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# THE SEMANTIC ANALYSIS OF THE CHALLENGES AND PROSPECTS OF ARTIFICIAL INTELLIGENCE (AI) IN URHOBO

by

**Famous Oghoghophia Imu**

National Institute for Nigerian Languages, Aba, Department of Linguistics and Nigerian Languages,  
Email: [Omufamous@gmail.com](mailto:Omufamous@gmail.com),

**Lucky Ogheneruemu Ejobee**

Delta State University Abraka, Department of Languages and Linguistics  
Email: [Luckyejobee@gmail.com](mailto:Luckyejobee@gmail.com)

**and**

**Oghenerume Agare**

Delta State University Abraka, Department of Business Administration  
Email: [agarerume@gmail.com](mailto:agarerume@gmail.com)

## Abstract

This paper examines the challenges and prospects of AI in the Urhobo language. The challenges of AI in the Urhobo language are multifaceted, encompassing ethical, societal, technical, and regulatory considerations. Addressing these challenges and harnessing the prospects of AI require international cooperation, interdisciplinary approaches, and a commitment to ethical and responsible AI development and integration. Difficulties in extending active use of indigenous languages to school-age children pose a latent threat. AI-trained language models are being used to address this challenge and revitalize indigenous languages, including the Urhobo language. The study reveals that AI will fully harness the potential of the Urhobo language, and policy issues such as incentivizing data sharing, improving safety and security, and updating. The study also reveals that AI can make endangered languages more accessible and engaging to a wider audience, thereby revitalizing interest in these languages and ensuring their transmission to future generations. By aiding in the reconstruction of extinct languages and creating effective learning materials, AI technologies offer innovative solutions to integrate revived languages into communities. The study further recommended that efforts to revitalize the Urhobo language extend to virtual spaces like Facebook, WhatsApp, and other social platforms. These platforms serve as avenues for promoting language use and engaging with the language community, contributing to the preservation and revitalization of the Urhobo language.

**Key words:** Artificial Intelligence (AI), Challenges, Multifaceted, Prospects Urhobo Language.

## 1.1 Background to the study

Artificial Intelligence (AI) presents both challenges and prospects across various domains, including business practices, societal integration, and policy implications. The integration of AI within small and medium-sized enterprises (SMEs) is a focal point for examining the challenges and prospects of AI. The reduction in costs and ongoing research and development are contributing to the promising prospects of AI in SMEs, despite the challenges hindering its adoption. Challenges such as ethical and societal implications, security, and the robustness of AI models are critical considerations as AI continues to be integrated into diverse fields. Addressing these challenges requires international cooperation for standardizing AI regulations and implementing monitoring, compliance audits, and reporting mechanisms. Additionally, the ethical implications of AI development and its societal impact are areas that demand attention and

innovative solutions. Several studies (Okediji, 2019; Obaro, 2020) highlight the need for concerted efforts to collect and digitize linguistic resources in Urhobo.

The practical, legal, and ethical implications of AI, particularly in the context of funding, development, supply, and regulation, are significant challenges that need to be addressed. The absence of government oversight in the application of AI poses potential risks, emphasizing the need for regulatory frameworks to ensure responsible and ethical use of AI.

The challenges in AI extend to the practical, technical, and societal implications of merging AI with human cognition. Ethical, technical, and societal implications are at the forefront of challenges in AI, necessitating a comprehensive approach to address these multifaceted issues. The transformative power of AI also comes with challenges, including issues of transparency and security. Efforts to address AI-related security challenges, particularly in areas such as e-finance, e-governance, smart sustainable cities, and connected cars, are crucial for ensuring the safety and privacy of end-users.

The challenges of AI encompass a wide range of issues, including privacy and personal data protection, ethics of use, algorithmic bias, and the socio-economic impact of job displacement. Overcoming these challenges calls for interdisciplinary cooperation, defining regulatory policies, and strategic planning to optimize AI and minimize disruptions.

