TECHNICAL ANNEX

1. S&T EXCELLENCE

1.1. SOUNDNESS OF THE CHALLENGE

1.1.1. DESCRIPTION OF THE STATE OF THE ART

As Suveren (2022) states “one may become biased as they try to make sense of the available information”. It is not different when an Artificial Intelligence (AI) system bases its output upon the information that is available to it, as it may reflect societal prejudices and stereotypes. If an AI system is trained on datasets that predominantly feature certain demographics or viewpoints, it may inadvertently perpetuate those biases, leading to undesired skewed outcomes. Additionally, the design choices made by developers, including feature engineering and algorithmic parameters, can introduce biases if they are not critically examined through diverse perspectives. This can result in real-world applications that favour certain groups/stances over others, undermining fairness and inclusivity and producing filter bubbles.

Fig. 1 A “scientist” according to state-of-the-art technology. Left: DALL-E-generated image for the prompt "scientist". Right: image retrieved by the DuckDuckGo search engine for the query "scientist"; both are top hits.

Fig. 1 showcases the bias prevalent in state-of-the-art technology. After the query “scientist”, the models output middle-aged white males in a lab coat. Stereotypes such as age, race and gender present in the data are still being perpetuated, besides ongoing efforts. These *misbehaviours* are observed in multiple tasks, languages and modalities and are particularly prevalent due to a lack of awareness of local cultures. Both predictive and generative AI models are typically evaluated against metrics that assess performance (the extent of correct responses to a given request) and efficiency (the cost for training a model and eventually for producing a response upon deployment). Nevertheless, evaluation typically neglects important aspects, such as cultural awareness, gender equity, stereotyping, and language. The formalisation of these concepts, and their incorporation into reference evaluation frameworks for this sort of technology, is crucial in pursuing a culturally and linguistically diverse as well as an egalitarian (European) society.

The integration of diverse perspectives into the development and evaluation of AI models is necessary to ensure more equitable systems. Pioneering efforts, such as the U.S. National Institute of Standards and Technology's book for identifying and managing bias in AI (Schwartz, et al., 2022.), identify some broad challenges for mitigating bias —datasets, testing and evaluation, and human factors— and introduces preliminary guidance for addressing them. The principles outlined in these guidelines are directly relevant to the goals of this action, which seeks to harmonise AI-driven information access systems with Europe’s diverse cultural and linguistic realities.

The linguistic and cultural diversity present in Europe poses specific challenges for information access systems. Ensuring that these systems are capable of handling multiple languages and cultural nuances is critical for their inclusivity. The importance of creating culturally aware AI systems has been discussed in recent studies (Dehdashtian et al.,, 2024; Navigli et al., 2023; others?), which highlight

the disparities in AI system performance when serving/applied to diverse populations (Guerreiro et al., 2023). By embracing this diversity, information access systems can become more fair towards different languages and cultures, diminishing the negative effects of technology biased toward dominant languages or cultural groups.

The European Union (EU) is making some efforts to face the risk of using AI technology. In 2022, the (European Union Agency for Fundamental Rights (2022) reported on bias in algorithms focusing in the areas of offensive speech detection and predictive policing . This report highlights how easily algorithms can be biased or develop bias over time. The European Union Gender Equality Commission and the Steering Committee on Anti-Discrimination, Diversity and Inclusion also wrote a report in 2023 to address the problem of algorithmic discrimination (Bartoletti and Xenidis, 2023). This study recommends that the EU adopt a strong human-rights-based framework for AI, specifically addressing issues of equality, including facets such as gender equality, and discrimination.

Varsha (2023) surveys and exemplifies the negative effects of biased and unfair AI-based technology in different scenarios which go from e-commerce and advertising to human resources and even medical sensoring devices and discusses the negative effects of this faulty technology in the final user and the industry. Calegari et al., (2023) identify the four stages in an AI-based model cycle where one can intervene to raise its level of fairness: during planning, data collection, development and deployment of the model. It calls for the paramount necessity to raise the awareness and augment the capacity of technology developers to intervene in the models in favour of fairness and the positive impact that it can have into the overall quality of their services and even the reputation of the providers behind. Our action includes members with that sort of experience (e.g, on offering courses to companies and guaranteeing that they will excel in evaluation of their technologies in regards of bias and fairness).

