

HUMAN MOBILITY AND LANGUAGE: TOWARDS NEW MULTILINGUAL APPROACHES WITH AI

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Abstract. *This study investigates the relationships between language and human mobility in terms of investment, accessibility and inclusion and how human-computer interactions, AI (Artificial Intelligence) speech translators might overcome language barrier in a multilingual perspective. After a brief analysis of population dynamics, demographic change and migration based on European Union publications, the aim of this paper is to highlight the strong nexus between language and mobility and how it plays a key role in citizenship, educational policies, employment and social services. The phenomenon of linguistic identity, together with the power relations of ELF (English as Lingua Franca), is observed by presenting poststructuralist perspectives on SLA (Second Language Acquisition). It emerges that the power relations can be equal and unequal and can influence both positively and negatively users' identities, shape people interactions and, thus, place them in particular communities or statuses. This 'communicative imperialism' can be inferred by the English Proficiency Index that places European countries in a high position, while countries in Eastern Europe, the Middle East, Africa, Latin America, and some Asian countries in the lowest ones. Non-native speakers have differing levels of command of the language, meaning that, for them, crucial details and nuances, as well as cultural references, might often be lost. This study explores the real-time multilingual interpretation, with the new emerging technologies, as a means to reduce language discrimination, information loss, and increase the return on investment (ROI), enabling everyone to join in a conversation in their own language from anywhere around the world.*

Keywords: *migration, linguistic identity, language inclusion, artificial intelligence, multilingual interpretation, machine translation system.*

JEL: C88, J15, J61, O30, Z13

UDC: 314.15+304

Introduction. The aim of this paper is to show how machine translation and AI-powered translation platforms can help removing barriers that prevent people from communicating when they do not share the same language, or the same ELF (English as Lingua Franca) proficiency, both in the private and working environment. A literature review shows how European migration and integration policies currently in place need to be re-assessed in light of changing demographics

and the future of work, focusing on the strong nexus between language and mobility.

Literature review. *Population dynamics: ageing population and gender gaps.* Population dynamics, demographic change and migration have many implications, they affect various EU policy areas, including growth, welfare, employment, education, infrastructure needs, environment and health. They may influence also political stability in the EU, and ultimately the EU's position in the world. Across Europe, over the last 50 years, life expectancy has increased considerably while birth rates are declining: a decreasing and ageing population brings new challenges. Even though Europe has higher rates of immigration than emigration, the gradual decline of the EU's population and labour force is expected to continue. Migration can both exacerbate and help address the problem of a shrinking working-age population. As our labour markets adapt to the new reality, it also brings more opportunities for active ageing and continued personal development.

Furthermore, the growing share of older people will result in an increased need for care services and will also challenge the long-term financial sustainability of our welfare states. The European Pillar of Social Rights is an important guiding framework under which the Commission recently adopted the European Care Strategy, which included the proposal for a Recommendation on access to affordable, high-quality long-term care adopted by the Council on December 2022.

Women's overall participation in the labour market remains much lower than that of men shining light on gender gaps (ILO Brief, 2023).

However, demographic trends do not affect every country and every region in the same way. Population decline has been particularly acute in some Eastern EU Member States, which have experienced high levels of emigration as well as people moving within their home countries from rural regions to predominantly urban areas in search of better opportunities for work and education and training possibilities. The resulting demographic differences can exacerbate existing economic, social and territorial inequalities, and provoke political divides.

Language and human mobility interface. Language and semiotic resources are fundamental in mediating, regulating, and shaping migrant processes, mobility is also providing new perspectives on language uses and forms, and it has made visible new communicative practices. An interdisciplinary and multidisciplinary perspective can bring to critical reflection and further development in migration studies, language policy, and sociolinguistic. The nexus language/mobility might play an important role in citizenship, educational policies, employment and social services.

Human migration is not a new phenomenon, as people have been migrating from one place to another throughout history, but what is making the language and human mobility nexus significant is the space/time compression brought by new social, technological and geopolitical developments. People belonging to a group but migrating to different countries keep their community ties through communicative and digital media, collapsing boundaries and space or time gaps.

Neoliberal economy, based on production and marketing relationships, on the other hand, made language a human capital to facilitate workers and products

flows. Talented people are encouraged to travel, collaborate and share their experience, thus language is of paramount importance because mediates, shapes and builds relationships. Innovation, branding, client service, and marketing are based on human interaction and are creating new communicative practices in the global multilingual market.

