The Pros and Cons of Artificial Intelligence in Humanitarian Responses

Mariam Kahloun[1]

1. International Politics and Diplomacy, The CEDS, Paris, France.

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Abstract

The use of artificial intelligence (AI) technologies is increasingly reshaping the humanitarian sector, yet it also brings significant risks for safeguarding vulnerable individuals and populations affected by crises. This article delves into the potential benefits and drawbacks of integrating AI into humanitarian responses. It explores the feasibility and conditions under which AI can be deployed safely to support the efforts of humanitarian workers in the field. The article contends that AI holds promise in aiding humanitarian actors as they transition from reactive to proactive approaches in their work. However, according to the findings, the article underscores the necessity of addressing prevailing risks, such as algorithmic bias and data privacy concerns, as a top priority if AI is to genuinely serve humanitarian objectives without compromising humanitarian principles. By doing so, the article contributes to ongoing discussions regarding the ethical and responsible utilization of AI in humanitarian action. Moreover, it aims to dissect the myths and discourse surrounding AI and assess the various arguments put forth for or against their utilization, drawing insights from literature reviews and evaluation by referring to both international organizations and non-governmental organizations. Finally, the article provides conclusions and recommendations on how humanitarian actors, technologists, and donors can effectively engage with AI in humanitarian contexts.

Keywords: Artificial Intelligence; humanitarian response; humanitarian organizations; emergency response, aid relief

الملخص

إن استخدام تقنيات الذكاء الاصطناعي يؤثر ايجابا في القطاع الإنساني وبشكل متزايد، ولكنه يجلب أيضًا مخاطر كبيرة لحماية الأفراد والمجتمعات الضعيفة المتضررة من الأزمات. تتناول هذه المقالة الفوائد والمخاطر المحتملة لدمج الذكاء الاصطناعي في الاستجابة للعمليات الإنسانية. كما تتناول ايضًا الجدوى والشروط التي يمكن في ظلّها استخدام الذكاء الاصطناعي بشكل آمن لدعم جهود العاملين في المجال الإنساني. وتؤكد المقالة أن الذكاء الاصطناعي يبشر بالخير في مساعدة الجهات الفاعلة في المجال الإنساني أثناء انتقالها من نهج رد الفعل إلى النهج الاستباقي في عملها. ومع ذلك، وفقًا للنتائج، تؤكد المقالة على ضرورة معالجة المخاطر السائدة، مثل التحيز الخوارزمي والمخاوف المتعلقة بخصوصية البيانات، كأولوية قصوى إذا كان المطلوب أن يخدم الذكاء الاصطناعي الأهداف الإنسانية بصدق دون المساس بمبادئها. من هنا، تسهم المقالة في المناقشات الجارية حول الاستخدام الأخلاقي والمسؤول للذكاء الاصطناعي في العمل الإنساني. علاوة على ذلك، تهدف إلى تحليل الأحاديث والمعتقدات الخاطئة المحيطة بالذكاء الاصطناعي وتقييم الحجج المختلفة المطروحة لصالح استخدامه أو لضد هذا الاستخدام، مستندًا إلى مراجعة الأدبيات والتقييم بالرجوع إلى المنظمات الدولية والمنظمات غير الحكومية. أخيرًا، تقدم المقالة استنتاجات وتوصيات حول كيفية تعامل الجهات الفاعلة في المجالين الانساني والتكنولوجي والجهات المانحة بشكل فعّال مع الذكاء الاصطناعي في السياقات الإنسانية.

الكلمات المفتاحية: الذكاء الاصطناعي؛ الاستجابة الإنسانية؛ المنظمات الإنسانية؛ الاستجابة الطارئة، الإغاثة في حالات الطوارئ

Introduction

Artificial intelligence, or AI, is a technology that helps computers and robots to mimic human intellect and provide the needed skills to solve problems (IBM, n.d.). In a world increasingly shaped by rapid technological changes, AI stands at the forefront of innovation, particularly within the realm of humanitarian efforts. The integration of AI into humanitarian endeavours represents a notable shift in the sector, as it combines advanced technology with the fundamental goal of reducing suffering alongside preserving lives. This integration reflects a larger movement towards digital innovation across different industries. AI's potential to transform critical areas such as disaster risk reduction and response, resource distribution, emergency education, and food aid is vast, presenting opportunities for increased efficiency, productivity, and effectiveness. Nevertheless, this progress also introduces numerous challenges and ethical dilemmas.

Utilizing AI in scenarios including marginalized communities raises fundamental concerns regarding fairness, prejudice, data confidentiality, and the potential for unforeseen repercussions (*International Review of the Red Cross*, 2022). In this setting, humanitarian organizations are actively investigating methods to leverage novel and advancing technologies to enhance the delivery of humanitarian aid, aiming for increased productiveness and efficiency while optimizing resource utilization. Technologists alongside advocates for innovation globally are more and more interested in utilizing AI and other cutting-edge technologies to address the most significant challenges facing humanity (MIT Technology Review, 2019). The Chief Information Officer of the World Food Programme (WFP) has emphasized the agency's responsibility to use technology to enhance efficiency, stating that it's a 'moral imperative' (The New Humanitarian, 2019).

As humanitarian emergencies evolve into more intricate and enduring challenges, the demand for humanitarian aid has surged dramatically, escalating from 78 million people in 2015 to an unparalleled 235 million in 2021 (ReliefWeb, 2020). This growth in humanitarian needs has correspondingly led to an increase in funding requirements, as highlighted in the Global Humanitarian Overview by the Office for the Coordination of Humanitarian Affairs (OCHA). Over the same period, funding needs have risen from US$16 billion to $35 billion (ReliefWeb, 2020). Notably, the Coronavirus Disease 2019 (COVID-19) epidemic only generated humanitarian funding needs amounting to $9.5 billion (ReliefWeb, 2020). It should be noted that the COVID-19 outbreak has expedited the deployment of digital technologies in order to sustain humanitarian activities, further amplifying an existing trend in the sector (International Review of the Red Cross, 2021).

However, despite these escalating funding requirements, a significant gap persists each year in meeting the requirements of the marginalized populations. Mark Lowcock, the Under-Secretary-General of Humanitarian Affairs and Emergency Relief Coordinator, has stated that while increasing funding is important, it's insufficient to bridge the void entirely. He also emphasized that the efficiency of existing resources should be maximized. The most effective approach involves shifting from a reactive to an anticipatory system (ReliefWeb, 2019).

Figure 1 demonstrates the percentage of people targeted vs in need from 2015 till 2024. As shown, 2024 shows the lowest percentage. Yet, a reduction in needs does not necessarily mean an improvement.

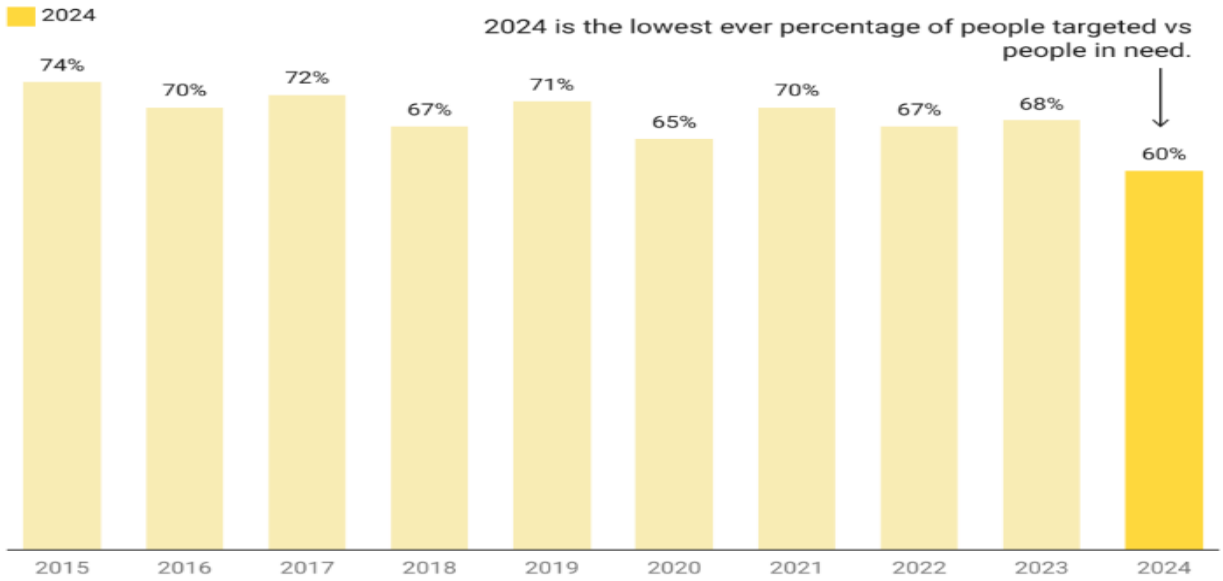

Figure 1: Percentage of people targeted vs in need (defishumanitaires, 2024)

On the other hand, various compelling incentives and motivations drive the adoption of AI-powered digital technologies in humanitarian fields. One of the most significant is the potential for improved data for contextual analysis. Particularly for humanitarian organizations with limited resources and confronting urgent needs, these tools hold the promise of gaining a deeper and quicker understanding of contexts, ultimately facilitating more efficient assistance delivery. Additionally, for recipients of aid, the visibility provided by digital tools - such as Mapping non-formal agreements within communities, which are not typically found on commercial or government channels, might serve as an initial point toward enhancing aid delivery. Nonetheless, such applications necessitation goes beyond technology and may entail certain concerns.

