover, suppose if we could study the political situation in South America, especially in countries like Honduras and El Salvador, we could determine how many refugees and migrants might come to the U.S. seeking asylum and a new home.

A.I.-based chatbots can help refugees seek legal help to find asylum in the country they want to settle in. These chatbots can help them find a marketplace where they can find help from the people willing to help. Data science and technology can also help solve refugees' many problems, including food, shelter, employment, security, and assimilation.

Additionally, data science and machine learning can be used to prevent the refugee crisis from happening, and we can help refugees, especially refugee kids, cope with the horrors of refugee camp life using the right technology.

The plight of refugees is an ever-growing concern and a topic of the global dialogue. Finding a workable solution to this problem is the need of the hour. With the world growing more violent by the second, the refugee crisis will likely grow as more countries might become conflict zones. Children will face the brunt of it by all estimates. They comprise about one-third of the global refugee population, and as of 2020, they formed half of the global refugees. (UNHCR, GLOBAL TRENDS FORCED DISPLACEMENT IN 2020)
A significant world population may not be directly affected by the refugee crisis. But as the number of refugees grows, their effect on society will become more pronounced. Seeing refugees as data points would enable us to find a realistic solution to the crisis.

Who Qualifies as a Refugee?

After World War II, many people fled from their homes and crossed the nearest borders to seek asylum. In response to these massive migrations, the 1951 Refugee Convention officially defined who a refugee is. As per their definition, a refugee is *"someone who is owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it."* (UNHCR, What is a refugee?)
Refugees are individuals who have fled war, violence, conflict, or persecution by crossing an international border in pursuit of safety. Such individuals often have to abandon their homes, belongings, livelihood, and family to cross borders overnight with nothing more than the clothes on their backs. Several causes lead to refugees fleeing their home countries, including war and ethnic cleansing, tribal and religious violence, and regime changes. In recent years, Syria, Venezuela, Afghanistan, South Sudan, and Myanmar alone account for 68 percent of those displaced across borders. (UNHCR, Global Trends - Forced Displacement in 2018).

The world has been experiencing the highest level of human displacement on record to date. The world's refugee population had risen to a staggering 26 million, a new high, by the end of 2019. (U. f. UNHCR) From 2005 to 2020, about 10 million refugees have been added to this ever-expanding list. Among these, children make up about half of the world's refugees.

Over 75,000 children have been born in Bangladesh's Cox Bazar refugee camps in the last three years. These children account for roughly 30 percent of the refugees arriving through the Balkans. A disheartening 25 percent of these children arrive alone. (Save The Children).

Besides refugees, even Internally Displaced Persons (IDPs) have fled their homes. They have not crossed an international border but shifted to nearby towns, cities, or villages, places that are not equipped to take care of them. They flee their homes due to natural or artificial calamities. IDPs are barred from international

aid or international legal protections. Countries like Colombia, Syria, the Democratic Republic of the Congo, and Yemen have the highest number of Internally Displaced Persons.

In the Belly of Refugee Politics

The refugee crisis elicits a host of emotions – sadness, empathy, apathy, and hatred. Politicians have caught onto this. They have used polarization to cleverly ignite the cinders of xenophobic sentiment referred to as *Nimibilism*. Anytime people are asked to help (and not just donate), an interesting trend of not-in-my-back-yard emerges. People support the refugees, but they do not favor letting refugee camps and low-income housing be built in their neighborhoods. Politicians have cleverly seen an opportunity in this duality. At the cost of refugee lives, politicians have turned immigration and asylum-seeking into a political patina. They use this to strengthen international relations and score brownie points with their voters.

In November 2021, refugees were trapped in the freezing winter between Belarus and Poland because the former wanted them to reach the Poland border to put pressure on the European Union to lift sanctions on it. About 3,000-4,000 refugees were left stranded as a result of that.

In recent years, the United States of America, once known as the land of immigrants, too has adopted some of the most inhumane policies to stop immigrants and refugees. One such U.S. government official policy led to the separation of parents from their children to deter asylum seekers from seeking refuge in the U.S. Developing countries such as Turkey, India, and Myanmar, also have policies, not in favor of refugees' rights.

