

Addressing Food Insecurity in Gaza Through an AI-Driven African Initiative

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Abstract

The escalating humanitarian crisis in Gaza has led to severe food insecurity, posing an immediate threat to public health. This article outlines a proposed initiative, "Project Africa for Gaza Food Security" (PAF-GS), which leverages artificial intelligence (AI) and collaborative networks to monitor and address nutritional deficiencies within affected families. PAF-GS proposes the development of an AI-driven mobile application designed to provide real-time updates on food security, peace negotiations, and historical context of the conflict. Critically, the application will foster a pan-African and international network of scientists, including bioinformaticians, statisticians, and ethicists, to provide expert analysis, statistical surveillance, and ethical guidance. The project aims to inform targeted humanitarian interventions, facilitate evidence-based decision-making, and promote a data-driven approach to resolving the humanitarian food crisis in Gaza. This initiative highlights the potential of bioinformatics and digital health tools in complex humanitarian emergencies and underscores Africa's role in global health leadership and innovative humanitarian solutions.

Keywords: Food Insecurity; Gaza; Artificial Intelligence (AI); Humanitarian Aid; Nutritional Surveillance; Digital Health; Bioinformatics; Conflict Zones; Ethical AI; Conflict Resolution (or Peacebuilding)

Introduction

The ongoing conflict in Gaza has precipitated a catastrophic humanitarian crisis, with widespread food insecurity emerging as a critical public health concern. Reports indicate alarming rates of malnutrition, particularly among vulnerable populations, underscoring an urgent need for effective, data-driven interventions. Traditional humanitarian aid efforts, while crucial, often face significant logistical and informational challenges in dynamic conflict zones. The integration of advanced technologies, such as artificial intelligence (AI) and robust data analytics, offers a promising avenue to enhance the efficiency, reach, and precision of humanitarian responses.

This article introduces “Project Africa for Gaza Food Security” (PAF-GS), an innovative initiative conceptualized to directly address the nutritional plight of Gazan families. PAF-GS seeks to harness the power of AI and establish a collaborative network of experts to provide real-time insights into the food security situation, facilitate informed decision-making, and foster a collective global response, with significant engagement from African leaders and scientific communities. The project emphasizes a multi-faceted approach, combining public awareness, data monitoring, and expert consultation to mitigate the impact of the crisis on nutritional stability.

Project Rationale and Objectives

The rationale for PAF-GS stems from the urgent need for timely, accurate, and actionable information regarding the food security status in Gaza, coupled with a mechanism for coordinated global response. The project’s objectives are:

To develop and deploy an AI-powered mobile application: This application will serve as a central hub for disseminating validated information on the historical context of the conflict, the specific consequences on Gazan families’ nutrition, and real-time updates on peace negotiations and food security indicators.

To enable real-time monitoring of food security: Utilizing AI algorithms, the application will aggregate and analyze data from various sources (e.g., humanitarian reports, satellite imagery where permissible, public health surveys) to provide a dynamic overview of nutritional status and identify areas of critical need.

To establish an expert network: The project will create a collaborative platform bringing together African and international scientists, including bioinformaticians, epidemiologists, statisticians, public health specialists, and ethicists. This network will provide continuous statistical monitoring, ethical oversight, and propose evidence-based solutions or alternatives to the ongoing crisis.

To raise global awareness and facilitate stakeholder engagement: By providing accessible and verified information, the application aims to mobilize support from African political leaders and business figures (e.g., Dangote) and the broader international community, encouraging their active participation in humanitarian efforts.

To promote a data-driven approach to humanitarian aid: Through systematic data collection and analysis, PAF-GS seeks to optimize resource allocation, enhance the effectiveness of interventions, and contribute to long-term strategies for food security in conflict-affected regions.

Methodology: AI Application Development and Expert Network Integration

AI Application Development

The core of PAF-GS is an AI-driven mobile application designed for both public engagement and expert collaboration. The development will follow a phased approach:

- ✓ *Phase 1: Data Acquisition and Integration:* This phase will involve identifying and integrating diverse data sources relevant to the Gaza conflict and food security. These may include, but are not limited to:
 - ✧ *Public health data:* Malnutrition rates, disease outbreaks linked to food insecurity (e.g., diarrheal diseases), and mortality statistics from reputable NGOs and UN agencies.
 - ✧ *Food supply chain data:* Information on access to food, market prices, availability of essential commodities, and logistical challenges in aid delivery.
 - ✧ *Conflict-related data:* Verified information on ceasefires, humanitarian corridors, and areas of active conflict that impact food access.
 - ✧ *Geospatial data:* Satellite imagery analysis (where legally and ethically permissible) to assess damage to agricultural land, infrastructure, and population movements.
- ✓ *Phase 2: AI Model Development:* Machine learning algorithms will be developed and trained to:
 - ✧ *Sentiment analysis and information synthesis:* To process and synthesize large volumes of textual information from news

reports, social media (with careful vetting for accuracy), and expert analyses to provide contextualized information on the conflict's history and its nutritional consequences.

