The Dual Role of Artificial Intelligence in Irregular Migration: A Case Study of the Moroccan-Spanish Border

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Abstract

This article analyzes Morocco as a strategic laboratory for AI-driven border management and "**Deep Border**" surveillance. While the state implements predictive customs systems and smart sensors to cluster "risky" profiles, migrants utilize "**tactical placemaking**" via smartphones for survival and "camera-witnessing". Morocco's digital transformation faces a significant legal void, risking institutionalized algorithmic bias and human rights violations. A balanced governance model aligned with UNESCO ethics is crucial to protect human dignity.

Keywords: Artificial Intelligence (AI), Irregular Migration in Morocco, Digital Placemaking, Algorithmic Governance, Border Surveillance, human rights.

Introduction:

Morocco has emerged as a **strategic laboratory** for the deployment of Artificial Intelligence (AI) and digital surveillance at the southern gates of the European Union. As a primary transit point for Sub-Saharan migrants seeking to reach the Spanish-occupied enclaves of 'Ceuta' and 'Melilla', the country sits at the center of a complex "digital border" where state-led technological control clashes with migrant survival tactics. This introduction explores the intersection of Morocco's **"Digital Morocco 2030"** strategy with the evolving landscape of irregular migration management, characterized by a persistent tension between technological innovation and human rights.

On the state level, the border is defined by an increasingly sophisticated surveillance apparatus. Systems like the Spanish *Sistema Integgerado de Vigilancia Exterior* (SIVE) utilize a network of radars, thermal cameras, and Forward-Looking Infrared (FLIR) technology to monitor maritime and land boundaries in real-time. Furthermore, the Moroccan administration is progressively integrating **predictive analysis and machine learning** to optimize customs controls and identify "risky" profiles before they reach physical barriers. This shift toward a "deep border" seeks to make migration flows more orderly, predictable, and manageable through the quantification of flow movement.

Simultaneously, irregular migrants have reclaimed digital tools as essential instruments of survival and resistance. The smartphone has become a vital "currency" for navigation and safety, enabling migrants to use GPS and Google Maps to traverse dangerous terrains and share real-time alerts on border closures or rescue needs via encrypted apps like WhatsApp. These practices, termed **"tactical placemaking,"** allow vulnerable populations to document their journeys and the violence they encounter, creating a symbolic counter-discourse against official narratives of "illegality".

However, the rapid "algorithmization" of migration management in Morocco raises profound ethical and legal concerns. While the country possesses a robust framework for general data protection (Law

09-08) and cybersecurity (Law 05-20), there is currently a legal void regarding specific AI regulations. This gap creates risks of institutionalized discrimination, as AI systems are prone to human biases that can lead to the unfair exclusion of individuals based on race or ethnicity. Ultimately, this article investigates the **empowerment-control relation** in Morocco, questioning how the state can balance its digital ambitions with the imperative to protect the fundamental rights and dignity of those on the move.

2. AI as a Tool for Border Management and State Surveillance

Digital technologies for data gathering, processing and analysis and their integration into interoperable systems have taken on a heightened role in the management of populations and mobilities in recent years. The digital technopolitical experimentation has become particularly apparent since the onset of the Covid-19 global pandemic. bringing transnational movement almost entirely to a halt, containing whole populations and subsequently filtering border crossing to those deemed essential or desirable. There are important links between these developments, not least the digital management of migrant populations, those deemed illegal and irregular whose movement is paused at or before the border, the role of technology in quarantining of migrant labour populations seen as disease risks (Francis 2023).

The Moroccan-Spanish border, particularly around the enclaves of 'Ceuta' and 'Melilla', has evolved into a **"logistical infrastructure"** where digital technology and physical barriers form a unified apparatus of control. This "hi-tech border" represents a shift from reactive physical interception to **preemptive, algorithmic governance**.

2.1. Integrated External Vigilance: The SIVE System

The information obtained from the interview with the Guardia Civil indicates that the Melilla border has undergone a significant transformation in a relatively short period of time, approximately two years. The implementation of new analog and digital tools, as well as changes in diplomatic relations

between Spain and Morocco, among other causes, has resulted in a significant decrease in the number of people entering "irregularly" through the fence, both by land and sea (Naiara & others 2024).