North America

In recent times, the politics of the U.S. has been more hostile toward refugees than ever before. Especially during the election season, the anti-refugee voices persist at a fever pitch. The last presidential election cycle saw the plight of migrants and refugees exploited to the maximum. Politicians blamed them for the country's crime waves, labeling them criminals and rapists even though data and reports suggested otherwise. According to reports, in the U.S., crime committed by native-born citizens is higher than among migrants/refugees. According to a study by the Cato Institute, the latter are also more likely to be imprisoned and harassed by law enforcement agencies in the U.S..

The election campaign that fueled anti-immigrant voices was Donald Trump's presidential campaign in 2016. He made immigration a central theme of his election campaign – promising to "build a wall" to stop migration from Mexico. He wanted to drastically lower the number of refugees permitted to enter the U.S. The former President probably felt that it was easy to blame refugees and other migrants for rising security concerns. He also claimed that the existing migration policies, such as the refugee resettlement program, might have provided terrorists the passage to enter the U.S. This statement was not based on evidence, which indicated that terrorist incidents in the United States had been gradually declining since 9/11. Most of the perpetrators now, more often than not, were white, far-right extremists based inside the U.S.

The so-called "Muslim ban" aimed to reduce the number of Muslim refugees entering the United States. After becoming the President, Trump banned nationals from seven Muslim-majority countries, including Syria. Since then, refugee admissions to the United States have dropped by two-thirds, and the Muslim refugee resettlement has fallen drastically. In 2019, around 79 percent of refugees were Christian, while 16 percent were Muslim, compared to 44 percent Christian and 46 percent Muslim in 2016.

Europe

Europe can be called the epicenter of refugee problems. However, it is worth remembering that while the recent refugee crisis presents an easy target, the social tensions and challenges in Europe are a decade-old phenomenon. The arrival of refugees from Syria, Iraq, and Afghanistan certainly didn't create these tensions, nor did the accompanying economic migrants.

The first comprehensive study in Germany that took a look at its 1 million refugees noted, "The refugee influx to Germany in 2014 and 2015 wasn't followed by a "crime epidemic." Instead, "there were 'muted increases' in some criminal activity in the immediate aftermath of the record influx of refugees, which saw an uptick in drug crimes and fare-dodging in areas with bigger reception centers...also associated with the increased minor crime for German citizens—partly explained by increased police presence."

Research points to an "immigrant paradox," which isn't fully understood according to Boston University's Salas-Wright. One theory suggests that people who start a new life in a foreign country tend to be interested in making their new life work. This also likely holds for refugees fleeing war.

The reality is that the challenges of integrating some Muslim youth have indeed provided (a tiny) opening for terrorist recruitment in Europe. Fifteen years ago, the now infamous neighborhood of Molenbeek from where many of the Brussels and Paris attackers came, was known for riots "born out of desperation in a neighborhood characterized by poor job prospects, bad housing, and deficient education"—much like similar outbursts in the U.K., France, and elsewhere. There is also an emerging link between petty crime, another point of call for the disenfranchised and alienated, and terror groups.

The issues that lead to terror and crime, which affect the West, are overwhelmingly homegrown—including a trend of violence against immigrants and refugees. Banning the displaced and migrants will have little impact on this challenge—a point underlined by the U.N. Better integration of disenfranchised youth can help deal with the challenge in a better way. Also it is worth remembering that the vast majority of Muslims in the West and beyond are firmly against I.S. and their ilk.

The political game that played on the Belarus-Polish border is a tactic that Turkey perfected in 2020. The tactic is to push migrants and refugees into neighboring countries or create a situation in which they are stuck at the border. Refugee policies of each European country may appear different, but they may not be as stark as the media might portray them as.

I spent time at the borders of Greece, North Macedonia, Serbia, and Hungary in the fall of 2015, trying to cross borders with hundreds of thousands of refugees who had congregated there. Germany had invited refugees to come to Europe in those days, and Turkey enabled Syrians and Afghans to move to Greece. Greece, in turn, would move the people, sometimes by ferry or by other methods, to the border with North Macedonia. I watched as people in cars crossed into North Macedonia while refugees were huddled together in a field. Local authorities lined them up in groups of 20 to 40 people and moved them to a bridge. On the other side, in North Macedonia, the authorities would stop the people and let some board buses to Serbia. Then, from Serbia, they crossed the Hungarian border until Hungary closed it. This tragic game plays out between the states but mostly harms refugees.