Skilled migration has been associated with economic progress and ‘development’ to spur development in emerging economies. Mobility has received attention as a new social reality, deserving urgent attention in academic research and language teaching. Organizations such as World Bank and International Monetary Fund encourage countries to open their borders and teach English in their schools, on the assumption that allowing their talented and educated citizens to share their skills and knowledge in the global market is a win–win situation for sending and receiving countries.

Terms such as ‘mobility turn’, ‘diaspora’, ‘multilingual turn’, ‘cosmopolitanism’, ‘superdiversity’, ‘translanguaging’ and ‘mobilities paradigm’ in diverse disciplines (Buscher, Urry, & Witchger, 2011; Faist, 2013; Urry, 2000) indicate a shift in academic discourse.

‘Translanguaging’, for example, is the ability to move fluidly between languages, while ‘truncated multilingualism’ (Bloomaert 2010) is about adapting linguistic features from different language for communicative functions in diverse migrant spaces. People freely move in and out of languages, developing complex repertoires, as motivated by their life experiences. People are open to unpredictability and demonstrate a willingness to negotiate in-equalities to co-construct meanings, motivated by their shared activities in their shared spaces.

The use of English as lingua franca ELF provides a means of communication among those who share no other language and is used by people in all parts of today’s globalized world as a resource in the conduct of their professional and private lives. Since it effectively allows speakers of different languages to interact with each other and so brings their respective L1s into contact, it is necessarily related to multilingualism.

Identity and language in the ELF intercultural communication. Research on language and identity reveals that the language choices we make are a central element of our conception of ourselves not just as members of communities or social groups but as self-contained individuals distinct from all others. An individual can be identified by others through his or her speech patterns. This research wants to highlight how identity impacts language teaching and learning processes, in particular with lingua francae and, last but not least, how digital technologies may be affecting language learners' identities and communication.

Linguistic identity is a complex phenomenon: Pavlenko and Blackledge point out in their discussion of identity in multilingual contexts that ‘language choice and attitudes are inseparable from political arrangements, relations of power, language ideologies, and that interlocutors’ views of their own and others’ identities’ (Jenkins, 2007). Moreover, the relationships among them are becoming ever more complex in postmodern societies.

One of the main reasons for the increased complexity of identity in recent times is the phenomenon of globalization and, with it, shifts in ‘the range of

identities available to individuals'. In terms of the English language specifically, its rapidly-growing dominance as the world's main lingua franca (ELF) is leading both to an increasing diversity in the way the language is spoken, and to corresponding attempts to limit this diversity by the continued 'distribution' of native speaker(NS) norms to an ever-larger number of English speakers (Jenkins, 2007).

In the 1970s and 1980s researchers considered language learner identity as something fixed to learners' personalities, learning styles, and motivations. In contrast, more recent work on language learner identities adopts poststructuralist understandings of identities as fluid, context-dependent, and context-producing, in particular historical and cultural circumstances: context 'pushes back' on individuals' claims to identity, individuals also struggle to assume identities that they wish to claim.

Norton (2000) highlights the relationship between imagined communities (Anderson, 1991) and imagined identities: when learners imagine who they might be, and who their communities might be, they feel a sense of community with people they have not yet met and with whom they may never have any direct dealings. These feelings of affiliation and nationhood might even have a stronger impact on their investment in language learning.

Poststructuralist perspectives on identity have introduced into the equation a number of previously ignored concepts of which the most important as far as ELF is concerned is probably the effect of power relations on the negotiation of linguistic identity (Heller, 1978). According to Heller's framework, language is seen as a way in which people influence others in social interaction and as a symbolic resource linked to power. Multilingual speakers may perform 'acts of identity' as they 'creates for themselves the patterns of their linguistic behaviour so as to resemble those of the group or groups with which from time to time they wish to be identified, or so as to be unlike those from whom they wish to be distinguished'. Interactional sociolinguistic approaches acted as an important stimulus to further research into linguistic identity but they have been criticized for their use of an untheorized concept of identity to explain language practices.

For example, research in South African multilingual contexts has provided a different set of insights into issues of race with respect to language learning, and the learning of English in particular (Makubalo, 2007; McKinney 2007; Nongogo, 2007). McKinney (2007) conducted research on the language practices of black South African students attending high schools that had previously enrolled white students. She showed that these black youth were mindfully acquiring English for their own uses rather than identifying with white first language speakers of English in their language acquisition processes. Although South Africa has eleven official languages, it is English that is the language of power. One learner referred to the prestige variety of English as 'Louis Vuitton English', representing English as a commodity.