https://www.ijcai.org/proceedings/2023/0735.pdf

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The necessity to bring knowledge from cognitive sciences to better evaluate AI technology and guarantee it is safe has been justified by the fact that such an area has decades-long experience in trying to assess (general) intelligence across species (Burden, 2024). Still, it is stressed that the proper mechanisms to bring into practice multiple aspects to boost AI models in terms of measuring their quality, robustness, and fairness (among many others) remains an open issue. Liang et al., (2024) offers the most thorough exposition of the aspects that multi-factor evaluation frameworks for language technologies should consider. They propose seven complementary metrics have to be combined to pursue fairness and transparency in language models: accuracy, calibration, robustness, fairness, bias, toxicity, and efficiency. Complementary to these aspects are the seven categories proposed for the evaluation of the social impact of AI Solaiman et al., (2024): social impact (bias, stereotypes, representational harms, cultural values and sensitive content), cultural values and sensitive content, disparate performance, privacy and data protection, financial costs, environmental costs; and data and content moderation labour costs.This kind of evaluation goes well beyond the one typically adopted in evaluation campaigns (Barrón-Cedeño et al., 2022; others)

The proposed action, entitled “Towards the Information Access Technologies of Tomorrow: Embracing Cultural, Linguistic, and Ethical diversity” (TIATT), seeks to bridge gaps in AI-driven information systems by integrating cultural, linguistic, and ethical diversity into their design and evaluation. By building on existing frameworks for managing bias, addressing ethical challenges, and fostering interdisciplinary collaboration, the project will advance the development of inclusive and fair AI systems capable of serving a diverse and interconnected world.

TIATT brings together diverse fields to create a common foundation for developing more inclusive and diverse technology. This includes experts from AI domains like computer vision, natural language processing, and information retrieval —behind technologies such as Google's Gemini and OpenAI's DALL-E— as well as experts in ethics, philosophy, linguistics, and cultural studies. Leveraging insights from these fields aims at creating more holistic solutions that not only address the technical challenges but does it with a ground on relevant societal needs. This action brings all these disciplines together to create a common ground for the definition and development of more diverse and inclusive technology from different angles.

1.1.2. DESCRIPTION OF THE CHALLENGE (MAIN AIM)

Our main endeavour is enabling scholars, practitioners and other stakeholders to measure and raise the level of Fairness, Accountability, Transparency, and Ethics (FATE) of AI technology, regardless of language or modality. TIATT intends to address a major challenge: the formalisation and standardisation of good practices in data collection and evaluation frameworks for AI-powered information access systems that bring into the formulation so far overlooked aspects, such as culture, ethics and bias. The Action tackles several problems structured in 5 working groups (WG) and frames them as the following set of research questions (RQ):

RQ1. How can interdisciplinary collaboration across European and global AI-based information access initiatives be optimised to ensure the integration of diverse cultural and linguistic perspectives, while fostering innovation? This action addresses the challenge of fostering sinergies of diverse fields and initiatives to drive both inclusivity and innovation in AI-driven information access systems. As such systems shape decision-making and knowledge dissemination, optimising collaboration between computer science, linguistics and ethics, among other fields, is crucial for ensuring that technology reaches the highest standards of FATE. This requires overcoming communication barriers across disciplines and aligning research goals among global evaluation campaigns such as CLEF (European; information retrieval, information access, natural language processing; computer vision, signal processing; multimodal, multilingual) and local ones such as GermEval, IBERLEF and Evalita (Germany/Spain/Italy; natural language processing and information retrieval; multimodal), while considering the specificities of each region's cultural landscape. A core difficulty that TIATT will address lies in understanding the limitations that account for underrepresented languages and minority cultures. Additionally, balancing the need for standardisation across initiatives with the flexibility necessary for innovation is critical to ensure that, while Europe's rich cultural diversity is integrated into AI systems, new approaches to information access are also encouraged and reinforced.

RQ2 How can data collection practices be designed to mitigate biases and ensure equity, transparency, and ethical standards in AI-based information access systems? This action addresses the critical challenge of enabling fair and ethical systems by focusing on the foundation of these technologies: data. Bias in AI often stems from skewed or unrepresentative data, which can perpetuate inequalities and lead to unfair outcomes in decision-making processes. To mitigate these biases, data collection practices must be carefully designed to ensure that they are inclusive and representative of diverse populations, cultures, and perspectives. This involves reviewing the methodologies to capture the complexities of human diversity while adhering to ethical standards that protect individuals' rights and privacy. Transparency in how data is collected, annotated, and processed is essential to maintain accountability in AI systems, allowing for better scrutiny and trust from the public while being socially responsible and inclusive.