The Spanish *Sistema Integrado de Vigilancia Exterior* (SIVE) serves as the primary technological shield at the border. It operates as an interconnected network of aerial, terrestrial, and maritime sensors designed to eliminate "blind spots" in the border zone.

- **The "Owl" (FLIR Technology):** Security forces utilize Forward-Looking Infrared **(FLIR)** thermal cameras, nicknamed "the owl," which allow for the detection of human heat signatures in total darkness.
- **Architectures of Fear:** These systems are concentrated in high-pressure areas like Tarajal and Benzú, providing a real-time virtual extension of the physical fences. The cost of this infrastructure has exceeded 30 million euros, highlighting the massive state investment in "technologizing" the frontier (Miguel & Irene 2021).

2.2. Moroccan "Smart Customs" and Predictive Analysis

The Moroccan Administration of Customs and Indirect Taxes (ADII) is currently undergoing a radical digital transformation under the "Digital Morocco 2030" framework. This strategy incorporates AI to create a "Smart Customs" environment.

- **Intelligent Selectivity (Triple Circuits):** The ADII uses machine learning to automatically categorize individuals and goods into green, orange, or red circuits based on risk assessment.
- **Automated Surveillance:** The use of intelligent cameras with facial recognition, automated vehicle scanners, and drones allows for the detection of fraud and the identification of "risky" profiles with minimal human intervention.
- **Operational Efficiency:** The goal is to make border crossings "orderly, predictable, and productive" by concentrating resources on niches identified as high-stakes by predictive algorithms.

2.3. The "Deep Border" and Algorithmic "Dividuation"

Beyond physical detection, authorities are moving toward the concept of the "Deep Border". This is a machine learning-driven border that "learns" from digital traces to generate meaning before a person even reaches the fence (Nabil, F 2025).

- **Data Doubles:** In this paradigm, the individual is replaced by a "data double" an aggregation of digital traces (nationality, social media activity, online behavior) used to predict future movements.
- **Clustering:** Individuals are no longer viewed through their unique biographies but are "clustered" into risk categories. This allows for predictive modeling, where the state attempts to anticipate "migration crises" by analyzing data patterns from conflict zones, food security reports, and Google Trends (Stephan 2019).

Table 1: Typology of Technological Surveillance at the Moroccan-Spanish Border

Category	Technology / System	Primary Objective	Key Impact on Migration
Hardware	FLIR (Thermal Cameras), Radars, Drones, Scanners	Real-time detection and night-vision monitoring.	Eliminates the possibility of "invisible" crossings.
Biometrics	Facial Recognition, Smart ID Cards	Identity verification and tracking of "illegalized" persons.	Creates a persistent digital record of the individual.
Logic/Algorithms	Predictive Analytics, Machine Learning (ADII)	Risk stratification and automated decision-making.	Clusters individuals into "safe" vs. "risky" profiles.
Infrastructure	SIVE Network, Triple Circuit Systems	Interoperability between different security agencies.	Shifts border control from the physical line to a "Deep Border."

2.4. Ethical Risks: Institutionalized Bias

The deployment of these AI systems is not neutral. AI and facial recognition technologies have been shown to amplify human biases, frequently misidentifying individuals with darker skin tones. In the context of the Moroccan-Spanish border, this risks institutionalizing discrimination against Sub-Saharan populations. Furthermore, the use of predictive modeling to prevent entries raises concerns regarding the illegal practice of non-refoulement, where technology is used to block individuals before they can claim asylum (Clarisse, 2022).

3. Migrant Counter-Tactics and "Tactical Placemaking"

In response to the "architectures of fear" and high-tech state surveillance, irregular migrants have pioneered what researchers call **"tactical placemaking"**. This conceptual framework describes the assemblage of digital and spatial practices used by mobile populations to reclaim symbolic and territorial space against the violence of border security forces. For migrants, the "digital border" is not just a mechanism of control, but a space for survival, resistance, and self-affirmation (Naiara, 2024).