Small countries like Greece or Serbia cannot take in a million Afghans and Syrians. There is also no reason that countries in Europe necessarily have to take in all these people. However, the fact remains that millions are on the move, and no one has quite figured out what to do with them.

Asia

Asia has seen the maximum number of refugee crises. For most of the 1980s, Asia was home to the world's largest refugee population. Towards 1995, Asia had a total refugee population of just under 8,000,000 people, spread across the continent. Asia is also a region where most states have not ratified the 1951 Convention Relating to the Status of Refugees or the 1967 Protocol, which terminated the Convention's temporal and geographical limitations.

In Asian countries, refugees and asylum seekers are often denied legal protection and become victims of harassment, extortion, arrest, detention, and deportation. Some states, including those that have not signed the Convention, have policies that authorize temporary admission. However, they are usually limited in coverage (pertaining only to certain nationals) or only when refugees intend to resettle in another country. In 2021, Southeast Asia allowed in 2.1 million displaced people, with nearly 300,000 of them being refugees and asylum seekers. Many Southeast Asian countries, on the other hand, still have not signed the international refugee treaties and have yet to designate a regional mechanism to harmonize policy responses to refugee populations.

The United Nations High Commissioner for Refugees (UNHCR) is concerned about 9.2 million people in Asia and the Pacific, including 4.4 million refugees and asylum seekers, 3.3 million internally displaced people, and 2.3 million stateless people. Among the Southeast Asian nations, Cambodia, the Philippines, and Timor-Leste are the only ones who have sanctioned the 1951 Convention and 1967 Protocol Relating to the Status of Refugees of the United Nations. The 1951 Convention and 1967 Protocol direct the UNHCR to coordinate three long-term resolutions for refugees:

- Local integration in a host country
- Uncoerced return to the refugee's home country
- Permanent cross-border resettlement in a third country such as the United States

Individual Southeast Asian countries have slowly developed their refugee policies, usually in response to emergencies, rather than cohering to this international framework.

The Philippines has been the most articulate among the three Southeast Asian signatories to UNHCR treaties about its temporarily hosting Afghan and Rohingya refugees. However, due to its geographical location in Southeast Asia, the Philippines only manages a small percentage of the region's refugees. The Philippines hosted about 1,300 refugees and asylum seekers in 2021, while Malaysia, Indonesia, and Thailand hosted 289,000 refugees and asylum seekers in the same year, despite having lower GINI inequality index scores than the Philippines.

Australia

Australia has become more intolerant to refugees and immigrants in the recent decade. Australia has an established policy of sending them to Manus Island if people arrive by boat. "Human rights" and respect for international treaties have been largely ignored. Many individuals in modern Australia support the statement, "we are aware that detaining refugees in limbo is unethical and against human rights, but we have the right to continue violating human rights to stop the boats." Many Australians are blind to the reality: what has stopped the boats is the turnback policy, not the exile program, and these are two different issues.

Australian government is holding hundreds of people as hostages and that hundreds have been detained in camps on Manus Island and Nauru for the past five years. These people have little understanding of Australia's political scene. Essentially, these are individuals who wish to live in a secure environment. Regardless of the repercussions, Australia's exile program has remained and has severely harmed Australia's human rights standing. International credibility and reputation are critical when exerting authority in the area and worldwide. Even dictatorships with inflexible political systems aim to project a favorable image to the world community. Still, Australia's reputation as a human rights supporter has evolved into a country that breaches human rights.

As a signatory to the Refugees Convention, Australia is committed to ensuring that those who fulfill the U.N. refugee criteria are not deported to a nation where they would jeopardize their lives or Freedom. It is known as the non-refoulement principle. Under the International Covenant on Civil and Political Rights (ICCPR), the Convention Against Torture (CAT), and the Convention on the Rights of the Child (CRC). Australia also has duties not to repatriate individuals who face a danger of violating certain human rights and not send

individuals to other countries where they would meet a genuine risk of violating their human rights under these treaties.