In navigating AI challenges, limited transparency as well as determining accountability for AI recommendations, are key areas that require attention. Developing ethical guidelines and principles that reflect a commitment to fairness, transparency, privacy, and accountability is essential for addressing these challenges. The prospects for AI in the near future and the implications for policy and research are areas of focus for understanding the emerging opportunities and challenges resulting from AI developments. AI's far-reaching effects on society and the need for changes in policy and research underscore the importance of addressing the multifaceted implications of AI.

## **2.1 Literature review**

The meta-theoretical issues of AI and Artificial General Intelligence (AGI) are central to understanding the nature of the field. Criteria such as correctness, concreteness, and compactness are proposed for desired theories, and their application is evaluated within the context of AI. The lack of a common theory is a point of contention among AI researchers, with some emphasizing the holistic nature of intelligence they seek to achieve through AGI. This study aims to investigate the challenges and prospects of AI in the Urhobo languages in order to chat a proper footing for the application of AI in the Urhobo language.

A three-level model that synthesizes and unifies existing learning theories is proposed to model the roles of AI in promoting learning processes. This model draws from developmental psychology, computational biology, instructional design, cognitive science, complexity, and sociocultural theory. It includes a causal learning mechanism that explains how learning occurs and works across micro, meso, and macro levels, offering implications for research and practice. Various technology acceptance theories, such as the Technology Acceptance Model (TAM), the Theory of Planned Behavior (TPB), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Value-based Adoption Model (VAM), have been used to explain consumer acceptance of AI-based intelligent products. These models are employed to determine which best explains consumer acceptance and the factors with the greatest impact on purchase intention.

The foundational theories of AI psychology integrate concepts from neuroplasticity, phenomenology, and beyond to understand the intricate mechanisms that govern AI behavior, learning processes, and decision-making. This multifaceted exploration delves into the complex interplay between artificial intelligence and psychological theories, offering a unique perspective on the cognitive aspects of AI.

The Theory of Mind AI, a concept in the world of Artificial Intelligence, aims to understand and simulate human relationships, intentions, and emotions. It goes beyond understanding emotions of oneself, predicting others' feelings, and simulating human relationships. In summary, the theories of AI encompass a wide array of meta-theoretical, learning, acceptance, psychological, and social interaction considerations.

Multimodal AI: Integrating multiple modalities such as text, speech, and images can enhance the effectiveness of AI applications in Urhobo language processing (Oghenekohwo, 2022). Endangered Language AI: Drawing insights from the broader field of endangered language documentation and revitalization, future research could explore innovative AI solutions tailored to the specific needs of Urhobo and other minority languages (Obaro & Oghenekevwe, 2023). The orthographic diversity in Urhobo presents a significant hurdle for natural language processing tasks such as text normalization and part-of-speech tagging.

Obaro & Obaro, (2018) emphasize the importance of developing standardized writing conventions to facilitate AI development in Urhobo. The complex morphological and tonal features of Urhobo pose challenges for AI systems designed for languages with simpler structures. Studies (Ejedafiru, 2017; Emori, 2021) suggest the need for linguistically informed approaches to AI development in order to accurately model Urhobo language phenomena. a. Language Documentation and Preservation: AI technologies offer opportunities to digitize and archive oral traditions, folklore, and linguistic data, thereby contributing to the preservation of Urhobo language and culture (Oghenekohwo & Obaro. AI-driven language technologies can empower Urhobo speakers by providing access to educational resources, digital literacy tools, and online communication platforms (Ovie, 2018; Akpobome, 2023). Machine translation and speech recognition systems hold promise for facilitating communication between Urhobo speakers and speakers of other languages, promoting cultural exchange and collaboration (Okotie, 2019; Obaro & Obaro, 2021).

