



Lessons Learned  
Deveveloping AI  
for Migrant  
Guidance  
Insights from the Lupai Project

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# Introduction

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In recent years, artificial intelligence technologies have been increasingly explored as tools for addressing complex social challenges. However, developing AI systems that genuinely contribute to social good requires a distinct approach compared to conventional technology development. Applications designed for sensitive domains such as migration, social rights, or public services must address not only technical challenges but also ethical, epistemic, and social considerations.

The project Lupai: AI Guidance for Life in Germany was developed with the aim of supporting migrants in navigating labor and migration rights in Germany. The application allows users to ask personalized questions in natural language and receive guidance based on curated knowledge sources. Rather than attempting to replace existing advisory structures, Lupai was conceived as a tool that can extend access to relevant information and support individuals in situations where formal counseling or community support may not be immediately available.



During the development of Lupai in 2024, the project team gathered a number of practical insights regarding the challenges of building AI systems in socially sensitive contexts. These insights concern the relationship between technology and existing social practices, the nature of the knowledge that must power such systems, and the technical architecture required to ensure reliable and responsible outputs.

This paper summarizes the most important lessons learned during the development of Lupai. By documenting these experiences, the project aims to contribute to a broader discussion on how AI technologies can be designed and implemented in ways that strengthen social support structures.

# Scaling Social Practices: Potential and Limits

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The inspiration for Lupai emerged from an everyday practice commonly observed in migrant communities: mutual aid in navigating bureaucratic systems. Individuals who have lived longer in Germany, have stronger language skills, or have already gone through specific administrative processes often help newcomers understand how to deal with institutions, paperwork, and legal procedures.

These exchanges of knowledge play an important role in helping migrants manage complex bureaucratic environments. Tasks such as applying for visas, signing employment contracts, or responding to official letters from authorities can be confusing and intimidating, especially for those who are unfamiliar with German administrative structures. Mistakes in these processes can have significant legal or financial consequences.

Mutual support within communities therefore functions as an informal infrastructure of knowledge. People share experiences, explain procedures, and provide practical advice that is often more accessible than official documentation.

At the same time, these practices have important limitations. Informal networks depend on social proximity and existing relationships. They are typically stronger in large cities where migrant communities are more established, while individuals living in smaller towns or more isolated contexts may not have access to such networks. Even when support is available, those offering help may not always have the necessary or most up-to-date information.

In addition to these informal practices, professional counseling services exist across Germany. Many are run by civil society organizations or supported by public funding, and some rely heavily on volunteer work.

These advisory centers provide an essential service, offering expert guidance on issues such as labor rights, residence permits, and social benefits. However, they also face structural constraints. Demand for counseling often exceeds available capacity, and the breadth of migration-related topics makes it difficult for individual organizations to cover all possible questions.

Lupai was conceived as a tool that could help extend and amplify these existing practices of support. By providing accessible guidance through a digital interface, the system aims to make knowledge available to people who might otherwise lack access to advisory networks.

For this reason, Lupai was explicitly designed as a complementary tool rather than a substitute for human counseling. Its role is to help users better understand their situation, access relevant information, and prepare for interactions with institutions or advisory services. In doing so, the system can potentially reduce barriers to information while preserving the central role of human support structures.

# The Knowledge that Powers Lupai

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A central challenge in developing Lupai concerned the nature of the knowledge required to provide meaningful guidance.

Official information provided by government institutions is often incomplete, fragmented across multiple websites, and difficult to understand without legal expertise. Legal texts define rights and procedures, but they are typically written in highly specialized language. For many migrants, barriers related to language proficiency and legal literacy make it difficult to interpret these sources directly.

Civil society organizations therefore play a crucial role in translating complex legal frameworks into accessible guidance. Many organizations produce informational materials, guides, and counseling resources specifically designed for migrant communities. These resources are often written in clearer language and take into account the practical realities faced by migrants.

During the development of Lupai, it became evident that even these resources capture only part of the knowledge required to navigate bureaucratic systems. A significant portion of relevant knowledge is experiential in nature. It emerges from the lived experiences of migrants and advisors who have repeatedly interacted with administrative institutions.

This experiential knowledge includes practical strategies that are rarely documented in official sources. Examples include how to prepare for appointments with authorities, which documents to bring to specific procedures even though not listed in official websites, or how to respond when institutions fail to respect legal rights. These forms of knowledge can be essential for successfully navigating administrative processes.