Due to overpopulation in Australia's immigration detention network & capacity restrictions in the detention facilities designed to house asylum seekers in Nauru and Manus, they risk being transferred to a third country. The Australian government stated on November 21 that those asylum seekers who landed in an "excised offshore site" on or after August 13 would be released into the Australian community on bridging visas. Community detention is being used more frequently, which is good for detainees. Still, the Commission is alarmed that thousands of individuals remain confined to closed immigration detention centers.

In Australia, immigration detention is indefinite — there is no legal or policy restriction on how long a person can be imprisoned. Some asylum seekers and refugees are held in immigration detention for long periods while their refugee claims are processed and health, identity, and security checks are completed. They are awaiting removal from Australia if they are found not to be refugees or to be owed protection in any other way. While the legal and legislative basis for involuntary detention remains in place, since late 2010, a significant number of asylum seekers and refugees have been moved from closed immigration detention to the community. Unaccompanied minors and families with children would be sent to community detention centers by the Australian government in October 2010. Following initial health, security, and identification checks, the government stated in November 2011 that it would evaluate an increasing proportion of detainees in closed immigration detention centers for bridging visas or placement in community detention.

Journey of Refugees – A Tale of Sufferings and Misery

Home

Most refugees leave their homeland because of war, fear of violence, or religious suppression. If we look at the concentration of refugees in the last few years, we can see that most of the refugee crisis is happening because of war or other geopolitical reasons. In Syria, the entire country has been devastated due to internal conflict between different sects or groups. People fled due to violence in their country, and most of them fled to Turkey and Lebanon and then to Europe. People also left because of economic reasons. Once the war starts, there is no job left and inflation runs high. It is tough to live in these conditions, and there is no choice left other than to leave.

In Afghanistan, we saw the tragedy unfolding right before our eyes. After the U.S. left the country, there was no law and order and people did not feel safe. Reportedly, now, half of the Afghans live in hunger. They are selling their body parts to survive. In Yemen, people have to flee their country due to religious violence and political violence. Conflict in Yemen is mainly due to problems between Iran and Saudi Arabia, but the victims are innocent citizens of Yemen, and they have nowhere to go. This is a tragic situation unfolding right before our eyes, but no nation is coming to help the people of Yemen.

In Myanmar, the local government has victimized the Rohingya people, and no other neighboring countries are willing to take them. Their homes were systematically burned by local police and military, forcing them to leave their homes and country. All the neighboring countries have refused to shelter them, even in refugee camps. They have become a population without any home and country. These refugees are going through a harrowing time.

Last but not the least, we have seen extreme violence in countries on our southern border. Countries like El-Salvador and Honduras are facing extreme poverty and gang violence. Lack of employment and necessities has driven thousands of refugees/ migrants out of their country and the USA. Because of U.S. government policies, these migrants/ refugees live in extreme conditions just outside the country's southern border.

Refugee Camps

After facing life-threatening situations in their home country, life turns for the worst in refugee camps for refugees. Most of the time, refugees flee to neighboring countries where the local population is not usually welcoming. Conditions in refugee camps are horrible. There is hardly any running water or sanitation available, food scarcity and disease outbreaks are common challenges that refugees encounter in refugee camps. These camps are also rife with criminal activities as there is no authority to maintain law and order. Gang-related violence is common. Most of these refugee camps are dependent on charity organizations like Red Cross and UNHCR, and they are not very well funded.

The most vulnerable in these camps are children and women.

Nearly half of the refugees worldwide are children with no support system or education. Most of these children suffer from hunger and malnutrition. They are also subjected to physical violence and forced labor. As there is hardly any education system in place in refugee camps, these children have no way to grow up into healthy adults. The psychological trauma on kids living in refugee camps is lifelong.

Inadequate Education

Along with food, clothing, and shelter, education is one of the most fundamental needs of children, which is not available in the refugee camps. According to UNICEF, refugee children are more likely than other children to drop out of school due to a lack of safety, language hurdles, or even financial difficulties.

Child psychologists and other top refugee care officials have claimed over the years that the trauma of experiencing war at such a young age and a lack of stability in their lives have left these youngsters mentally traumatized and unable to attend regular classrooms. As a result, children are forced to work to aid their financially shaky families in refugee camps.