Moreover, AI holds the potential to enhance any mistakes that may occur in aid distribution, aiming to measure impact and mitigate instances of fraud or diversion of resources. This is particularly evident in the case of biometrics. In Jordan, for instance, the adoption of biometric systems for refugee aid recipients was primarily driven by the promise of providing heightened levels of confidence to funders and relief groups that monetary help reached the intended recipients (Holloway et al., 2019). However, individuals residing away from biometric-enabled ATMs, in addition to individuals with health issues like those who encountered complications with innovative technologies such as iris-scan, elderly individuals, those with disabilities, alongside marginalized categories that face challenges in accessing appropriate aid, reported additional barriers when such tools were employed. As a result, the goals of improving supervision and liability to satisfy donors and corporations conflicted with the values of inclusion.

Arguably, the most compelling impetus for digitalization in the humanitarian sector stems from the necessity to align with the broader global landscape, enabling the assessment and engagement with vulnerable communities that routinely utilize digital programmes and technologies within their daily lives. Unlike the project-centric and segmented approach typically adopted by humanitarian actors towards digital interventions, digital mapping activities and especially social networks are utilized for various networking, recreational, and collecting information purposes, even within humanitarian settings. Despite their diverse uses, throughout catastrophes, these programmes play a pivotal part in spreading data, enabling operators to explore, discuss, and communally comprehend

these developments (Mark Latonero, Paula Kift, 2018).

Thus, balancing the utilization of AI's capabilities for positive outcomes while navigating its difficulties requires a refinement comprehension of both its potential and limitations. This article examines these crucial topics, and it also explores how AI can pose both challenges and solutions in the realm of humanitarian assistance.

Literature Review

Definition of Humanitarian Response and History of AI Utilization

Humanitarian work, the relief of suffering, or the advance of the interests or fundamental rights of fellow humans at risk or in need, is done in many ways by different actors, in many different places, and in many different situations. Given the plethora of options and needs, there are also a plethora of designs and sources of these responses. What is peculiar about such quintessentially non-profit motives in the non-profit sector of work is the amount of effort, time, energy, and the will to do good, and the orientation to professional attention to implementation that goes into its systematic application. There are many organizations and associations that mobilize professional staff who are ready to deploy themselves in the service of others, whether in acute emergencies, in postwar reconstruction support, dealing with the consequences of slow-onset natural or human-made disasters, reawakening activity after a sudden, unexpected reversal of opportunity to pursue those activities in a beneficial and safe manner or needed work. AI has the potential to drive operational gains for humanitarians through enhanced efficiency in routine tasks like report drafting and data formatting (UNOCHA, 2024). Drones, a well-known example of new technology, are massively being deployed in different humanitarian operations. They can be used to collect high resolution imagery and reach areas where there is high risk of logistical delivery. The first drones utilized in the humanitarian sector were employed in 2006 for peacekeeping surveillance in the Democratic Republic of Congo, according to Wynsberghe and Comes (Rosén, 2013). The use of drones for mapping and logistics has been explored by several international humanitarian actors (Ning Wang, 2022) .

Three Rs for a Conceptual Humanitarian Response Framework

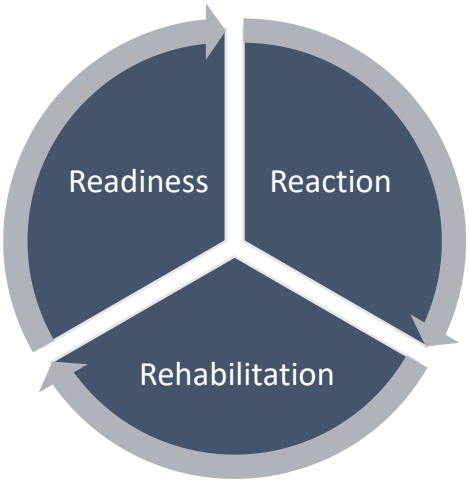

Figure 2: 3Rs Conceptual Framework

As previously mentioned, AI is capable of assisting humanitarian organizations in shifting from reactiveness methods to those that are based on anticipating within the realm of the humanitarian field. The radical change of this phenomena encompasses an initiation activity the instant of anticipating a possible catastrophe and actively work to lessen its negative effects on helpless populations. Thus, AI can enhance the tasks capabilities of humanitarian sector across the following '3Rs' primary scopes: Readiness, Reaction, and Rehabilitation.

Readiness involves an ongoing effort to comprehend current risks and suggest strategies to address them, thereby enhancing the efficacy of humanitarian responses to crises and emergencies (*UNHCR*, 2023). Reaction efforts concentrate on providing aid to affected individuals, while recovery initiatives extend beyond immediate relief efforts (IFRC, n.d.). Rehabilitation holds significance as modern humanitarian crises often exhibit complexity and longevity, blurring the lines within the realm of humanitarian assistance and that of the progress collaboration (Lie, 2020).

Readiness

Artificial intelligence has the capacity to bolster humanitarian readiness through the examination of vast datasets, therefore providing valuable information regarding possible dangers faced by impacted groups. These insights equip humanitarian actors with knowledge about impending crises or disasters before they unfold (Institute of Development Studies, 2020). Predictive cognit, leveraging machine learning guided by data and arithmetical representations, holds promise in forecasting various events such as natural disasters, displacement patterns, famines, and global health crises (Molnar, 2019). While current AI systems excel in pre-emptive alerts and near-term forecasts, their capabilities remain considerable in enhancing preparedness efforts (Institute of Development Studies, 2020).

As an illustration, the Forecast-based Financing initiative implemented by the International Federation of Red Cross and Red Crescent Societies (IFRC) facilitates the rapid provision of humanitarian funds to implement without delay actions. This initiative employs diverse data sources, including meteorological data and market analysis, to identify the timing and location for the allocation of humanitarian resources (Bengtsson, 2018). Another case in point is the Project Jetson initiated by United Nations High Commissioner for Refugees (UNHCR), which employs predictive analytics to anticipate involuntary dislocation linked to the exacerbation of conflict in Somalia (Service, 2019). In a different setting, the WFP has pioneered a ground-breaking approach by harnessing predictive analytics to anticipate food insecurity in regions beset by conflict. In areas where conventional methods of data collection, such as surveys and assessments, are hindered by logistical challenges or security risks, the WFP's model offers a promising solution (HungerMap LIVE, n.d.).

Thus, these integrated analytic models hold the potential to enhance the readiness method in the humanitarian sector. To delve deeper, the systems relying on AI can indeed enhance the mentioned sector by offering a more in-depth awareness of the issue and facilitating greater reaction prediction. For instance, increased readiness can allow for the prompt deployment of assets, which proved to be critical in terms of the efficacy of actions in the field.

However, conversely, relying solely on the analysis of historical data to inform future actions may present limitations. Models based solely on past data may overlook crucial factors that are a game-changer. These factors include shifts that inevitably befall on the human actions and the climactic change, resulting in inaccurate forecasts. This scenario may apply to the period when the pandemic was rapidly spreading in 2019. During this time, even AI models faced difficulties in determining the most effective approach for medical decision-making. Consequently, AI's inability to mitigate the spread of the pandemic was exacerbated by the influx of new and unknown data, as well as the heightened risk of bias, managing disease outbreaks due to the low quality of historical data unrelated

to COVID-19 and the high risk of discrimination (Wynants et al., 2020). Moreover, AI systems focused on analysing past data may perpetuate errors, inaccuracies, historical inequalities, biases, and unfairness (Richardson et al., n.d.). Therefore, given the distinct characteristics of the humanitarian background, thorough examination is essential when implementing AI systems to prevent exacerbating techno-solutionism which is characterized by an unwavering belief in technology's ability to address different kinds of challenges especially in the social factors, thus demonstrating diverse outcomes. Another example is the prediction of the Ebola disease. Research indicates that emphasizing the analysis of data did not consistently yield effective results compared to investing in robust public health and social infrastructure (Wamsley and Chin-Yee, 2021). On the other hand, a collaboration with societies that are mostly affected plays a significant role in improving the productivity of humanitarian aid. This is done when there is better informing and preparation for a reaction before conflicts or crises emerge.

Reaction

As stated before, AI is considered one of the big players when it comes to reacting to disasters or crises, especially in the humanitarian sector. In recent years, rapid advancements in AI technologies have revolutionized the way humanitarian organizations can harness social media data during crises. These advancements enable quicker and more accurate classification of social media messages, which is crucial for humanitarian organizations to effectively monitor and respond to unfolding crises. Such capability might aid humanitarian organizations to be ready for different crises (Padhee et al., 2020). Specifically, these advanced AI technologies facilitate the identification of areas where streamlined delivery of assistance to affected populations would be most beneficial.