Data Augmentation: Some studies propose techniques for augmenting scarce Urhobo language data using synthetic data generation methods (Oke, 2020). Transfer learning approaches, adapted to the low-resource setting of Urhobo, have been explored for building language models with limited training data (Obaro, 2021). Participatory research methodologies involving collaboration with Urhobo-speaking communities are advocated for ensuring the relevance and sustainability of AI projects in the language (Ogaga & Obaro, 2022).

Semantics on the other hand is a linguistics discipline that scientifically studies meaning at the levels of words, phrases, sentences and units of discourse. However, the concept of meaning appears controversial and ungraspable, in order words, meaning is visibly difficult to pin down to a specific term Imu (2019). This controversy informs the view of Odgen and Richards in Imu (2019) who have produced twenty-three contextual meanings of the concept of meaning. Imu (2019) remarks that meaning is a harlot among words; it can seduce the writer or speaker from the path of intellectual chastity.

Imu (2019) opines that, meaning is a chameleon changing the colour of its effect with the change of speaker, hearer, context or setting. He further posits that meaning can, symbolise, stand for, mean, indicate, intend, and translate etc. The problem is to ascertain what the meaning of the challenges and prospects of AI means as meaning serves many functions.

### **3. Challenges and Prospects of AI in the Urhobo Language**

#### **3.1 Challenges of AI in the Urhobo Language**

##### **3.1.1 Data Scarcity and Quality**

The scarcity of high-quality data poses a significant challenge for the development of AI in the context of the Urhobo language. AI and NLP systems require extensive datasets to effectively learn and understand a language, and such datasets may be lacking for less commonly spoken languages like Urhobo. Data scarcity and quality are critical challenges in the realm of Artificial Intelligence (AI), impacting decision-making, model training, and the overall efficacy of AI systems. Here are some insights drawn from the provided search results: To address data deficits, data scientists commonly use synthetic data to enhance data quality and mitigate scarcity. Additionally, public-private partnerships are explored as potential means of addressing data gaps in developing countries, aiming to promote transparency and accountability in the process of achieving a data revolution needed for sustainable development.

##### **3.1.2. Overcoming Data Scarcity**

Various techniques and approaches have been proposed to overcome data scarcity in AI, including transfer learning, data generation, and the use of machine learning techniques such as clustering and classification to complete missing data. These methods aim to improve the capacity of exploiting available data to better represent, understand, predict, and manage the behavior of environmental systems.

In specific applications, such as monitoring migratory animals in remote parts of the ocean, the scarcity and variability of data require high-quality labeling to ensure accurate AI identification and monitoring without confusion or misinterpretation. Research indicates that prioritizing data diversity and inclusivity is crucial for the responsible development and deployment of AI models. Well-curated data is found to hold greater efficacy in training models. The challenges of data scarcity and quality in AI are multifaceted, encompassing issues related to volume, quality, and accessibility of data. Various strategies, including the use of synthetic data, public-private partnerships, and advanced machine learning techniques, are being explored to address these challenges and enhance the effectiveness of AI systems.

##### **3.1.3. Bias and Stereotyping**

AI systems trained on datasets that do not adequately represent the diversity of languages and cultures can perpetuate bias and stereotypes. With Nigeria's vast linguistic diversity, it is crucial to ensure that AI systems are trained on datasets that include minority languages like Urhobo to avoid these issues. Historical biases were widespread and institutionalized, leading to overt and unapologetic stereotypes about entire groups of people. These stereotypes were based on generalizations and often lacked personal interaction with the groups being stereotyped. Stereotyping bias can significantly impact various stages of the hiring process and affect people's lives if not addressed, leading to biased decision-making and prejudiced actions. Individuals' perceptions and behaviors can be influenced by implicit stereotypes, even if they are unaware of holding such biases. Implicit bias operates prior to conscious intention or endorsement, affecting decision-making and behavior.