For refugee children, the problem of a "lost" childhood is a constant. For adults, forced migration is traumatic. Children do not have the tools that adults do to deal with trauma, making their situation much worse. However, because they are still in the emotional and mental growth stage, youngsters who grasp circumstances considerably better.

The reality is that when children are raised in such a chaotic environment of refugee camps, the deep mental scars that are left on their minds are often neglected. Long-term exposure to violence, anxiety, and uncertainty in these camps permanently impacts refugee children. All of this contributes to the feeling of 'lost' childhood because these youngsters find it difficult to connect emotionally with others.

Sadly, most refugee children are Muslims, and they are victims of religious conflict in their country. There is a very high chance that they get influenced by terrorist organizations in that area. It is very easy for terrorist organizations like ISIS and Al-Qaeda to recruit young kids from these camps. We have seen in the recent past that these terrorist organizations have used children as suicide bombers.

Charities like Red Cross and UNHCR have tried to provide education support systems in the refugee camps, but these initiatives often fall short without help from local governments.

Life in New Country

Life does not get easier for refugees when they find a new home in the country which has provided them asylum. Refugees are never welcome in the country they find their new home. They face systematic neglect from local governments, and most often, they are used as political tools to arouse nationalism.

Refugees have to overcome a lot of challenges in their traumatic journey to reach a new country. They are mentally drained and exhausted when they arrive, but they do not get a moment to relax. They have to immediately tackle new challenges, such as learning a new language and dealing with discrimination and racism in their new country.

How Can Data Science and A.I. help?

In a time when artificial intelligence and data have infiltrated almost every aspect of human life, why not use these tools to alleviate the global refugee crisis? With rapid advancements in technology and Artificial Intelligence, there must be some applications to manage the current crisis.

AI-based innovations have solved many problems in refugee camps. Here are some ways in which A.I., data science, and technology can be utilized to tackle refugee crises across the globe:

Big Data to Solve Refugee Resettlement

Does it matter where asylum seekers find their home? The answer is “Yes.”

Most of the time, governments worldwide try to resettle refugees where they think they have the most resources to help them. Some countries try to resettle them on a random basis.

According to new research done by the Immigration Policy Lab (IPL) at Stanford University and ETH Zurich, in conjunction with Dartmouth College, whether or not refugees land on their feet may depend on a critical factor: where they are resettled within the host country. Depending on the refugee's profile, their new city or town can act as an obstacle to successful integration or facilitate it. A good location match can make a significant difference in helping refugees find work and put down roots. Data science and machine learning algorithms can help governments and resettlement agencies to make the best match possible.

Refugees are often very hard-working people. Data science can help find a particular refugee's language and other skills that will fit in which country and in which part of the country. Some refugees have the job and language skills to do well just about anywhere, and some locations boast strong labor markets and community-based organizations that would benefit any refugee. Data can reveal clear synergies between individuals' characteristics and local conditions: some refugees' strengths will be rewarded more in certain places than others, while some skills might be liabilities in some places.

Currently, these synergies are not taken into account in any systematic way. In the U.S., refugee arrivals tend to be sent to a location that has space to receive them at that moment in time. In other countries, such as Switzerland, asylum seekers are allocated randomly and proportionally across regions. Data regarding where refugees have been most successful can provide excellent insight for the future resettlement of refugees.

Immigration Policy Lab (IPL) at Stanford University and ETH Zurich have done lots of research, and the results have been very encouraging. IPL has developed a data-driven algorithm to optimize the process by which refugees are assigned to locations within a resettlement country.

Social Media Data and its Prediction Ability

In the last decade, the explosion of social media has generated a massive amount of data worldwide. Social networking platforms like Facebook, TikTok, Twitter, and Snapchat generate vast amounts of data daily. When properly analyzed, this Data can have immense prediction value that can help governments and relief organizations prepare for the coming refugee disaster.

One live example is playing in front of our eyes and on live T.V. in Ukraine. The Ukraine crisis unfolded quickly, but a detailed and straightforward analysis could have predicted the crisis efficiently. Proper

social media analysis in the run-up to the war would have given an excellent indicator of the coming crisis. Social media data accurately predicts the emotions and sentiments of the population on a real-time basis.