Thus, the Emergency Situation Awareness platform has a real-time monitoring capability which is particularly valuable during fast-moving and unpredictable events such as natural disasters. By continuously analysing Twitter content, the platform can detect and alert users to relevant information, including reports from eyewitnesses, official announcements from emergency services, and updates from local authorities. Moreover, this platform can utilize advanced algorithms and machine learning techniques to filter and prioritize Twitter content based on its relevance and reliability. By distinguishing between credible sources and misinformation, the platform helps users access accurate and trustworthy information during times of crises (Power et al., 2014). Likewise, the Artificial Intelligence for Disaster Response platform, which categorize the data gathered from social media, provides valuable perceptions regarding disaster progression (AIDR, n.d.). These platforms are capable of triaging and categorizing content, including pertinent images shared on social media depicting infrastructure damage and the severity of harm to affected communities, thereby assisting in fast reaction toward a catastrophe.

There is also the Rapid Mapping Service which represents a significant effort aimed at harnessing satellite imagery and geospatial technology to rapidly assess and respond to humanitarian crises and natural disasters worldwide. This project is a joint effort between the United Nations Institute for Training and Research (UNITAR), UN Global Pulse, and the UN Operational Satellite Applications Programme (UNOSAT) (*UNITAR*, n.d.). This initiative utilizes AI to analyse satellite imagery to provide near real-time mapping and analysis of disaster-affected areas. This information is invaluable for informing humanitarian response efforts on the ground.

The question remains, are these examples enough to demonstrate the effectiveness of AI in humanitarian responses? The examples provided indeed suggest that AI has the potential to contribute to a swift reaction that helps the humanitarian sector to acknowledge crises by providing timely and relevant information for decision-making. However, the effectiveness of AI systems in humanitarian

action is highly context-dependent. Factors such as the accuracy of data, the integration of AI technologies with existing response mechanisms, the involvement of local communities, and the ethical considerations surrounding AI deployment all play crucial roles in determining the impact of AI on humanitarian responses. Therefore, while AI can offer valuable assistance, careful consideration of context and ethical implications is essential to ensure that AI systems truly enhance humanitarian efforts rather than exacerbate existing challenges.

Using AI technologies for mapping disaster-affected areas has shown promising outcomes, as exemplified by the Humanitarian OpenStreetMap project (*Humanitarian OpenStreetMap Team*, n.d.). However, while such projects demonstrate effectiveness in disaster response scenarios, they may face challenges in contexts of armed conflict (ICRC, n.d.). For instance, when a conflict between two parties erupts, the prevalence of spreading false or misleading information can hinder entree to credible and reliable information, impacting the reliability of information used for mapping efforts. Additionally, issues related to the availability of accurate and reliable data, that often become limited or unavailable during conflicts, may impede the creation and advancement of AI technologies that are tailored to such contexts, thereby potentially compromising the suitability and effectiveness of mapping tools in humanitarian responses to armed conflict.

The effectiveness of AI applications in humanitarian contexts hinges on various factors, including the nature of the crisis, the availability of data, the technological infrastructure, and the local socio-cultural context. While AI-powered tools like predictive analytics, natural language processing, and image recognition can provide valuable insights and support decision-making in certain scenarios, they may not always be suitable or feasible to all humanitarian organizations. Each humanitarian situation presents unique challenges, including varying levels of data availability, cultural considerations, and moral apprehensions, significantly influencing the appropriateness and efficacy of AI interventions. That being the case, while AI can be a valuable tool, it should be approached with careful consideration of the specific context and in conjunction with other approaches to humanitarian action, such as community engagement, local expertise, and traditional response mechanisms.

Rehabilitation

One of the key advantages of AI in the recovery phase is its ability to streamline and optimize processes, enabling more efficient resource allocation and decision-making. For instance, AI-powered analytics can help humanitarian organizations identify priority areas for intervention, assess needs, and track progress towards recovery goals. By analysing large volumes of data from diverse sources, including satellite imagery, social media, and survey responses, AI can generate valuable insights that inform evidence-based programming and resource allocation strategies. AI has the potential to support humanitarian action in protracted situations by streamlining processes and enhancing outreach efforts (Madianou, 2015). For instance, one of the most challenging aspects faced by displaced individuals and families is the uncertainty and anguish resulting from separation during conflicts, natural disasters, or migration journeys. Reuniting families torn apart by such circumstances is a complex and time-consuming process that often relies on manual methods of searching and matching photographs and documents. The Trace the Face tool addresses this challenge by leveraging the capabilities of AI to streamline and expedite the process of family reunification. The AI algorithms deployed in this tool are trained to analyse facial features, such as the shape of the eyes, nose, and mouth, as well as distinctive marks or scars, to identify potential matches. This automated matching process significantly accelerates the search process and increases the likelihood of reuniting families separated by conflict or displacement. This tool is developed by the International Committee of the Red Cross (ICRC) (ICRC, 2019).

Moreover, AI-powered chatbots represent another innovative application of AI in humanitarian contexts. These chatbots represent a valuable tool for enabling affected community members to connect with humanitarian organizations and access essential information during times of crisis. These AI-powered conversational agents offer a user-friendly interface for individuals to seek assistance, guidance, and support, regardless of their location or language proficiency. For example, chatbots deployed by humanitarian organizations such as the International Organization for Migration (IOM) and the UNHCR provide a range of services to migrants and refugees. These services may include information about legal rights and procedures, access to healthcare and education services, guidance on asylum processes, and referrals to local support networks and resources (World Migration Report 2022, n.d.).

Yet, it's crucial to avoid generalizations about the effectiveness of AI in contributing in the rehabilitation process. In the proceeding analysis of readiness and reaction, the utility of AI technologies hinges in the particular context where they are utilized. Employing the involvement of some societies and novel methods that are centred around people can help identify areas where technologies, including AI, can aid rehabilitation efforts in the field. Inversely, there may be contexts where AI systems offer limited worth in the rehabilitation process. Decisions regarding the utilization of AI systems in recovery programs should be informed by a thorough comprehension of the requirements of impacted societies. Moreover, it's essential to recognize that AI technologies carry inherent risks for affected populations. Hence, careful consideration of both the benefits and risks associated with AI deployment is essential in ensuring that recovery efforts are both effective and ethical.

Benefits and Drawbacks

Several articles discussing humanitarian innovation fail to tailor their definitions specifically to the humanitarian context. For example, Scott-Smith offers a broad definition, characterizing it merely as a method of accomplishing tasks in novel or improved manners. (Scott-Smith, 2016). Similarly, Bounie et al. describe it as 'incremental improvements' (Bounie et al., 2020), while Krishnan suggests that creative approaches foster fresh concepts and thoughts to address existing challenges (Krishnan, 2020).

Swasdee et al. (2020) argue that AI, Big Data, alongside RS, have significantly influenced societal ethics (Swasdee et al., 2020). The utilization of these technologies shows promise in enhancing problem-solving capabilities. Their study delves into the growing significance of the mentioned technologies within the realms of humanitarian relief and warfare (Swasdee et al., 2020). Negi elaborate on the critical role of humanitarian aid organizations in quickly assessing the extent of damage to buildings and identifying safe transport routes in disaster-stricken areas, ideally in real-time (Negi, 2022). Aiken demonstrates that leveraging data from mobile phone networks, combined with AI algorithms, can enhance the effectiveness of humanitarian aid efforts at the local level (Aiken et al., 2022). Using conventional examination of the data to educate machine learning methods in identifying poverty trends in mobile data, they illustrate how AI algorithms can effectively prioritize assistance for the impoverished mobile subscribers. Thus, in response to the urgent need for swift and efficient delivery of relief supplies to inaccessible areas during disasters or conflicts, researchers from the German Aerospace Centre are actively engaged in developing and testing new AI technologies as a Drones4Good project component (DLR, 2021).

Ramalingam asserted that numerous international humanitarian organizations have embraced the shift towards creativity, alongside a growing amount of entities embracing new and creative approaches to spur fresh perspectives humanitarian aid delivery (Ramalingam et al., 2009). This

involves establishing specialized teams, innovation labs, challenge grants, or other initiatives aimed at inspiring novel approaches to problem-solving and seizing opportunities. Additionally, Dette stated that an increasing percentage of benefactors, private sector entities, different sort of academies, and other stakeholders have forged businesses focused on artificial intelligence (Dette et al., 2016).
Artificial intelligence is powered by data, especially accurate and high-quality data, to construct a smart system. The more complex AI tool demands more information as input. Constraints on data sharing in the humanitarian sector are viewed as a challenge and a risk to confidentiality. Humanitarian organizations gather sensitive data to adjust responses and ensure that safeguarding remains a top concern. Cyber assaults have happened against various humanitarian actors, such as the ICRC in January 2022, when personal data belonging to almost 515,000 individuals globally were compromised in a sophisticated cyber-attack (ICRC, 2022). The linked risks with AI usage in humanitarian intervention raises the concern and restrictions for accountability for the proper use; AI policies have been recently part of the code of conduct in the humanitarian volunteering or employment.