As Norton (2000) observed, learners 'invest' in the target language because they believe they will acquire a wider range of symbolic and material resources, which will, in turn, increase the value of their cultural capital. The term 'cultural capital' was used by Bourdieu & Passeron (1977) to refer to the knowledge, credentials, and modes of thought that characterize different classes and groups. As

the value of learners' cultural capital increases, so learners reassess their sense of themselves and their desires for the future. Norton argued that investment and identity together signal the socially and historically constructed relationship of learners to the target language and their sometimes ambivalent desire to learn and practice it.

The nexus identity/language is also linked to the concept of competence. For instance, ELF is used by people from diverse communities as part of their everyday repertoire outside the language's traditional homeland; yet subtle cues in accent or word choice can index identity and, thus, place people in particular communities and statuses. For these reasons, Blommaert, Collins and Slembrouck (2005) argued that competence is 'placed'—that is, it is not what repertoires one carries with them that matters but how they are assessed in the places they communicate in. A person considered incompetent in one place might be carrying repertoires valued and respected in another. Privileged speakers arrogate to themselves the right to place speakers according to their language ideologies. As a consequence, despite the presumed democratization of languages and identities in mobility, students everywhere want to acquire privileged versions of English belonging to its traditional homelands. There is a profitable global teaching industry to cater to this demand. Sustaining a vicious circle of influences among markets, ideologies, and languages, we also have a global testing industry that assesses people's proficiency according to norms that are placed in privileged communities. Thus, discourses on mobility and deterritorialization have not obviated restrictive space or place ideologies from language policies and teaching practices. It is important, therefore, to formulate theories that do not disregard space, but address it critically in our teaching and scholarship (Canagarajah, 2021).

Multilingualism, ELF and machine translation systems. As interest grows on the value of skilled migration for development, there are also concerns that the overwhelming dominance of English as a lingua franca in the academic domain is having an insidious effect upon other languages, leading to the erosion of their traditional scholarly discourses. Evidence based on a paper published in the journal PLOS Biology found that nearly two thirds of the papers containing the terms "conservation" and "biodiversity" and accessible through Google Scholar were in English, with Spanish coming a distant second (Amano, 2021). The paper mentions the example of work done in Chinese in 2004 on the transfer of H5N1 flu from birds to pigs, which went largely unread outside China while "critical time was lost." It is evident then multiculturalism should be encouraged wherever practical, while AI and machine translation systems also have a role to play.

The Association for Computational Linguistics (ACL) has emphasized the importance of language diversity, with a special theme track at the main ACL 2022 conference on this topic. The ACL has also launched the 60-60 initiative, which aims to make scientific content more accessible by creating translations of the entire ACL anthology into 60 languages; cross-lingual subtitling and dubbing for all plenary talks in 10 languages; and a comprehensive standardized scientific and NLP terminology list in 60 languages. The latter resource and glossaries for African languages could help to facilitate the discussion of language technology in local languages (ACL, 2022).

AI has revolutionized the content creation landscape, and its impact on multilingual content is no exception. Gone are the days of laborious manual translation and localization efforts. AI-powered tools can now process vast amounts of data, analyze language patterns, and provide seamless translations that maintain the essence and context of the original content. This efficiency opens up new avenues for scholars and businessmen to engage with international audiences in their native languages. In the era of rapid digital evolution, artificial intelligence (AI) and natural language processing (NLP) models are transforming various aspects of life, significantly improving human-machine interactions.

Looking forward, AI's integration will drive worldwide digital transformation: from healthcare to banking, multilingual services can transform how services are delivered making technology more inclusive and accessible, ensuring cultural sensitivity.

Research methodology. A literature review frames the current population dynamics and demographic change. Common qualitative research methods used in studies of identity and language learning are presented. Finally, we examine how multilingual AI will boost inclusion and accessibility and foster collaboration.