RQ3. How can evaluation methodologies for AI-based information access systems be improved to ensure comprehensive, transparent, and context-sensitive assessments that account for reliability, fairness, and effectiveness across diverse applications? This action focuses on the critical need of enhancing how the quality of AI-driven information systems is measured to ensure they meet key standards of reliability and fairness. Current established evaluation frameworks often fall short at capturing the full scope of an AI system's impact, particularly in diverse real-world applications that involve varying cultural, linguistic, and ethical considerations. Improving these methodologies requires engineering evaluation metrics that not only measure technical performance but also assess how well systems handle issues like fairness, bias, and transparency, especially in contexts involving marginalised and/or underrepresented groups. A more context-sensitive approach involves incorporating different stakeholder perspectives and considering the broader societal implications of AI-driven systems as well.

RQ4. How can interdisciplinary insights, ethical considerations, and comprehensive evaluation metrics be effectively integrated into AI-based information access systems to enhance the inclusivity, fairness, and effectiveness of digital multimodal and multilingual information access across diverse real-world applications? It is essential to identify and apply the findings of this action to create AI-driven information retrieval systems that prioritise inclusivity and fairness. This action will identify specific use cases and potential infrastructures where best practices can be applied, ultimately guiding the development of information access systems that are inclusive, effective, and responsive to the varied needs of users in an increasingly interconnected digital world.

1.2. PROGRESS BEYOND THE STATE OF THE ART

1.2.1. APPROACH TO THE CHALLENGE AND PROGRESS BEYOND THE STATE OF THE ART

The Action aims at advancing the state-of-the-art in AI-driven information access in the following aspects:

WG1. Global information access evaluation campaigns such as TREC, CLEF, FIRE, and NTCIR have established strong foundations in evaluating AI systems for diverse tasks. Furthermore, local initiatives across Europe —such as BSNLP (Balto-Slavic languages), Evalita (Italy), GermEval (Germany), IBERLEF (Spain), and NB-REAL (Nordic and Baltic)— demonstrate an untapped potential for synergy. Currently, collaboration across these initiatives is sporadic. WG1 focuses on identifying and fostering strategic cooperation to unify these efforts, aligning resources and methodologies while respecting Europe's cultural and linguistic uniqueness.

Promoting collaboration between regional initiatives that have so far operated in silos provides a holistic European approach to the construction, maintenance and enhancement of AI evaluation frameworks. While global initiatives like CLEF have offered transnational collaboration, WG1 significantly expands the translational collaboration by engaging a wider range of regional initiatives, embracing a wider spectrum of Europe's cultural and linguistic diversity. Additionally, this action will highlight underrepresented languages and cultures, addressing a gap in the inclusivity of current AI systems and evaluation frameworks. By emphasising the needs of minority languages and cultures, the group will drive research into AI fairness and inclusiveness, ensuring that the next generation of AI systems better reflect Europe's diverse heritage.

The creation of shared platforms for knowledge exchange, alongside joint evaluation campaigns, will lead to more standardised and equitable practices across Europe, which are essential for the development of truly fair AI systems. This cross-border cooperation does not only minimise duplication of efforts and resources, but also amplifies the impact of existing research and development activities. This represents a pivotal step towards a more integrated and inclusive European research, driving innovation and promoting diversity in AI technologies.

WG2. This action addresses the critical issues of bias, inequity, and ethical standards in data collection processes, which directly impact the fairness and inclusiveness of AI systems. As AI technologies increasingly influence decisions across domains such as healthcare, finance, education, and legal systems, ensuring that the data used in training and evaluation are both representative and unbiased is paramount.This action aims to pinpoint where improvements can be made and propose ethical standards that support inclusive data practices. A holistic approach to the intersection of ethics, equity, and AI data collection will be taken. While existing research has evidenced bias in AI models (Azzopardi 2021; Blodgett et al., 2020; Dai et al., 2024; Fabbrizzi et al., 2022; Hovy and Shrimai, 2021; Schwartz et al., 2022) and proposals to mitigate them have surged (Dehdashtian et al., 2024; Parikh et al., 2019; Roselli et al., 2019; Sun et al., 2019), WG2 focuses specifically on the root cause of such biases —data collection. By examining the data sources and the ways in which they are compiled, curated, and represented, it will provide actionable insights to prevent biased AI outcomes before they occur.