Materials and Methods

Comprehensive Search Strategy

To ensure a systematic and thorough exploration of prevailing literature on the subject of AI in humanitarian responses, a comprehensive qualitative search strategy was conducted. The researcher surveyed a search strategy that involved a systematically querying academic databases, including Science Direct, Google Scholar, JSTOR, Scopus, IEEE Xplore, and relevant journals and conference proceedings. Keywords and search terms such as 'artificial intelligence,' 'humanitarian response,' 'disaster relief,' and 'emergency response' will be utilized among others to narrow down the results. Boolean operators such as 'AND,' 'OR,' and 'NOT" will be employed to combine search terms effectively. Additionally, relevant MeSH terms and controlled vocabulary specific to each database will be incorporated to enhance the precision of the search. The search strategy will be supplemented by manually probing the list of reference of pivotal articles and seeking advice from experts in the domain to ensure a comprehensive coverage of relevant literature. This in-depth approach will enable the identification of a diverse range of scholarly articles, reports, case studies, and other sources that contribute to the understanding of AI applications in humanitarian responses, facilitating a robust literature review for the article. The detailed search method of the article is demonstrated in Figure 3.

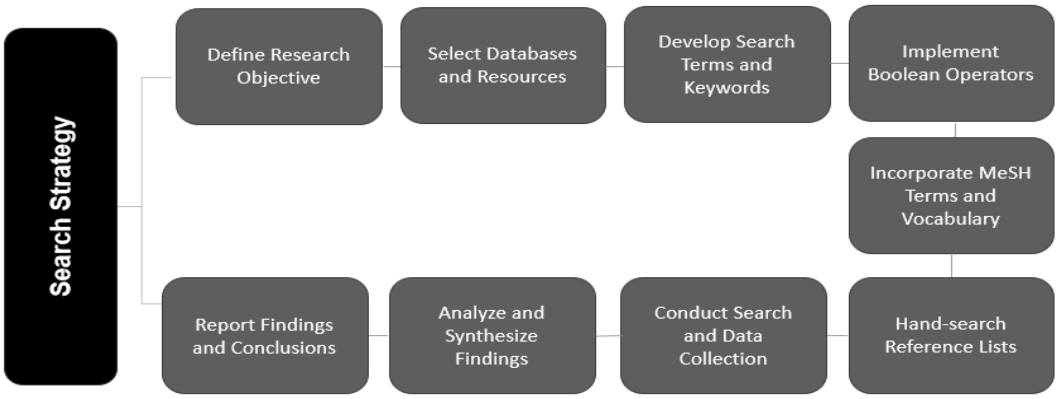

Figure 3: Pipeline of the search strategy

The Risks of Implementing AI for Humanitarian Action

Several organizations have shown the feasibility of employing AI in humanitarian situations, yet few have convincingly argued for their preference over alternative tools. As AI technologies increasingly infuse our daily lives, the potential harm caused by biased algorithms becomes more profound and widespread. AI systems integrated into digital platforms may speed the spread of false information, divert focus, and negatively affect mental health. However, a lack of comprehensive analysis concerning the expenses and hazards associated with the integration of AI in the humanitarian sector and their impacts continues to be a major concern. Are the advantages of employing AI systems worth the investments needed, including economic, high-tech, and man power, as well as moral considerations and potential missed opportunities? There has been minimal research conducted on this aspect within the humanitarian domain. Although this doesn't necessarily invalidate the potential benefits of AI, it underscores the need for caution, thorough questioning during the design and implementation phases, and innovative approaches to both validating concepts and evaluating impacts.

Effectiveness

When aid professionals evaluate the advantages and drawbacks of AI, one of the most crucial questions they pose is, 'Does it show results?' The response, certainly, varies. For instance, AI or machine learning (ML) demonstrates remarkable efficacy in swiftly generating detailed maps of regions affected by disasters of previously uncharted areas. The achievement by Facebook AI in generating highly detailed population density maps is a significant advancement in the field of geospatial analysis and remote sensing. By analysing an extensive dataset of 11.5 billion individual images covering Africa, Facebook AI was able to extract valuable information about the distribution of buildings across the continent. This process involved sophisticated machine learning algorithms capable of identifying and categorizing buildings from satellite imagery with remarkable precision. The high success rate of 99% demonstrates the effectiveness and accuracy of the AI-powered approach employed by Facebook (Meta, n.d.). Achieving the same scale through manual review by a team of 20 individuals working continuously, without any breaks, would have taken several decades. Moreover, AI systems that enhance efficiency through automation enable humans to reallocate their time towards addressing more pressing challenges.

Although AI systems can outperform humans in numerous aspects, they have the potential to be faulty in manners beyond human capabilities (Brundage et al., 2018). The clarity regarding the influence of various AI technologies remains limited. Although aid organizations are creating models to anticipate disasters, population displacement, and disease outbreaks, there is a lack of transparency regarding the success rates of these models. In 2021, the OCHA partnered with Johns Hopkins University to launch a pioneering initiative model that represents a significant step forward in leveraging cutting-edge technology to improve decision-making and response coordination in humanitarian crises worldwide. This collaboration is known as the OCHA-Bucky model (The Centre for Humanitarian Data, 2020).

However, these models effectively reproduce past trends into the future by relying on historical data to forecast crises. In the most severe cases, they perpetuate existing discrimination and bias. The inconsistent outcomes from some models could suggest issues with data quality, along with questionable methods of documentation. Interestingly, such models may achieve higher accuracy if the human action partakes minimal immediate impact on the data. Thus, the effectiveness of such model diminishes when it comes to forecasting population displacement due to conflict, even if they show a promising forecast in forecasting risks, agricultural output, and the spread of illnesses.

The impact of using of AI in humanitarian aid in various disciplines has been reflected in recent studies. " Despite of its risks and threats, AI still is giving more benefits to humanity (Efe, 2022). The Norwegian and Danish Red Cross organizations have implemented the first AI application examples. The humanitarian sector is experimenting with AI by evaluating the various AI capabilities of various national organizations (Tolic) . Turkish Red Crescent collaborated with Microsoft and its partner Mart Software to develop a content management system (Microsoft, 2022). The runaway AI scenario model predicts positive development through 2050 and unsuccessful attempts to prevent AI from assuming control of important institutions and societal roles between 2050 and 2075 (Undheim & Ahmad, 2024).

The present emphasis on predictive analytics within humanitarian contexts prompts a critical question regarding its impact and effectiveness: are humanitarian actors addressing the right problem? Supporters of such statistical algorithms and machine learning techniques argue that this approach can enhance humanitarian efforts while facilitating the implementation of humanitarian involvements, expediting money allocation, along with the optimization of help distribution through improved supply chain management. However, two fundamental fallacies underlie this assertion: first, the assumption that donors and policymakers inadequately respond to crises due to a lack of precise and appropriate information, and second, the belief that with more precise and appropriate information, mainly prior to a crisis, key stakeholders will react in a more compassionate or efficient manner.

These mistakes overlook the political dynamics that initiate crises and shape their response. For instance, the insufficient funding to address humanitarian needs in Venezuela, has led the country to only secure approximately 30.8% of the $720 million requested in the Humanitarian Response Plan formulated by the UN's emergency aid coordination entity (The New Humanitarian, 2023), which stems from political decisions rather than a shortage in data In the crisis in Tigray, aid agencies have reported that government-imposed restrictions in Ethiopia have hindered the effective distribution of aid (Phillips et al., n.d.: 1967–1970). Furthermore, some aid specialists caution that if not utilized cautiously, the outcomes of predictive models could inadvertently prompt harmful responses to crises. These responses may include border closures, limitations on the movement of displaced populations and migrants, and the diversion of aid away from areas of political dissent. An example provided is that the national public health authority within the sub-Saharan African nation deliberately disregarded the forecasts generated by their Covid-19 model (Murewanhema and Dzinamarira, 2022). The model identified detailed populations facing heightened Covid-19 threats across the country, yet the authority chose to allocate limited health resources to different set of people as an alternative. When questioned to justify this decision, they indicated that such decisions were not solely driven by data.

Governments aren't the sole entities disregarding data and analysis. Humanitarian organizations conduct numerous evaluations and gather vast data volumes. However, a study showed that humanitarian organizations upon encountering a new disaster, tends to replicate previous procedures with only slight modifications. (ReliefWeb, 2015). The issue lies not in the accuracy or detail of available information, but rather in the high degree of 'path dependency' in policymaking. This is constituted by obstinate doubt and inadequate cooperation among agencies, powered by collaborative rivalry and donor necessities.