Data from social media offers a wealth of information that can be parsed to understand better what people think and how people feel about things affecting their lives, such as the displacement and movement of large volumes of people. Researchers, in turn, can use this Data to inform topics of interest; government and relief organizations can use such data and insight into social media data to predict the amount of effort that would be required.

Sentiment analysis of social media content can capture public perceptions of a government's policy towards refugees, and governments around the world can use sentiment analysis to correct the strategy on a real-time basis.

Analysis of Interaction data and Sentiment analysis data can provide lots of insight into prevalent social-political situations in any given country and part of the country. It can point to future crises in making.

The potential of using data science and machine learning to analyze social media data to help predict future refugee crises and help refugees is immense and largely untapped.

Predicting Refugee crisis and Future Hot Spots

While looking at refugees and migrators, one essential factor that is often overlooked is the lack of economic opportunities in a country. Many migrants are forced to migrate due to the inability to earn a livelihood in their own countries. By studying historical Data, we can predict future trends in economic figures. Some of these trends, such as those of population growth, GDP, and unstable political situation and conflicts can aid in the prediction of whether mass migration is a possibility in the future.

Most of these geopolitical problem areas are not very hard to predict. Most of the refugee population is in war-torn countries. War-ravaged countries like Syria, Afghanistan, Iraq, and Yemen have the most refugee populations. Based on the population of these countries, the number of refugees could have been easily predicted. Creating a model based on geopolitical data and population can help predict future hot spots.

These predictions do not just warn against the possibility of a crisis but also help mitigate such a possibility. Implementing the proper remedies can help put in place timely policies that can prevent or reduce the intensity of such crises. By examining these trends, we can be more aware of the areas for improvement and channel political and institutional efforts towards the betterment of these areas.

An example of when this could have been implemented is the war between Ukraine and Russia. As a result of the war with Ukraine and Russia, many people became displaced and immigrated to the United States, Israel, and Germany. If we had the means to predict this event, governments and organizations worldwide would have been ready for this situation that displaced millions of people.

With the explosion of social media data, more models can be built, which can help predict the next hot spots and help governments and relief agencies plan. Social media provides real-time data about the sentiment and interactions of any population, which can effectively predict the resources required for any future refugee hot spots.

Based on geopolitical data and climate change data of any given region, a logistic model can be used to predict if a refugee crisis will take place in that area. After the refugee crisis is predicted, a linear regression can predict the number of people going to be displaced and how many resources will be needed to avert a humanitarian crisis.

As we saw in the Ukraine war, the situation was easy to predict, but neighboring countries were unprepared for the massive refugee influx. We failed to use data science to solve the refugee crisis.

AI-based Chatbots for Legal Advice

In recent years, AI-powered chatbots or robot lawyers have been designed to provide free legal advice to refugees. They use intelligent algorithms to customize legal advice and documents for every case. In some countries, such chatbots assist in filling out immigration applications, while in others, they help asylum seekers obtain financial support from the government. Given the functions chatbots perform and the pace with which algorithms are updated, these AI-powered tools can do wonders in spreading awareness about the legal rights of those in refugee settings.

The conversations with the chatbot can help refugees get immediate information and help the non-profit's limited staff work through cases faster. "We receive hundreds of inquiries a week from people fleeing from persecution and violence," says Betsy Fisher, director of the International Refugee Assistance Project strategy. "Using a chatbot allows us to get an initial picture of people's circumstances rapidly using platforms that many of the displaced people are already using to identify resources and communicate with family. At scale, we hope that this will enable us to identify individuals much more rapidly for refugee resettlement, family reunification pathways, and other resources." The team is currently evaluating the pilot, but the preliminary results show that it is working, and refugees have rated the tool highly.

Most of the time, Refugees have no money to hire a lawyer to get legal advice. An AI-powered chatbot that can adapt based on refugees from different parts of the world will be a great help. Companies like Fast company (<https://www.fastcompany.com>) are working to develop a chatbot that can help refugees in Syria and Iraq.

This also provides relief for social or charity workers to focus on their work instead of answering asylum-related legal questions over the phone.

Legal chatbots are being widely used to automate contract, policy, and legal document generation and can help lawyers avoid some of this work. Chatbots are also used to create contracts and legal documents, which is often tedious work that involves adjusting boilerplate legal text with relevant information.