Current approaches to data ethics are often reactive, identifying bias after AI systems are deployed. This WG aims to shift the paradigm towards proactive prevention, developing practical guidelines that organisations can use during the data collection phase. This is a key step towards creating AI systems that are not only technically robust but also fair, equitable, and ethically sound from the ground up. The

resulting recommendations will contribute to building fairer, more inclusive AI systems that align with the diverse needs of modern society.

In summary, this WG will lead to more equitable data collection processes, ensuring that AI-based information access systems are aligned with ethical standards and are designed to minimise bias and promote inclusiveness from their inception.

WG3. Current evaluation frameworks may not fully capture the complexities of real-world use cases, particularly in terms of bias, diversity, and equity. This action will introduce a multi-faceted approach to AI evaluation that goes beyond traditional, one-dimensional metrics. While current frameworks typically focus on task-specific performance, this WG emphasises the inclusion of diverse evaluation criteria, such as fairness, bias detection, and equitable representation of various demographic and cultural groups. This broader approach will lead to more holistic assessments of AI systems, ensuring that they are not only technically proficient but also socially responsible. This resource will allow researchers to apply and test new evaluation methodologies across a variety of AI domains, from natural language processing to computer vision, ensuring that the proposed metrics are applicable to diverse contexts. By refining evaluation standards and integrating new tools for bias detection and mitigation, this WG sets new benchmarks for how AI systems are assessed, ensuring that future AI technologies are not only effective but also fair and inclusive.

WG4. TIATT also bridges the gap between research and real-world application by translating the interdisciplinary insights, ethical frameworks, and advanced evaluation methodologies developed in this action into actionable, practical use cases. WG4 leverages established platforms such as CLEF and other evaluation campaigns at the European and national levels to identify, develop, and demonstrate relevant use cases.

By grounding these research outcomes in practical use cases, WG4 will demonstrate how interdisciplinary and ethical considerations can be embedded into AI-based systems, ensuring that fairness, equity, and inclusivity are not just theoretical aspirations but operational realities. The WG will showcase how ethical AI practices can lead to more effective, trustworthy systems that reflect the diversity of their user base.

Furthermore, WG4's focus on leveraging established evaluation campaigns will ensure that the action builds on strong foundations of collaboration and innovation. By fostering partnerships between academia, industry, and other stakeholders, the WG will create a pathway for sustained impact, demonstrating how advanced evaluation methodologies and ethical considerations can transform AI systems across multiple sectors. This practical focus not only validates the research findings from the other working groups but also sets a new benchmark for translating AI research into meaningful societal impact.

1.2.2. OBJECTIVES

1.2.2.1. Research Coordination Objectives

Objective 1: Achieving a shared understanding of the challenges of guaranteeing diversity and equity with a wide European perspective in the generation and compilation of datasets to train AI models for information access technologies. The objective goes from concrete aspects such as defining terminology and primary necessities to broad aspects such as the assessment of limits and obstacles. This objective is pursued by WG1, WG2 and WG3. Its indicator of completion is Deliv. XX(?)

Objective 2: Collecting representative datasets for multiple tasks and modalities to (a) identify common and specific issues in terms of generally overlooked aspects such as diversity and bias, (b) define proper policies and guidelines to avoid such issues, and (c) test their effectiveness while amending the datasets. This objective is pursued by WG2 and its indicator of completion is a technical report with the most effective guidelines (Deliv. 2.3).

Objective 3: Designing and implementing multilingual, multimodal, and multi-task evaluation frameworks, showcased within international shared tasks, that consider fairness, accountability, transparency, and ethics, among other aspects, during the different life stages of an AI-based

technology for information access. This objective is pursued by WG1, WG2, and WG3. Its indicator of completion is the successful organisation of a shared task… (Deliv. 4.x)

Objective 4. Disseminating the knowledge and achievements resulting from the action to any relevant audience. This objective is pursued through the Dissemination Plan (Sect. 2.2.2) and its indicator of completion includes the release of communication channels, the organised events, and the publications and other materials, making them all available through the established communication channels.