3.1. The Smartphone as an Indispensable "Survival Currency"

For migrants living in clandestine settlements near 'Fnideq' or the forest of Benyunesh, the smartphone is far more than a communication device; it is a vital form of **"currency"** for survival.

- **Navigation and Safety:** Migrants rely on Google Maps and GPS to traverse dangerous terrains, avoid landmines in transit zones, and navigate the "Balkan route" or the Moroccan coast without falling into police traps.
- **Real-time Distress Alerts:** Applications like WhatsApp and Viber are used to alert rescue networks such as "Alarm Phone" in real-time when boats are in distress at sea. Sharing GPS coordinates via encrypted channels has saved hundreds of lives by bypassing the disorientation caused by maritime "no man's lands".

- **Encrypted Survival:** Because state authorities use digital traces to track signals and identify the undocumented, migrants prefer encrypted apps to maintain their strategic invisibility and protect themselves from "surprise attacks" by border guards (Maria 2018).

3.2. "Camera-Witnessing" and Symbolic Resistance

Migrants utilize video cameras and smartphones as instruments of **"camera-witnessing"** and **"camera-dissidence"**.

-Documenting Violence: In settlements like the forest of "Fnideq", migrants record the aftermath of periodic night raids where border guards burn tents and personal belongings. These recordings serve as a **political technology of the body**, materializing evidence of human rights violations that would otherwise remain "invisible".

-Counter-Discourse: These self-images create a **mobile counter-discourse** against official narratives of "illegality". By documenting their routines and the "adventure" of the crossing, migrants humanize their struggle and challenge the neocolonial order of representation (Miguel 2021).

3.3. ICT Networks: The "Gateway" to the Digital Passage

Social media platforms function as the essential infrastructure of the "digital passage".

-Facebook as a Market: Facebook acts as a primary "gateway," where migrants find smuggler contacts, compare prices for "packages" (e.g., travel to Italy via merchant ships), and share warnings about scams or fraudulent brokers.

-Peer-to-Peer Information: Groups such as "Asylum and Immigration without Smugglers" allow migrants to self-organize, sharing real-time updates on border closures, weather conditions, and European asylum policies (such as family reunification times in Germany vs. Sweden).

Table 2: Typology of Migrant Tactical ICT Use

Tactical Tool	Primary Function	Strategic Objective
GPS / Google Maps	Real-time navigation and landmine identification.	Circumventing physical barriers and police detection.
Encrypted Apps (WhatsApp/Viber)	Private coordination and distress calls to NGOs.	Evading geotracking and state surveillance.
Social Media (Facebook)	Market research for smugglers and destination news.	Organizing "digital passages" and avoiding scams.
Digital Video / Social Media	Documenting border violence and daily routines.	"Camera-witnessing" to counter-act dehumanization.

3.4. The Empowerment-Control Nexus

Ultimately, these digital tactics are situated within an "empowerment-control nexus". While digital tools provide a lifeline for navigation and safety, they also generate digital traces that state authorities can leverage for predictive management. For the irregular migrant in Morocco, tactical placemaking is a constant negotiation between the liberating potential of technology and the ever-present risk of algorithmic detection.

4. Ethical Challenges and Regulatory Gaps in Morocco

The rapid deployment of Artificial Intelligence in Morocco, driven by the "Digital Morocco 2030" strategy, has created a significant "regulatory asymmetry". While technological adoption is accelerating, the legal and ethical framework remains in a state of development, leading to several critical concerns regarding human rights and accountability (Amoore (2020).

4.1. The Legal Void: Foundations vs. Specificity

Morocco possesses a robust institutional arsenal for general digital governance, yet it lacks a specialized "framework law" for AI.

- **Existing Legislation:** Current protections rely on **Law 09-08** (Data Protection) and **Law 05-20** (Cybersecurity). However, these are often insufficient to address the unique complexities of machine learning.
- **Accountability Crisis:** The absence of specific regulation creates a "legal void" concerning the accountability of automated decisions. Without clear directives, it remains difficult to assign responsibility when an AI system produces an erroneous or harmful decision, particularly in sensitive areas like visa processing or border control.
- **UNESCO Alignment:** Morocco is currently transposing UNESCO's Recommendations on the Ethics of AI (2021) to establish a national consensus on responsible deployment, yet this process is still in its institutional infancy.