Main results. *How AI is being used to improve multilingual AI voice systems in detail.* AI is being used to improve multilingual AI voice systems in a number of ways, including:

- Developing more accurate models of language: AI models can be trained on large datasets of text and speech in multiple languages to identify and correct errors in the input and output of the multilingual AI voice system. This includes errors in pronunciation, grammar, vocabulary, and context. For example, an AI model could be trained to identify and correct errors in the pronunciation of specific words in different languages. This would help to improve the fluency and naturalness of the speech generated by the multilingual AI voice system.
- Developing more fluent models of language: AI models can be trained on large datasets of natural-sounding speech in multiple languages to generate text and speech that is more natural and easy to understand. This includes learning the different prosodic features of different languages. For example, an AI model could be trained to learn the different pitch and intonation patterns that are used in different languages. This would help to generate speech that sounds more natural and engaging to listeners.
- Developing more adaptable models of language: AI models can be trained on large datasets of text and speech in multiple languages, as well as data that is specific to the application of the multilingual AI voice system. This allows the AI model to generate more natural and helpful responses to customer requests or to create more engaging and immersive educational and entertainment experiences. For example, an AI model for a multilingual AI voice system that is used in customer service could be trained on data that includes customer service scripts and common customer questions. This would help the AI model to generate more natural and helpful responses to customer requests.

In addition to these general improvements, AI is also being used to develop new types of multilingual AI voice systems. For example, some researchers are developing systems that can generate text and speech in multiple languages simultaneously. This could be useful for applications such as real-time translation. Other researchers are developing systems that can generate personalized voices for each user. This could be used to create more engaging and immersive educational and entertainment experiences. For example, a multilingual AI voice system that is used in a language learning app could generate a personalized voice for each user that is similar to their own voice. This would make the learning experience more immersive and effective. Overall, AI is playing a key role in the development of new and innovative multilingual AI voice systems that have the potential to make a significant impact on the way we communicate and interact with technology.

Here are some specific examples of how AI is being used to improve multilingual AI voice systems in more detail:

- Google Translate is using AI to develop a new translation model that is trained on a massive dataset of text and speech in multiple languages. This model is able to learn the different ways that words are used in different contexts, as well as the different ways that people pronounce words in different languages. This allows Google Translate to generate more natural-sounding and accurate translations.
- Amazon Alexa is using AI to develop a new system that can understand and respond to natural language commands from users who speak different languages. This system is being trained on a massive dataset of text and speech in multiple languages, as well as data that includes customer service scripts and common customer questions. This allows Alexa to understand and respond to commands more accurately, even if the user has a strong accent.
- Microsoft is using AI to develop a multilingual AI voice system that can be used in a variety of applications, such as customer service, education, and healthcare. This system is being trained on a massive dataset of text and speech in multiple languages, as well as data that includes specific examples of how the system should be used in each application. This allows the system to generate more natural and helpful responses to users in a variety of different contexts.

These are just a few examples of how AI is being used to improve multilingual AI voice systems. As AI technology continues to develop, we can expect to see even more innovative and useful multilingual AI voice systems emerge in the years to come.

Multilingual AI voice systems have the potential to make a significant impact on the way we communicate and interact with technology. By making it easier for people to communicate with each other regardless of their language, multilingual AI voice systems can help to break down barriers and create a more inclusive and accessible world.

Here is a description of the different types of multilingual AI systems that are being developed:

- Machine translation systems can translate text from one language to another.

Multilingual NLP systems can be used to develop machine translation systems that can translate text between multiple languages.

- Speech recognition systems can convert speech to text. Multilingual NLP systems can be used to develop speech recognition systems that can recognize speech in multiple languages.
- Text analysis systems can extract information from text. Multilingual NLP systems can be used to develop text analysis systems that can work with text in multiple languages.

Multilingual AI systems have the potential to make a significant impact on the world in a number of ways. For example, multilingual AI systems can:

- Improve communication and collaboration between people from different cultures.
- Make education and healthcare more accessible to people who speak different languages.
- Improve customer service by providing multilingual support.
- Facilitate international business and trade.

Multilingual AI is a powerful tool that has the potential to make the world a more interconnected and inclusive place.

Multilingual NLP models. Multilingual NLP models are trained on a variety of text and speech data in multiple languages. This data can be used to learn the different characteristics of each language, such as its grammar, vocabulary, and pronunciation.

- Cross-lingual transfer learning is a technique that can be used to train multilingual NLP models more efficiently. In cross-lingual transfer learning, a model that is trained on one language is used to initialize a model that is being trained on another language. This can help the model to learn the common features of both languages more quickly.
- Multilingual word embeddings are vectors that represent the meaning of words in multiple languages. Multilingual word embeddings can be used to improve the performance of multilingual NLP models on a variety of tasks, such as machine translation and text classification.
- Multilingual neural networks are a type of artificial neural network that can be used to process and understand text and speech in multiple languages. Multilingual neural networks have been shown to achieve state-of-the-art results on a variety of multilingual NLP tasks.