Even if AI models precisely predict forthcoming food shortage or floods or any other crises, their efficacy hinges on aid organizations or policymakers taking action based on this information. Enhancing the effectiveness of AI in humanitarian contexts necessitates a shift in how people define the problems requiring solutions and how they identify AI applications. However, numerous AI pilot projects are crafted around explicit skills, such as predictive analytics, instead of addressing precise problems. To genuinely assess whether AI can enable humanitarians to achieve more with fewer

resources, this approach must evolve. Aid organizations should spearhead the humanitarian AI agenda, mutually pinpointing critical limitations where emerging technologies could offer assistance.

Bias and Prejudice

Certain supporters argue that AI offers additional paths for creating impartial and fair decisions, devoid of human discrimination and biases. Though AI systems may mitigate human prejudice in particular instances, asserting procedures that are highly accurate than humans overlook the challenges associated with eliminating and addressing bias.

It's challenging to assert that technology remains neutral in political manners when it processes historical data gathered in inherently biased contexts. As an example, when individuals are to count on data generated by service provisions gathered by humanitarian actors 40 years ago, could they assume it provided an accurate valuation of the experiences or requirements of females, given that most aid players weren't prioritizing such information at that time? Because data-driven technologies like AI derive their information from the current forces of the civilisations under study, they are just as skilled as humans at perpetuating, strengthening, and intensifying existing biases and prejudice (Leslie, 2019).

The emergence of algorithmic auditors reflects growing concerns about bias and discrimination in AI systems. These auditors scrutinize algorithms to safeguard transparency, guard privacy, and eliminate bias and discrimination. However, this approach is not without its limitations. Audit results can be manipulated or misrepresented for public relations purposes, and auditors themselves (MIT Technology Review, n.d.) acknowledge the formidable task of mitigating bias.

Currently, there are no mandates for humanitarian organizations to conduct audits on their AI systems to identify bias or discrimination, nor is there any methodical instruction governing the utilization of AI by these actors. Nonetheless, some experts (Johnson, 2021) propose that governments and donors might eventually necessitate algorithmic assessments before deployment, similar to the necessity of environmental impact evaluations preceding construction projects. Founding a self-governing body to scrutinize AI-driven initiatives in the humanitarian sector could mitigate the risks associated with bias and prejudice. The introduction of the Peer Review Framework for Predictive Analytics in Humanitarian Response represents a significant step forward in establishing standards and guidelines for the application of predictive models within the humanitarian landscape. This framework is designed by the Centre for Humanitarian Data to address the growing use of predictive analytics tools and techniques in humanitarian operations, aiming to ensure that these technologies are deployed ethically, transparently, and effectively. (Centre for Humanitarian Data, 2020). Although this framework is currently focused on predictive analytics, its accompanying support could lay the groundwork for an inclusive sector method and evaluate committee concerning the implementation of AI.

The Role of Public Contribution

Humanitarian efforts, primarily located in North America and Europe, is traditionally led by a small group of donors, international public entities, and Non-governmental Organization (NGOs). In spite of pledges made at events like the World Humanitarian Summit in Istanbul in 2016 to rectify this imbalance in the system, little improvement has been achieved (Peace Direct, n.d.). Rebalancing power dynamics to favour the Global South necessitates a comprehensive renovation in how essential life-saving aid is conceptualized, obtained, distributed, and evaluated.

AI present fresh prospects for bolstering broader localization initiatives and fostering community

partnerships. The proliferation of AI companies in middle or even low income countries is expanding, offering humanitarian organizations greater chances to redirect procurement toward technological solutions provided by companies based in the Global South, (*Mobile for Development*, 2020). Additionally, AI introduces novel methods to interact with a larger audience in shorter timeframes, enabling the solicitation of their perspectives and contributions regarding crises and ongoing relief endeavours.

Stakeholder analysis and mapping is a project management tool that is usually used by corporate businesses, it is also crucial in humanitarian aid approach. Elements for stakeholder analysis include the parties and scale of involvement. Community involvement is essential at different stages of humanitarian aid from assessment till implementation. Adopting AI in humanitarian response shall be communicated early on with communities for several reasons primarily the revolution in using AI and ensuring acceptance for such technology especially that humanitarian response usually is in developing countries or where crisis occurs. Exploration and designing of certain AI tools may require direct coordination with stakeholders and communities especially if it is customized for a specific service. Numerous stakeholders who are linked intricately are frequently involved in Community Citizen Science (CCS) including communities, citizens, scientists, designers and policymakers. When addressing social issues, CCS gives stakeholders a platform to discuss underlying challenges and locally relevant action plans that are difficult to find in more conventional technology and researcher centred methods. Three major challenges that may arise upon adoption of AI systems: Codesigning AI systems with local communities, collecting and explaining community data using AI and adapting AI systems to long term social changes (Hsu1, 2021).

Although AI presents chances, there are concerns that it might hinder efforts toward localization and participatory approaches. Firstly, aid agencies have an irregular track record when it comes to local procurement, despite the fact that procuring goods and services constitutes a significant 65% of relief operation costs and has the potential to greatly redirect resources and authority to the Global South (Moshtari et al., 2021). Additionally, meaningful community involvement in the aid sector has been lacking not due to a shortage of tools, but rather since the prevailing prototype, along with the resulting supremacy structures, prioritize speed on the expense of involvement and proficiency expertise over the insights and practices of local societies.

Moreover, the increasing automation brought about by AI could have depersonalizing and dissocializing effects, potentially dehumanizing issues and diminishing the value of involvement approaches intended to strengthen societies and prioritize their perspectives in aid program project. A growing dependence on predictive models for population movements or conflict occurrences might reduce the inclination of agencies to gather insights from frontline workers and the societies they aid. Similarly, although models predicting employment outcomes have influenced refugee relocation decisions in the United States, it appears that neither the UNHCR nor the US Department of State sought or considered the views and preferences of refugees themselves when determining relocation sites. Also, data-intensive AI systems run the risk of additional marginalizing individuals who speak non-dominant or non-digitized languages, populations that have been disgracefully side-lined by aid agencies for decades. This emphasizes the importance of community contribution, individual empowerment, and agency in humanitarian efforts. However, aid organizations must ensure that their interventions not only address immediate needs but also actively involve the affected communities in decision-making processes. Additionally, it stresses the significance of recognizing and respecting the distinct perspectives, skills, and capabilities of each individual within the community.

Ensuring Ethical AI: Upholding Accountability, Transparency, and Human Error

When tech firms develop AI systems, they frequently entail clients to designate a human who can be detained accountable in case there was a failure in the success of the model. However, such attribution procedures typically transfer responsibility onto individuals beyond the companies. Elish observed that even in highly computerized structures in which people partake in minimal influence, they typically shoulder the majority of errors (Elish, 2019). People are treated as accountable, bearing ethical responsibility in instances of algorithmic mishaps, regardless of their level of involvement or intentionality (MIT Technology Review, 2019). Moreover, the opacity of 'black box models' further complicates matters, making it challenging to start accountability or pursue compensation when errors occur (Rudin, 2019). In instances where the nature of modern AI systems, particularly those driven by advanced technology and algorithms, suggests that the level of complexity involved is so high that even the individuals who design and develop these systems may not possess a complete understanding of every aspect or component. Thus, the question arises: Who should be held responsible if these systems lead to harmful actions or adverse outcomes for individuals or communities?

Moreover, many technologists advocate for AI to be established to complement and enhance individual decision-making rather than autonomously making decisions. However, the assurance of the supervision of people is not certain since they are prone to different perceptive partialities and preconceptions in which they influence their decision-making processes. In the absence of adequate training when dealing with deficiently designed models, humans may increasingly rely on the references provided by AI organizations. Nobel Laureate Daniel Kahneman proposed the theory of individuals that excessively lean on the reception of initial information, significantly influencing the decisions they ultimately make, referred to as an 'anchoring bias' (The Decision Lab, n.d.). Others contend that the human mind operates as a 'cognitive miser,' meaning that without taking intelligence into account, individuals typically opt for simpler problem-solving approaches that demand less energy (BBVA, 2020). These cognitive shortcuts have been observed to form value rulings concerning individuals or social circumstances. In operational settings wherever circumstances evolve swiftly and urgent decision making, aid personnel may comply to AI models that lack examination.

Such obstacles underscore the importance of implementing explainable and interpretable AI throughout the relief sector. In contrast, AI lacking explicability often yields outcomes through algorithms, yet AI cannot completely comprehend the algorithm function that leads to these outcomes. This lack of transparency makes it challenging to verify accuracy and results in a diminished sense of control and frailer accountability. Still, these measures are insufficient in addressing broader concerns regarding accountability and transparency in humanitarian settings, falling short of upholding the principles of humanitarian ethics and the values they encompass. Though accountability mechanisms are established, determining how they are enforced remains a challenge. Envisioning how the industry can attain responsibility regarding AI when a significant accountability gap persists throughout the aid sector as a whole.

Once humanitarian organizations adhere unwaveringly to ethical values and standards of conduct, many issues stemming from individual errors are averted. However, the most significant challenges often stem from problematic countries where crisis situations occur. By developing guidance documents to address these challenges, workers in the humanitarian sector can be equipped within the development on which they can respond to various situations. It's crucial to ensure that humanitarian principles are complemented by digital principles and are integrated into an explainable background encompassing strategy, arrangement, stakeholder expectations, legislative compliance, and internal regulations. This comprehensive approach helps to align actions with ethical standards and ensures transparency and accountability in humanitarian efforts (see Figure 4).