As a result, the Lupai project identified the need to integrate multiple forms of knowledge into its system: legal frameworks, explanatory materials produced by civil society organizations, official information from government offices, and practical experiential insights.

From a technical perspective, this posed two major challenges. First, it required the creation of a curated knowledge base that is reliable, regularly updated, and carefully structured. Given the dynamic nature of migration regulations and labor law, maintaining accuracy is a continuous effort.

Second, the system had to make this knowledge accessible through natural language interaction. Users typically ask questions using everyday language and may not be familiar with legal terminology. The AI system therefore needs to interpret informal questions and map them to relevant legal or advisory knowledge.

Designing mechanisms that allow large language models to retrieve and synthesize this information accurately was one of the central technical challenges of the project.

# The Lupai Architecture

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To address these challenges, the Lupai system adopted a multi-agent architecture. Instead of relying on a single interaction with a language model, the system organizes multiple AI components in a structured workflow. Each component performs a specific task, allowing the system to handle complex queries while maintaining greater control over the quality and reliability of responses.

This architecture allows Lupai to combine curated knowledge sources with the reasoning capabilities of language models while introducing additional safeguards and contextualization mechanisms.

Several design decisions proved particularly important for achieving satisfactory results.

## Lupai Helps Ask Lupai

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One of the first insights that emerged during testing was that many users struggle to formulate questions in ways that provide sufficient context. When people seek guidance about migration or labor rights, their situation often involves multiple variables such as residence status, employment conditions, or previous administrative decisions.

Users may not know which aspects of their situation are relevant to the question they are asking. As a result, the system may initially receive incomplete information.

To address this challenge, Lupai includes a component that asks follow-up questions before generating a final response. This mechanism helps gather additional context about the user's situation and ensures that the system has the necessary information to provide more precise guidance.

By actively guiding the conversation, the system improves both the relevance and the usefulness of its responses.



# The Importance of Sensitive Language

Migration-related questions frequently touch on sensitive topics such as discrimination, racism, precarious working conditions, or gender-based violence. Language models trained on large datasets may inadvertently reproduce biased or insensitive language when addressing these issues.

To mitigate this risk, Lupai incorporates an additional review component that evaluates generated responses with regard to sensitive language and potential bias. This component examines whether the response uses respectful language and whether it appropriately addresses situations involving discrimination or vulnerability.

The review process is informed by guidelines developed with experts working in migrant counseling and social services. These guidelines help ensure that the system responds to sensitive situations in a manner that is both accurate and supportive.



## Dealing with Contradictory Sources

Another challenge encountered during the project was the presence of contradictory information across different sources. Migration and labor regulations often involve multiple institutions, and official documentation may not always be fully consistent.

In some cases, different authorities interpret regulations differently or provide incomplete information. This creates difficulties for both migrants and advisory services.

To address this issue, Lupai incorporates mechanisms that allow the system to identify and contextualize conflicting information. Rather than presenting uncertain information as definitive, the system aims to explain possible interpretations and direct users toward authoritative sources when appropriate.

This approach prioritizes transparency and helps avoid the risk of presenting incorrect guidance with unwarranted confidence.

# Future Perspectives: Community-Driven Development

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The experience gained during the development of Lupai suggests that AI systems designed for social guidance should not be conceived as purely technical products. Instead, they should be understood as socio-technical systems that depend on continuous collaboration between technologists, domain experts, and affected communities.

One promising direction for future development is the integration of more participatory and community-driven approaches to knowledge production. Migrants, advisors, and civil society organizations possess valuable experiential knowledge that can help improve the relevance and accuracy of the system.

Creating mechanisms that allow communities to contribute knowledge, validate information, and identify gaps in the knowledge base could strengthen both the system's reliability and its legitimacy.

At the same time, maintaining strong connections with professional advisory structures will remain essential. AI-based tools should support the work of counselors and organizations rather than replacing them.

The development of Lupai demonstrates both the opportunities and the challenges of applying artificial intelligence in socially sensitive contexts. When designed carefully, AI systems can help extend access to knowledge and empower individuals to navigate complex institutional environments. Achieving this potential, however, requires a deliberate focus on the social practices, knowledge infrastructures, and ethical considerations that shape how technology interacts with society.