Technology Facilitates a Variety of Functions

Technology has helped ease a variety of processes for refugees. The advent of technology has allowed the ease of communication and encouraged education in the refugee camps of some countries.

As we struggle to cope with this crisis, technology may hold some of the answers. It has the potential to make the process of rehabilitating refugees more efficient and benefit the communities in which they are seeking asylum. This is particularly favorable if their skills can be used to fill employment gaps.

Refugees are eager to access technology and its benefits, as it enables refugees to remain in touch with their family and friends back home. Some refugees can go to any extreme to secure an internet connection; for example, the refugees living in Tanzania are sacrificing rations of food to buy data to call home.

In refugee camps, education of children is a major challenge, and technologies like mobile devices can solve it. On these devices, some distance learning programs are available for free, which refugee children can access to educate themselves.

Mobile technology is playing a crucial role in ensuring that refugees receive an education, which will ultimately help them realize there is a brighter future ahead. In the long term, continuing education in conflict-stricken zones can trigger social and economic improvements: digital technologies that capture and analyze educational data can also play an essential role in improving the basic operational, planning, and controlling functions in education systems in these settings.

In Western Ghana, children living in refugee camps are learning through the world's first satellite-enabled, live two-way interactive distance-learning [program](#). Each classroom in the school has been equipped with a projector and a low-cost, durable computer, which enables them to receive lessons via a solar-powered satellite link.

Due to cramped and squalid conditions, refugee camps are particularly prone to infectious diseases. Diagnostic platforms that can ensure pharmacy services, prescriptions, and treatment regimens are now beginning to appear. Furthermore, using technology to improve health services has already proven a success in Lebanon, which has the [highest per-capita](#) refugee population globally: in one of its camps, Syrian women have used technology for antenatal appointments, allowing them to communicate with doctors and receive health information online.

The number of refugees who either own or have access to a smartphone has also led to an increase in apps that provide these essential medical services – or, indeed, to help them navigate seas and connect with volunteers during their journey. The demand for mobile data can also be positive for network operating businesses.

Additionally, technology can provide a way for people to be identified, enabling them to maintain their social and economic rights and allow them to seek employment. By boosting their level of integration in their new country, technology provides them with a better chance of succeeding in the long term.

Accommodation for Refugees

Directors/ managers in various refugee and immigration centers often say that people want to help in every possible way but providing accommodation is tough. And, one of the critical areas where help is desperately needed is initial accommodation – when a refugee arrives in a new country. Technology can help create a refugee marketplace where seekers and providers can enter their requirements and reach out to refugees who need help.

Psychological Aid

Refugees whose migration is a consequence of terrorism and/or persecution are usually subjected to trauma that can stay with them for long periods. This trauma may result in mental health issues such as Post Traumatic Stress Disorder (PTSD), depression, and anxiety. Some refugees may even resort to alcohol and substance abuse, which continues to be a neglected problem affecting many refugee camps. For these reasons, stress relief becomes a critical need in refugee communities, and A.I. can help here as well.

Entertainment services such as television, video games, and other such activities can help provide consolation to refugees. These stress-busting techniques may ensure that anxiety does not lead to chronic mental disorders. Video games, especially, have proven to distract from traumatic memories, reduce stress, and help manage moods. Intelligent chatbots have also been developed to create natural and engaging conversations to provide emotional support to refugees.

Numerous humanitarian organizations are working to provide technology solutions to help refugee communities worldwide. Many of the innovations have proven to generate positive effects on the lives of those seeking shelter at refugee camps. Some AI-based algorithms have even successfully matched refugees to employment opportunities in their host countries.

Thus, if utilized correctly, technology can open multiple windows of opportunities for refugees. It enables them to protect their rights, educate themselves, and even earn their livelihoods. The effective deployment of data and A.I. can, thus, assist in solving numerous organizational and day-to-day problems in refugee settings. At the current pace, the day is not far when we can ensure that no refugee or asylum-seeker is left behind.

Conclusion

With the explosion of data in the last decade, Data Science has made it possible to solve many geopolitical and social issues. Technology has solved many problems which were thought to be unsolvable. The refugee problem around the world seems to be one of the most challenging problems to solve because of social and political reasons. Data science and machine learning can help solve or alleviate some of the problems that refugees face in their journey to a better life.

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