A bias is a personal preference or tendency that interferes with impartiality, while a stereotype is a preconceived idea that attributes certain characteristics to all members of a group. Both biases and stereotypes can lead to unfair judgments and actions, attitudes, stereotypes, prejudices, and biases are all examples of psychological constructs that can influence behavior and feelings toward individuals or groups, often operating at an unconscious level recognizing and reflecting critically on biases and stereotypes is crucial for avoiding harmful prejudice and promoting fair decision-making. Cultural competence in health care and other domains involves learning about implicit biases and working to overcome them, emphasizing the importance of addressing biases in professional settings.

#### **3.1.4 Ethical and Legal Considerations in Urhobo**

The widespread adoption of AI raises ethical questions, particularly regarding the preservation of cultural identity and the potential for cultural homogenization. There is also a need for laws and regulations to keep pace with technological advancements to ensure that AI is used responsibly. The Urhobo community upholds various ethical considerations, including traditional practices such as food prohibitions or taboos. These practices are deeply rooted in myths, beliefs, and cultural traditions, passed down through generations via stories, folklore, and religious practices. An example is the ethical consideration of food prohibition in the Urhobo nation, which reflects the cultural and ethical dimensions of traditional practices within the community. In broader contexts, legal and ethical considerations in community services play a crucial role in defining boundaries between personal and professional relationships, handling confidential information, and establishing policies on accepting gifts from clients. Understanding the differences between legality and ethics is essential, as it shapes the conduct and decision-making processes within community services.

Feminist ethics and gender portrayals in Urhobo traditional music highlight the ethical dimensions of gender representation and power structures within the community. The moral perspectives and experiences of women are critically examined, emphasizing the need to address unjust power structures and discrimination against women in cultural expressions, including music. The mode of inheritance among the Urhobo people, along with other ethnic groups in Delta State, raises legal and ethical considerations. Analyzing the discrimination prevalent among these ethnic groups and suggesting recommendations to curtail such discrimination reflects the intersection of legal and ethical dimensions in societal practices and traditions.

#### **3.1.5 Language Endangerment**

The Urhobo language is at risk as younger generations shift towards speaking more dominant languages. This trend is exacerbated by modernity and the influence of languages like Naijá, which could potentially "subdue" Urhobo and other local languages if no action is taken. The Urhobo language, spoken by the Urhobo people of Southern Nigeria, faces challenges related to endangerment, primarily influenced by the impact of Nigerian Pidgin and English.

Previous research indicates that the three languages of the Urhobo people are endangered to varying degrees. Urhobo is particularly impacted by Nigerian Pidgin and English in communication, with Uvwie and Okpe being identified as the most endangered among the trio. The influence of Nigerian Pidgin, English, and other languages has contributed to the endangerment of Urhobo, especially in urban and rural areas. Efforts to preserve and revitalize the Urhobo language are underway, both within Nigeria and expatriate communities abroad.

Various community groups have organized initiatives aimed at preserving the language and teaching it to the youth, reflecting a growing awareness of the need to safeguard the linguistic heritage of the Urhobo people.

A sociolinguistic survey has been conducted to provide an updated understanding of the roles that the Urhobo language plays in rural communities. Additionally, the utility value of Urhobo music across different social categories has been examined as an indicator of the vitality of the language. These studies shed light on the multifaceted nature of language endangerment and the importance of cultural domains, such as music, in preserving linguistic heritage.

The vitality of the Urhobo language has been assessed, indicating that it is used and sustained by institutions beyond the home and community. However, the language is not being sustained by formal institutions, and concerns about its endangerment and thereby highlighting the need for continued efforts to ensure its preservation and transmission to future generations.