The AI Ethical Framework should promote proportionality, avoiding damage, and upholding human rights. It should prioritize safety, justice, non-discrimination, prejudice reduction, equitable access, sustainability, and privacy. For inclusive AI governance to be effective, human monitoring, control, and accountability must be combined with openness, explainability, responsibility measures, public awareness, and multi-stakeholder collaboration.

It is best practice to create quantitative and qualitative indicators that give insights and provide control over the life of an AI system. For example, the agenda in figure 4 highlights numerous critical features of ethical AI. These metrics are used to generate an overall score for all aspects and assess an AI system. Humanitarian digital principles are aligned with general humanitarian principles. Since AI and digital principles may be considered as newly introduced to some actor, they should be easily and clearly explained and inducted. The humanitarian actors shall consider a proper timeframe for the upgrade and transition to ensure the transparency and openness. Communication and onboarding on the adoption and usage of AI shall be a pre-requisite to mitigate the resistance and lack of coordination internally and externally.

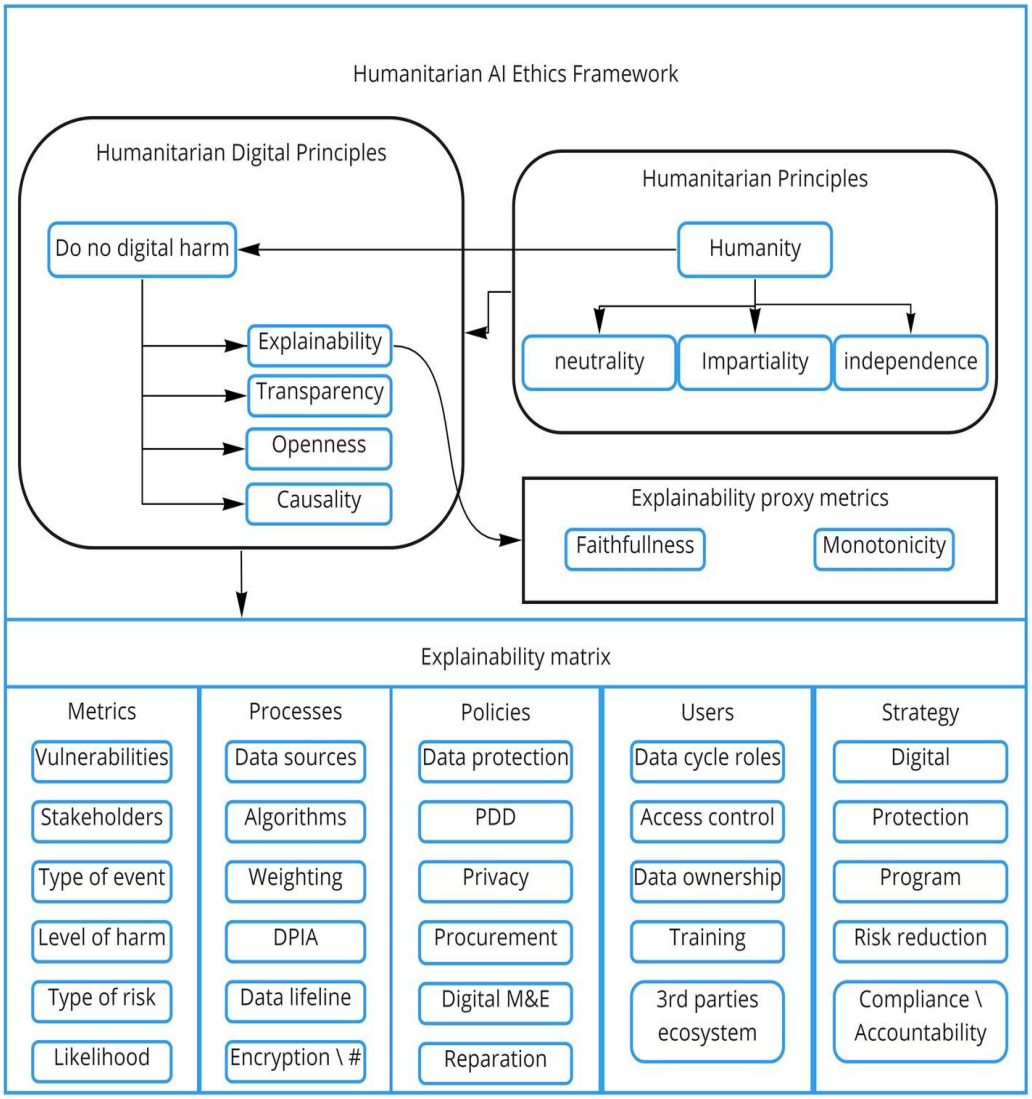

Figure 4: Ethics Agenda in Humanitarian aid for artificial intelligence (Coppi et al., 2021)

Ensuring Data Governance: Balancing Regulation, Safety, and Confidentiality

Altogether, humanitarian alongside technology sectors have a concerning history regarding regulation. Ongoing debates revolve around the necessity and optimal methods for regulating the technology industry (Smith and Browne, 2019). Moreover, the humanitarian sector stands out as one of the least regulated sectors globally. Thus, there's a pervasive practice of testing various initiatives, directly on communities because they do not meet the standards required in the European Union (EU).

There is no single overarching authority governing use and safeguarding of the data that are mostly related to the humanitarian sector or the application of technologies that are driven by data such as AI. However, the main concern prevailed is the uneven nature of regulations governing its utilization. General Data Protection Regulation (GDPR) enacted by the EU represents an advancement in safety and confidentiality. One of its fundamental principles is the recognition of individuals' ownership of their personal data, including any information that can directly or indirectly identify them. This means that individuals have the right to control how their data is collected, processed, and used by organizations (GDPR.eu, n.d.). As one of the most stringent privacy and security laws globally, GDPR has influenced data protection regulations worldwide. Nevertheless, this may not apply to aid organizations as a whole, but rather some are bound to adhere to the safety of data that are related to national interest, which can grant them explicit rights. Nonetheless, United Nations High Commissioner for Refugees (UNHCR) and WFP possess data on millions of individuals.

Nevertheless, the quality of agency-specific guidelines and policies varies, with differences in depth and extensiveness. Some guidelines lack instructions on when and how to appropriately dispose of data, including Personally Identifiable Information (PII). Moreover, there are instances of contradictory statements within these policies. While some assert a commitment to prioritizing the concept of people being the owners of their own data, the implementation of these policies tends to be weak. Breaches of agency-specific data protection policies often result in unclear consequences, as these incidents are handled internally. On the other hand, the repercussions for breaching these policies remain largely unknown. For instance, in July 2021, Amazon faced a $886.6 million fine for breaching GDPR (BBC, 2021). However, no penalties or disciplinary measures seem to have been imposed for recent United Nation (UN) data breaches or allegations (The New Humanitarian, 2020) of unethical data sharing, including the sharing of PII by UNHCR (The New Humanitarian, 2021).

Moreover, the humanitarian sector still lacks a standardized, contemporary system that reliably seeks the approval from people in order to gather and utilize their personal data. This system should also allow individuals to retract their documented approval that will naturally lead to the deleting of records that stores their personal data without forfeiting entree to life-saving assistance. Additionally, some agencies acknowledge their struggle to explain to individuals how AI contributes in the process of making decisions within an organization. Furthermore, even when agencies do prioritize informed consent, the rights of individuals to control their own data are frequently compromised by interagency agreements that facilitate the sharing of information. These agreements, often driven by the need for collaboration and coordination in complex humanitarian contexts, may prioritize operational efficiency and information sharing over individual privacy and consent. Similarly, international politics and power dynamics can also play a significant role in shaping data-sharing practices within the humanitarian sector. Political considerations may lead to compromises on data protection and privacy rights, particularly in situations where there are competing interests or geopolitical tensions at play.

The reliance on rules alongside the complete lack of devices that are implemented, eventually undermines responsibility which leads to the prioritization of requirements employed by the humanitarian agencies over the individuals' right they are responsible for safeguarding. According to

this governing void, where consistent data protection necessities are lacking, the competition to gather data persists. Thus, organizations in the aid sector are gathering data without known boundaries or a clear line to know where the ethical line is surpassed. This notion accumulates increasingly large number of data which is inadvertently fuelled by different donors that have high expectations regarding responsibility. However, this is done without completely considering potential consequences on information management. For example, The Rohingya population, facing persecution and violence in Myanmar, sought refuge in Bangladesh, where they expected protection and assistance. However, the collection and sharing of their personal information without adequate safeguards could jeopardize their safety and security which was breached in June 2021 by UNHCR and the government (Human Rights Watch, 2021).