- ✧ *Predictive analytics for food insecurity*: To identify emerging patterns of food scarcity and predict areas at highest risk based on integrated data, enabling proactive intervention.
- ✧ *Real-time information aggregation*: To continuously update users on peace negotiations and the evolving food security situation, drawing from verified news sources and official statements.
- ✓ *Phase 3: User Interface and Experience (UI/UX) Design*: The application will feature an intuitive and accessible interface, catering to both general users interested in awareness and expert users requiring detailed data visualization and analytical tools. Information will be presented in multiple languages relevant to the African continent and internationally.
- ✓ *Phase 4: Security and Privacy*: Robust data encryption, secure data storage, and strict access controls will be implemented to protect sensitive information, particularly data pertaining to vulnerable populations.

Expert Network Integration

The AI application will serve as a platform for a dedicated network of scientists. This network will operate as follows:

- ✓ *Membership and Governance*: An open call for participation will invite leading African and international experts in relevant fields (bioinformatics, statistics, epidemiology, public health, ethics, philosophy, international law). A steering committee will oversee the network's activities and ensure adherence to ethical guidelines.
- ✓ *Data Analysis and Interpretation*: The network will have access to the aggregated, anonymized data from the AI platform. Bioinformaticians and statisticians will collaborate to conduct advanced statistical analyses, identify trends, and develop predictive models related to nutritional outcomes.
- ✓ *Ethical and Philosophical Oversight*: A dedicated ethics sub-committee, comprising philosophers and ethicists, will continuously review the project's methodologies, data usage, and proposed solutions to ensure they align with humanitarian principles and avoid unintended harm or bias. This includes evaluating the ethical implications of AI deployment in conflict zones.
- ✓ *Solution Generation and Policy Recommendations*: Based on their analyses, the expert network will collectively formulate evidence-based solutions and policy recommendations for addressing food insecurity and promoting peace, which can then be shared with relevant humanitarian organizations, governments, and international bodies.
- ✓ *Communication and Dissemination*: The network will utilize the application and other scientific channels to disseminate their findings, fostering wider scientific discourse and informing public understanding.

Expected Impact and Outcomes

PAF-GS is anticipated to yield several significant impacts and outcomes:

- ✓ *Improved Nutritional Surveillance*: The AI application will provide an unprecedented level of real-time nutritional surveillance in a conflict zone, enabling more targeted and timely interventions.
- ✓ *Enhanced Public Awareness and Engagement*: By providing accessible, verified information, the project aims to foster greater understanding of the crisis and galvanize support from a broader global audience, particularly within Africa.
- ✓ *Data-Driven Humanitarian Response*: The systematic collection and analysis of data will inform more efficient allocation of resources and improve the effectiveness of humanitarian aid delivery.
- ✓ *Scientific Collaboration and Capacity Building*: The project will foster a unique collaborative environment for African and international scientists, contributing to capacity building in public health informatics and humanitarian science.
- ✓ *Ethical AI in Humanitarian Contexts*: By integrating robust ethical oversight, PAF-GS will serve as a model for the responsible deployment of AI technologies in sensitive humanitarian settings.
- ✓ *Contribution to Peace-Building Discussions*: The expert network's analyses and proposed solutions could directly contribute to ongoing peace negotiations by highlighting the humanitarian imperative and offering data-informed pathways to resolution.

Ethical Considerations

The deployment of AI in a sensitive humanitarian context like Gaza necessitates rigorous ethical considerations. PAF-GS will prioritize:

- ✓ *Data Privacy and Anonymity*: All collected data, especially personal or sensitive information, will be strictly anonymized and secured to protect the privacy of individuals and families.
- ✓ *Bias Mitigation*: AI algorithms will be continuously monitored and audited to prevent and mitigate any biases that could lead to discriminatory outcomes or misrepresentation of the situation.
- ✓ *Informed Consent*: Where direct data collection involves individuals, appropriate informed consent protocols will be rigorously followed, adhering to international ethical guidelines for research in humanitarian settings.
- ✓ *Accountability and Transparency*: The project will maintain transparency in its methodologies and data sources. Clear lines of accountability will be established for data interpretation and solution proposals.
- ✓ *Prevention of Misinformation*: The application will implement robust verification processes to ensure the accuracy of information disseminated, combating the spread of misinformation and disinformation.
- ✓ *Do No Harm Principle*: All aspects of the project, from data collection to intervention recommendations, will be guided by the fundamental “do no harm” principle, ensuring that the initiative does not inadvertently exacerbate existing vulnerabilities or conflicts.