Multilingual NLP Tools and Techniques. Multilingual NLP relies on a variety of tools and techniques, including:

- Pre-trained multilingual models: These models are trained on a massive dataset of text and code from multiple languages, making them highly versatile and applicable to a wide range of tasks.
- Transfer learning: This technique allows models to leverage knowledge gained from one language to improve their performance on other languages.
- Zero-shot learning: This technique enables models to understand and generate text in languages they weren't explicitly trained on.

Multilingual NLP in Real-Life Applications. Multilingual NLP is being used in a variety of real-world applications, including:

- Machine translation: Multilingual NLP is powering machine translation systems that can translate text between languages accurately and fluently. This is enabling people to communicate across language barriers and access information and services from around the world.
- Sentiment analysis: Multilingual NLP is being used to analyze customer sentiment and public opinion in multiple languages. This information can be used to improve products and services, identify market trends, and build stronger relationships with customers.
- Information extraction: Multilingual NLP can be used to extract valuable insights from multilingual text, such as entities, relationships, and events. This information can be used for a variety of purposes, such as market research, fraud detection, and risk assessment.

Multilingual chatbots are a prime example of how multilingual NLP can be used to improve customer service and communication. By using multilingual NLP to develop chatbots that can understand and respond to user queries in multiple languages, businesses can provide a more seamless and personalized experience for their customers.

Discussion and conclusions. Population dynamics, demographic change and migration evidences urge the importance of a multilingual approach to reduce language discrimination. Inclusion and accessibility are the keywords to treat individuals equally and afford them the same opportunities.

Multilingual NLP can be used to develop a variety of systems, such as machine translation, speech recognition, and text analysis systems that can work with multiple languages. Multilingual NLP systems are becoming increasingly important as the world becomes more interconnected. People from all over the world need to be able to communicate with each other, and multilingual NLP systems can help to break down language barriers.

Multilingual NLP systems are also being used in a variety of other applications, such as education, healthcare, and customer service. For example, multilingual NLP systems can be used to develop language learning apps that can adapt to the user's native language. They can also be used to develop medical diagnostic systems that can understand and interpret medical records from multiple languages.

Multilingual NLP is a complex field, and there are a number of challenges that need to be addressed in order to develop effective multilingual NLP systems. Some of the challenges of multilingual NLP include:

- Data scarcity: There is often less data available for training multilingual NLP models than for training monolingual NLP models.
- Data heterogeneity: The data that is available for training multilingual NLP models can be heterogeneous, meaning that it can come from different sources and have different characteristics.
- Language variation: There can be significant variation between different languages, even within the same language family.
- Accents and dialects: Multilingual NLP models need to be able to handle a wide range of accents and dialects.

Despite these challenges, multilingual NLP is a rapidly developing field, and there has been significant progress in recent years.

Providing language support for people from all backgrounds is not only a matter of inclusion. Live interpretation contributes to better engagement, inclusivity, and accessibility in the virtual meeting space. It allows employees, customers, and partners to participate in their preferred language to develop a deeper relationship with them. Indeed, machine real time multilingual translation is not only a cost saving solution, but it can increase the return on investment (ROI) enabling true engagement, fostering collaboration and increasing productivity.

During this study, we conducted some researches about the efficacy of machine real time multilingual translation. Among the most promising one we identified Wordly (www.wordly.com), Interprefy (www.interprefy.com) and Kudo (www.kudoway.com).

They all allow real-time translation into various languages by integrating with the most common conference products (Google Meet, Cisco-Webex, Microsoft-Teams, Zoom, etc.). These platforms use AI and NLP techniques to enable simultaneous translation. In particular, the Kudo platform was tested. It allows real-time instant audio and captions in more than 30 languages. You can select the meeting language you would like to speak and listen in and participants can choose a language to listen and respond in. Therefore, each actor can speak and listen to the interlocutor in their native language. An AI-generated voice imitates the natural flow of speech. Real-time subtitles or simultaneous translations of texts and documents are also available. Complex topics can be easily communicated and understood. Even if it emerged that real time translations was not always accurate, the possibility of communicating is certainly surprising compared to purely human-based solutions.

As more data becomes available and as AI algorithms continue to improve, we can expect to see even more powerful and effective multilingual NLP systems in the years to come together with microchip implants for real-time neural language translation. Indeed, recent studies at Berkeley's College of Engineering show how in the future the use of these technologies will be extremely user-centric, adaptable and agile.

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