At the core of rules, safety, and confidentiality that are related to risk lies a crucial, albeit not always apparent, discussion about the essential ownership of the data collected by humanitarian organizations. The ethical question remains if whether these data belong to the individual, the organizations gathering the data, or the state?

Cost Benefit Analysis (CBA)

When integrating AI in regular business or humanitarian aid, it is important to carefully assess and budget the related costs. Return on Investment (ROI) is a crucial indicator for AI consideration in humanitarian operations. The value of AI integration varies depending on the humanitarian aid element as AI is not a single technology but a family of technologies. Digitization by sector varies from one sector to another. ICT, media, and finance sectors are the most digitized sectors compared to agriculture, local services and construction.

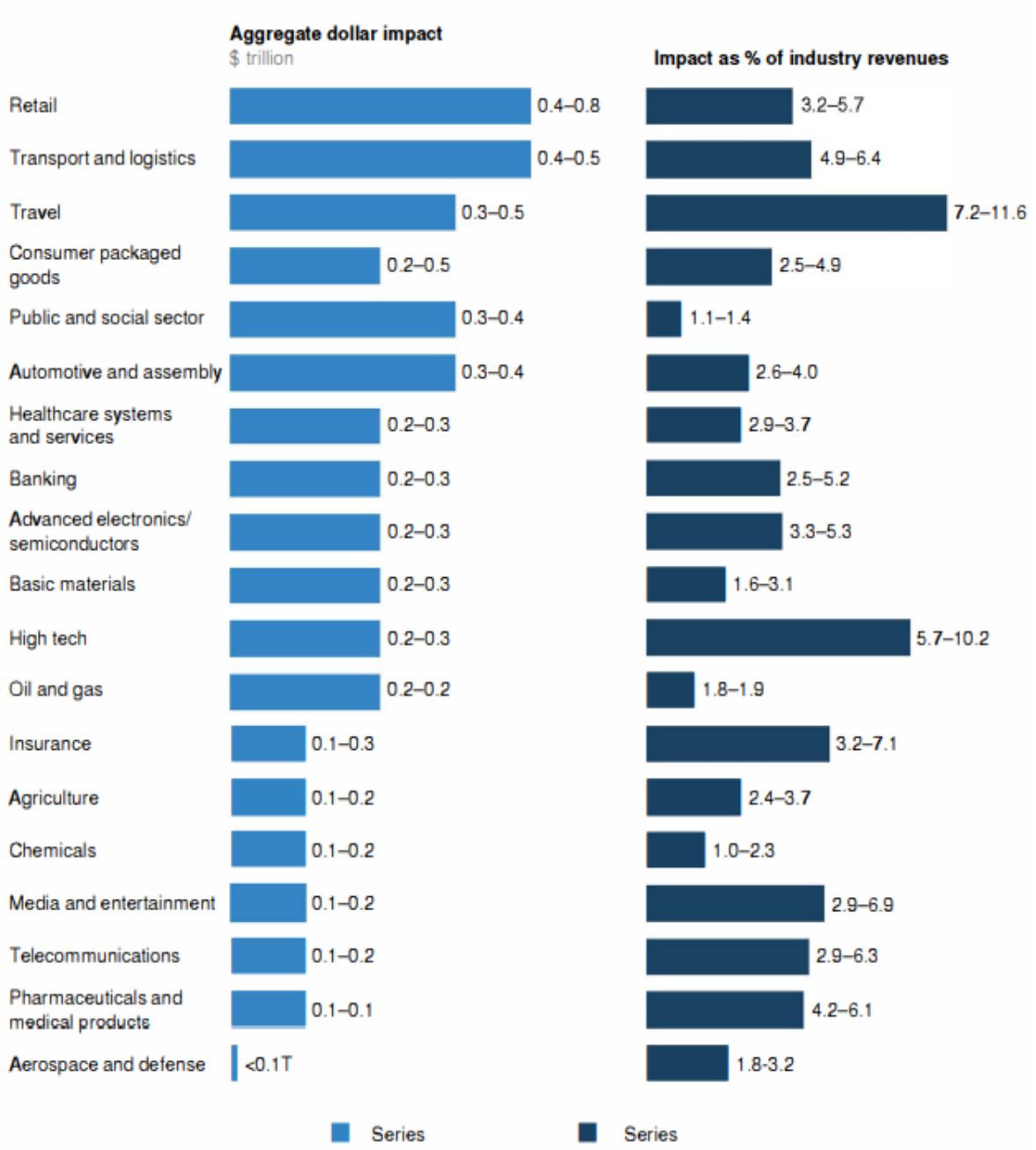

Figure 5: The potential value of AI by sector by McKinsey Global Institute ***(Institute, 2018)***

AI applications in education have achieved substantial traction, and they are set to revolutionize the educational environment in dramatic ways (Oyenashie ANANYI & SOMIEARI-PEPPLE, 2023). AI and advanced technologies are not an isolated business, they operate in a global market. Information exchange like e-commerce, increasingly rely heavily on digital data. Global data flows could contribute about 7% to GDP growth in 2030. In addition to that, automation of labour could add up to about 11% to GDP by 2030. The investment rate in AI is growing rapidly, but it is still mostly focused in the United States and China (Institute, 2018).

AI Safety and Sustainability

Well-intentioned initiatives aimed at applying digital solutions to longstanding challenges within the humanitarian sector can sometimes result in unintended consequences and harm to those most vulnerable. in the context of Yemen, where conflict and political instability prevail, the introduction of blockchain technology sparked controversy and led to a dispute over data ownership. The Houthis, a rebel group controlling parts of Yemen, contested the WFP's control and management of the data generated by the blockchain system. They raised concerns about the potential misuse of data and questioned the legitimacy of external actors having access to sensitive information about aid recipients (Reuters, 2019). Though Artificial Intelligence technologies propose various innovative ways to comprehend our surroundings, transform our lifestyles, and enhance our connections with others, they also introduce heightened risks of harm. Ensuring the creation and implementation of AI systems that prioritize safety, those that consistently achieve their intended goals harm free, is a paramount concern and an ongoing endeavour.

AI systems can potentially behave unexpectedly, resulting in unintended harm. For instance, robots or cars that operate with drivers fail to recognize humans can lead to accidents causing injury or death. At present, the risks associated with AI in the humanitarian sector remain relatively low, as few, if any, decisions are either automated or made solely by AI systems. However, these situations underscore the compelling argument for employing interpretable AI and maintaining the involvement of individuals. Additionally, the development of artificial intelligence can help mitigate the costs of potential errors, thereby transforming critical situations to manageable hazards. One illustration is by crafting responses tied to AI results to be less punitive and more constructive, the impact of any errors can be minimized, promoting a more supportive and resilient humanitarian response.

Another major risk is that the use of AI by humanitarian organizations inadvertently strengthens the surveillance abilities of malicious actors or contributes to digital authoritarianism (Yayboke and Brannen, 2020).

The emergence of surveillance capitalism, characterized by companies that have no consent while monitoring user behaviour in intricate detail often pose emerging risks and prospects for different kind of manipulations exerted by firms, governments, or criminal organizations (The Guardian, 2019). AI-powered surveillance technologies are revolutionizing governments' capacity to trace people throughout borders. It is especially worrisome among regions where law regarding the protection of data is lacking, digital literacy levels are low, and individual rights and freedoms are inadequately safeguarded. This exacerbates the vulnerability of millions of compulsorily displaced individuals or targets of harassment, whose lives are progressively digitized even by aid agencies that mean well.

These challenges, and much more, concerning AI safety will persist despite of how the humanitarian aid organizations interact with AI. Additionally, there are numerous other accidental negative impacts and enduring risks associated with AI adapted by humanitarians that should be adequately acknowledged and examined. Addressing these issues will necessitate collaboration between technology and aid experts to thoroughly investigate AI safety concerns and develop effective solutions.

Results and Discussion

The rapid pace, widespread reach, and intricate nature of the Fourth Industrial Revolution (4IR) are unparalleled. In this digital age, individuals are increasingly reliant on digital tools and platforms for communication, work, entertainment, and even basic necessities. From smartphones to social media platforms to online banking, many aspects of our lives are now conducted in the digital realm. However, this shift towards a more digital existence is not without its complexities and challenges.

While digital technologies offer numerous benefits, they also raise concerns about privacy, security, and the potential for manipulation. Moreover, the speed at which technology evolves often outpaces the ability of regulations and societal norms to adapt, leading to gaps in oversight and accountability. Humanitarian organizations, while striving to leverage technology for positive impact, also contribute to this digital transformation.