4.2. Algorithmic Opacity and Systemic Discrimination

A major ethical challenge is the "black box" nature of AI systems used in migration management.

- **Institutionalized Bias:** Algorithms can institutionalize and amplify human biases. Facial recognition technologies, for instance, have a proven tendency to misidentify individuals with darker skin tones, which risks systemic exclusion based on race or ethnicity.
- **Marginalization of Vulnerables:** In the context of irregular migration, these biases can lead to "predictive policing" that targets specific nationalities or social profiles, exacerbating the marginalization of already vulnerable populations (Niovi, 2024).

4.3. Humanitarian Implications and the "Deep Border"

The use of AI at the border shifts the focus from individual biographies to "clusters of attributes," raising grave humanitarian concerns.

- **The Non-Refoulement Principle:** Some states utilize predictive analytical tools to model future movements to **prevent entries**. Such practices, including "pushbacks" facilitated by algorithmic detection, raise ethical questions regarding the international principle of **non-refoulement**.
- **Power Asymmetry:** The "digital divide" is reinforced when states use high-cost, sophisticated surveillance to monitor individuals who lack the digital means to contest automated decisions (Alberto R. 2025).

Table 3: Regulatory Gap Analysis for AI in Morocco

Current Legal Pillar	Scope and Function	Identified AI Gap	Necessary Reform
Law 09-08	Protection of physical persons regarding personal data.	Insufficient for **aggregated data** and group profiling used in Big Data.	Integration of AI-specific transparency and "right to explanation".
Law 05-20	National framework for **Cybersecurity**.	Does not cover the **ethical misuse** of automated decision-making.	Adoption of a "Framework Law" (Loi-cadre) for AI ethics.
UNESCO RAM	Ethical diagnostic of AI readiness.	Lack of policies for AI's impact on **vulnerable groups** and environment.	Establishment of a National AI Agency for oversight.

To move beyond a purely security-oriented approach, Morocco must prioritize "human-in-the-loop" systems where automated decisions are subject to human review. Ensuring transparency, non-discrimination, and the protection of human dignity is essential for Morocco to become a regional leader in ethical AI development.

5. Conclusion

The integration of Artificial Intelligence into Morocco's migration management framework represents a profound **"empowerment-control nexus"**, where the digital border acts simultaneously as a site of state surveillance and a platform for migrant resistance. From the perspective of the state, AI serves as a powerful instrument of **algorithmic governmentality**, promising to transform borders into "orderly, predictable, and productive" zones through predictive analytics and the "Smart Customs" (ADII) modernization strategy. By deploying machine learning to identify "risky" profiles and automating border checks, authorities aim to achieve a **"Deep Border"**—a system that learns from digital traces to manage human mobility before it even reaches the physical fence.

Conversely, for the irregular migrant, digital technology functions as a vital instrument of **"tactical placemaking"** within a hostile and often lethal **"necroborder"**. The smartphone has evolved into an indispensable "survival currency," enabling mobile populations to use GPS for navigation, encrypted apps for distress calls, and social media for "camera-witnessing" to document human rights violations. These counter-practices effectively "unborder" the territory, allowing individuals to maintain strategic invisibility while asserting their right to move.

As Morocco pursues its "Digital Morocco 2030" strategy and hosts the UNESCO Category II Center for AI in Africa, the country stands at a strategic crossroads. To solidify its position as a regional leader in ethical AI, the Kingdom must bridge the current "legal void" by moving beyond general data protection (Law 09-08) toward a specialized AI framework law. This governance model must prioritize algorithmic transparency, accountability for automated decisions, and the protection of human dignity. In alignment

with UNESCO's recommendations, Morocco has the opportunity to demonstrate how technological innovation can coexist with the unyielding defense of fundamental rights, ensuring that the digital transition remains inclusive and beneficial for all, including those on the move.

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