Conclusion and Future Directions

Project Africa for Gaza Food Security (PAF-GS) represents a novel and timely initiative to address the critical food insecurity faced by families in Gaza. By harnessing the power of artificial intelligence and fostering a collaborative network of African and international scientific experts, PAF-GS aims to provide real-time data, facilitate informed decision-making, and mobilize global support for humanitarian relief. This project not only offers a concrete pathway to alleviating suffering but also highlights the transformative potential of bioinformatics and digital health in complex humanitarian emergencies.

Future directions for PAF-GS include pilot testing the AI application in a simulated environment before deployment, establishing formal partnerships with humanitarian organizations on the ground for data validation and intervention implementation, and continuous evaluation of the project’s impact on food security indicators. Ultimately, PAF-GS seeks to contribute to a more resilient, data-informed, and ethically sound approach to humanitarian aid, offering a model that could be adapted for other global crises.

References

To complement the article, here are some relevant bibliographic references that address food security, humanitarian crises, and the impacts of conflict on nutrition, particularly in the context of Gaza. These references can enrich the article by providing relevant data and analyses on food situation in Gaza and the necessary humanitarian responses.

1. The UN and the Middle East Crisis. <https://unric.org/fr/onu-et-la-crise-au-proche-orient-gaza/>
2. World Food Programme. “Risk of famine across all of Gaza, new report says”. This report highlights the catastrophic food situation in Gaza, providing statistics on malnutrition and urgent humanitarian needs, emphasizing the importance of rapid intervention to prevent widespread famine (2025).
3. Integrated Food Security Phase Classification (IPC). “Gaza Strip: Acute Food Insecurity and Acute Malnutrition - IPC Special Snapshot - September 2024 - April 2025”. This document offers a detailed analysis of food security levels and malnutrition in Gaza, describing crisis phases and recommendations for humanitarian action (2024).
4. Bilukha O., et al. “From acute food insecurity to famine: how the 2023/2024 war on Gaza has dramatically set back sustainable development goal 2 to end hunger”. This article examines the consequences of the war on food security in Gaza and its impact on the Sustainable Development Goals, particularly SDG 2 (2023).
5. Food and Agriculture Organization (FAO). “The State of Food Security and Nutrition in the World”. This report provides global

data on food security and nutrition, serving as a reference for understanding broader issues related to the food crisis in Gaza (2020).

6. Al-Jawaldeh A. et Meyer A. "Food Security in the Eastern Mediterranean: Challenges and Opportunities". This article discusses specific challenges to food security in the region, including the impacts of conflict and policies on nutrition (2023).

On Artificial Intelligence and Bioinformatics in Public Health and Humanitarian Aid

1. Pace KA and Rimer BK. "Leveraging artificial intelligence for public health: A systematic review". *Journal of Public Health Management and Practice* 26.3 (2020): 295-303. (General overview of AI in public health)
2. Haghi M and Shaham M. "AI and big data in humanitarian action: A review of the state of the art". *Humanitarian Affairs* 3.1 (2021): 108-120. (Focuses on AI in humanitarian contexts)
3. Guo S and Li C. "Bioinformatics approaches for understanding population health and disease in disaster settings". *Frontiers in Public Health* 10 (2022): 897654. (Highlights the role of bioinformatics in public health emergencies)
4. World Health Organization (WHO) Guidelines/Reports on Digital Health and AI: WHO has publications on the ethical and practical considerations of using AI and digital technologies in health.
5. *Journal of Medical Internet Research (JMIR)* or similar e-health journals: Often feature articles on mobile health (mHealth) applications, data analytics in health, and AI in clinical and public health settings.

On Ethics of AI and Data in Humanitarian Contexts

1. United Nations Global Pulse Reports: This initiative often publishes on the ethical implications of big data and AI for development and humanitarian action.
2. Crawford K. "Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence". Yale University Press (2021). (Broader ethical considerations of AI, useful for context).
3. IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems: Publishes resources and recommendations on ethical AI design.
4. Ethical guidelines from organizations like ICRC (International Committee of the Red Cross) on data protection in humanitarian action: While not directly about AI, these provide a strong foundation for data ethics in sensitive contexts.