### **3.1.6 Semantic Implication of the Challenges of AI in Urhobo**

Bias and stereotyping pose significant challenges in AI, influencing decision-making, fairness, and societal outcomes. Addressing these issues requires awareness, reflection, and efforts to overcome implicit biases, ultimately contributing to the development of more equitable and responsible AI systems. Ethical and legal considerations within the Urhobo community encompass a wide array of traditional, cultural, and societal aspects, reflecting the complex interplay between historical practices, gender dynamics, and inheritance traditions. These considerations are integral to understanding and respecting the ethical and legal frameworks that shape the Urhobo community's values and practices. The endangerment of the Urhobo language is a complex issue influenced by linguistic, cultural, and societal factors. While challenges exist, ongoing efforts to preserve and revitalize the language demonstrate a commitment to safeguarding the linguistic heritage of the Urhobo people.

## **3.2 Prospects of AI in the Urhobo Language**

### **3.2.1 Enhancing Linguistic Diversity and Inclusion**

Artificial Intelligence (AI) has the potential to positively impact linguistic diversity and inclusion in the Urhobo community, particularly in the context of preserving and promoting the Urhobo language. Here are some key insights from the provided search results: AI technologies can play a crucial role in enhancing linguistic inclusion by expanding opportunities in education, the workplace, and access to essential services. This can enable more people, including those from linguistically diverse communities, to communicate effectively with IT systems, and access healthcare, legal protection, and government services, thereby fostering greater linguistic inclusivity.

The intersection of AI and neurodiversity has been recognized as a means to promote diversity, equity, inclusion, and accessibility. AI's growing popularity is opening new doors to enhance work capabilities and performance for persons with disabilities, contributing to a more inclusive environment. AI can assist in addressing unconscious biases and stereotypes that may affect linguistic diversity and inclusion. By simulating intelligent behaviors, AI can help change the way organizations work and reduce trends and prejudices that undermine their ability to recruit diversely and inclusively, thus contributing to a more inclusive environment. Efforts to preserve linguistic diversity and cultural heritage, particularly in low-resource settings, have gained increasing attention. The development of Natural Language Processing (NLP) systems in such settings aims to safeguard linguistic diversity and cultural heritage, contributing to more

inclusive and fairer systems. Research emphasizes the importance of diversity and inclusion in the design, development, and deployment of AI systems. This systematic literature review identified challenges and solutions for enhancing diversity and inclusion practices by AI, contributing to a deeper understanding of these issues and considerations in the AI ecosystem.

### **3.2.2 Economic Value and Growth**

AI presents opportunities to enhance the digital and economic value of African languages. Investment in AI technologies can lead to improvements in productivity and economic outcomes, which could benefit the Urhobo-speaking community. The economic value and growth of AI in the context of the Urhobo community can potentially contribute to broader economic development and inclusive growth. Insights from various sources highlight the potential impact of AI on economic growth, productivity, and the overall economic landscape. Here are some key points drawn from the provided search results: AI's potential to deliver additional global economic activity of around \$13 trillion by 2030, leading to approximately 16 percent higher cumulative GDP compared with today, with an additional 1.2 percent GDP growth per year.

The global economic impact of AI could contribute up to \$15.7 trillion to the global economy by 2030, with significant economic gains expected in leading AI countries, including China and North America. AI has the potential to significantly increase total factor productivity across the economy, impacting a wide range of industries through multiple channels, such as the labour market, investment, and productivity. The adoption of AI and related technologies in Africa, including regions such as the Urhobo community, could significantly impact the achievement of the United Nations Sustainable Development Goals (SDGs) by driving economic growth, improving access to quality education and healthcare, and promoting sustainable agriculture.

AI systems can enable specific individual prices based on different price elasticities, reducing market information asymmetries and supporting market competition for better price equilibrium outcomes, thus contributing to economic growth and sustainable development. The impact of AI on economic growth and the division of income between labor and capital, as well as the potential emergence of singularities and super intelligence, are subjects of ongoing discussion and consideration. AI's impact on society extends beyond the economy, encompassing areas such as national security, politics, and culture, highlighting the multifaceted implications of AI adoption.