The evolution of technology, including the adoption of AI, is gradually reshaping the landscape of humanitarian work. Humanitarian organizations are realizing the potential of their data and information as valuable assets for improving their operations and outcomes. However, this realization is accompanied by a recognition that harnessing these assets requires careful planning, strategic thinking, and investment in appropriate technologies and capabilities. While larger aid agencies may have the resources and capacity to explore and implement AI solutions, the broader humanitarian sector faces various challenges in adopting these technologies. Poor-quality data, inconsistent investment priorities, and differing views on the role of AI within humanitarian work can all contribute to the slow uptake of these technologies. Furthermore, while larger agencies may be able to establish partnerships with major technology firms to leverage AI solutions, smaller organizations may struggle to access the necessary resources and expertise. This disparity in access to technology and expertise can widen the gap between larger and smaller humanitarian organizations, potentially hindering collaboration and coordination efforts within the sector. Despite these challenges, the adoption of AI within the humanitarian sector holds promise for improving the efficiency, effectiveness, and impact of humanitarian interventions. AI technologies have the potential to enhance decision-making, optimize resource allocation, and facilitate early warning and response systems for disasters and emergencies.

AI technologies offer a range of opportunities to address pressing challenges in humanitarian settings, particularly in regions with limited resources. One notable example is the use of predictive models to forecast humanitarian crises and epidemics with high levels of accuracy and coarseness. These models leverage large datasets and sophisticated algorithms to analyse various factors such as environmental conditions, population demographics, and disease transmission dynamics. By providing early warnings and actionable insights, these AI-driven forecasts enable humanitarian agencies to implement targeted preventive measures, thereby reducing the potential impact of crises on vulnerable populations. For instance, in the context of disease outbreaks, AI-powered models can predict the spread of infectious diseases and identify high-risk areas where intervention is most urgently needed. This allows humanitarian organizations to allocate resources more efficiently, deploy medical supplies and personnel to the areas most in need, and implement targeted public health interventions such as vaccination campaigns and hygiene promotion initiatives. Furthermore, certain AI applications, such as conversational AI and virtual assistants, hold promise for enhancing communication and service delivery in humanitarian settings. These technologies can provide valuable support to aid workers by automating routine tasks, facilitating information exchange, and delivering personalized assistance to affected populations. For example, chatbots equipped with natural language processing capabilities can interact with individuals in their native languages, providing real-time information and guidance on accessing essential services, reporting emergencies, or seeking assistance.

Hence, aid agencies must carefully consider the implications of adopting AI technologies, the competitive landscape of humanitarian data initiatives and the repercussions on the people that are helpless. Functioning under the premise that no data is entirely secure, humanitarian actors must deploy extreme attentiveness when they gather and store data and then discard them. This entails applying strong protocols that safeguard the protection of data and the compliance with relevant regulations, and placing utmost importance on safeguarding and prioritizing the privacy and safety of

the people whose personal data are subjected to being exposed. Moreover, aid agencies should actively engage in ongoing risk assessments and mitigation strategies to minimize the possible negative effects of AI adoption on helpless people. Upholding ethical standards in their humanitarian endeavours should be paramount, with a commitment to transparency, accountability, and the equitable distribution of benefits.

Therefore, Leaders in both the technology and aid sectors must collaborate effectively and should fully realize the positive potential of AI and effectively handle the associated risks. However, achieving such collaboration has proven to be challenging, particularly as it necessitates fostering confidence and openness within the realm of humanitarian assistance and across the intersection of aid and technology sectors. These industries are characterized by competitiveness and lack of clarity, making it difficult to establish the necessary levels of trust and transparency. The controlled disclosure within the technology that is aimed at positive social impact market ultimately restricts its potential influence, as it hinders the sharing of information and resources that could drive collective progress and innovation in addressing humanitarian challenges through AI technologies. Therefore, fostering greater openness and collaboration between leaders in these industries is essential to unlock the full potential of AI for humanitarian purposes while effectively managing associated risks. In this context, the advancement and implementation of AI tools within humanitarian contexts should be guided by individuals with extensive experience and expertise in the field of aid and crisis response. These aid practitioners possess invaluable insights into the intricate challenges faced on the ground, including logistical hurdles, political dynamics, cultural sensitivities, and ethical considerations.

Nevertheless, donors must broaden prevailing funding mechanisms and increase the funding available to humanitarian actors exploring ways to utilize these tools safely and ethically in order to unlock the full potential of AI in humanitarian settings. This entails expanding funding support for both the technological and innovative aspects of programs. Thus, human alongside financial resources need to be extended. This could involve creating comprehensive competency frameworks (Government of Canada, 2019) and learning goals across organizations for aid workers regarding data, alongside assessing information levels about them to determine the appropriate category and the needed training (*myDatabilities*, n.d.).

Collaboration between humanitarian organizations and their donors is key to establishing these regulatory bodies and tools. By working together, stakeholders can pool their expertise and resources to develop comprehensive guidelines and standards that address the unique challenges and considerations of applying AI in humanitarian contexts. These regulatory frameworks should encompass various aspects, including data privacy and protection, algorithmic transparency and accountability, ethical considerations in AI development and deployment, and mechanisms for oversight and accountability. They should also incorporate principles of inclusivity, fairness, and respect for human rights to ensure that AI technologies benefit all stakeholders, particularly vulnerable populations. This effort can draw upon existing frameworks such as the Centre for Humanitarian Data's Peer Review Framework (The Centre for Humanitarian Data, 2020) and the ethical framework for data science provided by the Data Science & Ethics Group (*Migration data portal*, 2020), in addition to various effective approaches that have been formulated by humanitarian organizations (ICRC, 2019). In all, the primary role of this ethics review board would be to assess the risks and advantages associated with the use of AI technologies in humanitarian settings. By leveraging the collective expertise of its members, the board would evaluate proposed AI projects, considering factors such as data privacy, algorithmic bias, transparency, accountability, and potential impacts on affected populations. This comprehensive evaluation process would help ensure that AI initiatives align with established best practices and ethical guidelines in humanitarian aid.

Conclusion

AI technologies that are driven by data are increasingly transforming the humanitarian sector, offering valuable support to humanitarian organizations as they transition from reactive to proactive approaches to humanitarian efforts. AI holds the promise of aiding humanitarian action across its primary facets: preparedness, response, and recovery. In terms of preparedness, AI technologies excel in analysing large volumes of diverse data rapidly, identifying patterns, drawing inferences, and offering key understandings into possible hazards prior to a crisis or aid catastrophe occuring. Furthermore, AI presents chances to enhance the effectiveness of humanitarian response efforts and facilitate recovery programs, particularly in prolonged conflict scenarios.

Numerous AI-driven initiatives are presently undergoing deployment and experimentation within aid relief actors which encompass the artificial intelligence implementation that is designed to predict migrations of people emerging from crisis, map regions impacted by aid emergencies, alongside locating individuals that are unaccounted for, thereby providing valuable insights and support for on-the-ground humanitarian endeavours. However, this implementation is not devoid of putting people in harm's way. This article has analysed few key risks such as effectiveness, bias and prejudice, localisation and community contribution, accountability and transparency, data protection and privacy, and AI safety and sustainability.

There are numerous crucial tips for properly integrating artificial intelligence (AI) into humanitarian activities. First, companies should promote cross-sector data sharing and collaboration to improve information quality and availability, hence increasing AI performance and decision-making skills. Furthermore, investing in AI training for humanitarian workers is critical to ensuring they have the essential abilities to use these technologies efficiently. Ethical issues must also be prioritized in deployment tactics; establishing openness and accountability in AI systems building confidence in impacted populations. Furthermore, adapting AI tools to unique local requirements will increase their impact, enabling more responsive and context-sensitive actions. Finally, AI applications should be continuously assessed and adapted to guarantee they advance in tandem with changing humanitarian contexts.

Although these risks are not limited solely to the humanitarian domain, they can profoundly impact people previously facing vulnerability due to struggles and crisis. The integration of artificial intelligence systems into humanitarian efforts presents both opportunities and challenges. While AI technologies can enhance the efficiency and effectiveness of humanitarian interventions, there is also a need to ensure that their deployment upholds humanitarian principles and does not inadvertently cause harm to vulnerable populations. One of the fundamental principles guiding humanitarian action is to cause no harm. This principle emphasizes the importance of minimizing negative impacts and protecting the dignity, safety, and well-being of affected individuals and communities. Conducting harm analyses and effect valuations can serve as practical measures to implement this imperative. Both procedures are instrumental in identifying and mitigating risks, as well as diminishing or preventing adverse effects on affected communities.

In the end, as humanitarian organizations deploy these technologies, it's important to establish robust contexts that enhance responsibility and clarity in their utilization within the background of humanitarian actors. Inclusively, these mechanisms are essential for achieving the objective of responsibly leveraging AI in humanitarian responses.

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Mariam Kahloun is a mechanical engineer with specialization in renewable energy. I am currently completing my PHD studies in International Politics and Diplomacy in Center for Diplomatic and Strategic Studies, Paris-France. I obtained my bachelor's degree in mechanical engineering in 2010 and my Master's in 2019. The focus in my research is the humanitarian engineering approach. I am currently working with International Committee of the Red Cross as a project manager for hospital program in Lebanon. Throughout my journey, I have coordinated various operations ranging from long-term interventions to emergency and conflict affected settings. I have keen interest in topics such as impact and effectiveness of engineering systems for humanitarian aid and specifically the resilience of healthcare infrastructure, water and energy in conflict, artificial intelligence in humanitarian aid, and engineering approach in crisis response.