### **3.2.3 Language Learning and Revitalization**

Various efforts to revitalize the Urhobo language can be supported by AI. By returning to oral traditions and using information communication technologies, AI can aid in the revival of the language. The revitalization and preservation of the Urhobo language using AI technologies hold significant promise for safeguarding and promoting this endangered language. Addressing policy and research needs in the context of the Urhobo community with AI presents opportunities to promote inclusive governance, ethical considerations, and economic development. The rapidly growing capabilities and increasing presence of AI-based systems raise pressing questions about the impact, governance, ethics, and accountability of these technologies. Narrowing the knowledge gap between AI experts and the variety of people who use, interact with, and are impacted by these technologies is crucial for inclusive governance and ethical considerations. **Addressing** fairness, equity, and inclusion in AI is an active area of research, emphasizing the importance of ethical considerations in AI development and deployment.

An anti-racist framework that prompts policymakers to ensure inclusive representation by

addressing structural challenges is essential. This includes limited research endowments to minority-serving institutions and having guardrails on AI systems to avoid replicating in-person inequities, such as in law enforcement applications. Stakeholders should engage in an ongoing dialogue to determine the strategies needed to seize upon AI's vast socio-economic opportunities for all while mitigating its potential negative impacts. This dialogue could address related issues such as educational reform, universal income, and a review of social services. Identifying future research agendas and gaps in the practical implementation of AI in sectors such as healthcare, ICT, education, social and cultural services, and fashion is crucial for promoting research in digital governance and addressing policy needs.

### **3.2.4 Semantic Implication of the Prospects of AI in Urhobo**

AI has the potential to enhance linguistic diversity and inclusion in the Urhobo community by promoting accessibility, addressing biases, and safeguarding cultural heritage. These insights underscore the transformative potential of AI in fostering linguistic inclusivity and preserving the linguistic heritage of the Urhobo people. The economic value and growth of AI in the Urhobo community have the potential to contribute to inclusive growth, economic development, and the achievement of sustainable development goals. The insights from the search results underscore the transformative potential of AI in shaping economic landscapes and fostering inclusive growth. AI technologies offer valuable tools and approaches for revitalizing and preserving the Urhobo language, from creating learning materials to leveraging virtual spaces for language use and engagement. These insights underscore the potential of AI in supporting the revitalization and transmission of endangered languages like Urhobo.

In summary, addressing policy and research needs in the Urhobo community with AI involves promoting inclusive governance, and ethical considerations, and addressing structural challenges to ensure the responsible and equitable deployment of AI technologies. These insights underscore the importance of engaging in ongoing dialogue, promoting inclusive representation, and identifying research gaps to address the specific needs of the Urhobo community.

### **4.1 Summary of Findings**

AI can make endangered languages more accessible and engaging to a wider audience, thereby revitalizing interest in these languages and ensuring their transmission to future generations. By aiding in the reconstruction of extinct languages and creating effective learning materials, AI technologies offer innovative solutions to integrate revived languages into communities. Innovations such as Open AI's GPT-4 are pushing the envelope in natural language processing, allowing for more accurate and human-like interactions between AI and users. These advancements can contribute to language revitalization efforts by generating educational materials tailored to specific languages and breaking down language barriers. AI-driven initiatives enable the creation of extensive language corpora, automated translation services, and interactive language learning applications, making language revitalization more accessible and measurable. These initiatives can help document the language and facilitate its teaching and learning.

### **4.2 Conclusion,**

There are significant challenges to using AI in the Urhobo language, including data scarcity, bias, and ethical considerations, and the prospects for enhancing linguistic diversity, economic growth, and language revitalization are promising. With appropriate policy and research efforts, AI can be a powerful tool in preserving and promoting the Urhobo language amidst the pressures

of modernity and globalization.

#### 4.3 Recommendation

The paper recommends that efforts to revitalize the Urhobo language should extend to virtual spaces like Facebook, WhatsApp, and other social platforms. These platforms serve as avenues for promoting language use and engaging with the language community, contributing to the preservation and revitalization of the Urhobo language.

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