By coordinating research activities and fostering innovation, this action enables AI-based information access technologies to be developed with a strong focus on ethics, equity, and cultural inclusivity. It will also advance the effectiveness and transparency of these systems, making them more reliable and socially beneficial.

1.2.2.2. Capacity-building Objectives

Objective 5. Developing an interdisciplinary effective network with different stakeholders to collaborate and coordinate activities aiming at maximising synergies, ensure FATE data practices, and promote innovative evaluation methodologies for AI-based information access systems. This objective will be pursued through Deliv. 1.1. and will aim for expanding the network beyond the initial group of proposers. The expansion efforts will pay special attention to early-career investigators and ITCs.

Objective 6. Fostering further research-oriented funding initiatives. The action will target the attraction of MSCA postdoctoral fellows to the different participating countries, with special emphasis on ITCs, as well as the construction of an MSCA Doctoral Network, among others. The indicator of completion of this objective is the preparation of… Deliv. at the European level and further applications at the national and bilateral level.

Objective 7: Gathering together diverse associations into a global and inclusive umbrella association, particularly in terms of disciplines. The action targets to identify synergies across national and European research initiatives on information access to ensure that resources are used efficiently and duplication of efforts is avoided. As a result, the action will keep producing outputs even beyond its duration, and it will establish recurrent scientific events. The indicator of completion will be…

Objective 8.

- Emphasise the importance of Europe's diverse cultural and linguistic landscape in research activities.
- Lead efforts to develop and promote ethical frameworks for data collection, ensuring that AI-based systems are built on fair and representative data. This will help mitigate the risks of bias, ensuring that the systems benefit all communities and do not reinforce existing inequalities.
- Promote the development of multi-dimensional evaluation approaches that account for different facets of AI performance, such as fairness, transparency, and cultural adaptability. This will ensure that AI systems are assessed comprehensively, with attention to their societal impact.
- Foster research into novel evaluation techniques that can better assess the real-world effectiveness of AI systems. This includes exploring new ways to evaluate AI applications in culturally diverse and complex environments, ensuring that these systems perform well across various linguistic and societal contexts.

- Strengthen Evaluation Methodologies for AI information access systems
- Develop Standards and Best Practices for AI Workflows
- Foster Cross-disciplinary Collaboration
- Promote Ethical and Fair AI Practices

2. NETWORKING EXCELLENCE

2.1. ADDED VALUE OF NETWORKING IN S&T EXCELLENCE

2.1.1. ADDED VALUE In relation to existing efforts at European and/or international level

According to the COST.eu database (http://cost.eu) there are no COST actions similar to TIATT. To the best of our knowledge, only the 2010 action “IC1002 - Multilingual and multifaceted interactive information access (MUMIA)” (https://www.cost.eu/actions/IC1002/) addressed information access systems, although they focused on interactive search in the domain of patent retrieval. Therefore, there is no overlap.

The Horizon Europe Project BIAS (https://www.biasproject.eu) is related to the TIATT action. It works on addressing and mitigating algorithmic biases. However it mainly focuses on their impact on employment and workforce management. A further effort is the AEQUITAS project (https://www.aequitas-project.eu), also funded by the Horizon Europe Framework Programme, which provides an open platform centred on control experiments to detect, mitigate, and repair potential issues of unfairness in AI tools. Action TIATT builds upon and enhances existing European and international initiatives by promoting interdisciplinary collaboration, equity-aware AI development, and innovative evaluation methods. While globally recognised information systems evaluation campaigns have made significant contributions to information access evaluation, TIATT uniquely integrates European cultural and linguistic diversity, focusing on underrepresented languages and cultures. This approach not only fills gaps in the current landscape but also strengthens European leadership in inclusive AI innovation. By amplifying the diversity of European research evaluation campaigns such as BSNLP (Balcans), Evalita (Italy), GermEval (Germany), and IBERLEF (Spain), this action directly addresses the inclusion of cultural minorities and less-represented languages. This aspect is often overlooked in larger international efforts, positioning TIATT to have a far-reaching impact on the global landscape of AI research by ensuring that AI-based information access systems are inclusive and representative of Europe’s rich cultural heritage.

Ethical concerns around bias and fairness in AI are becoming increasingly important. While international initiatives have begun addressing these issues, this action stands out by embedding equity and ethics at the core of data collections. It aims to ensure AI systems are trained and evaluated on data that are representative and unbiased, addressing issues of accessibility and fairness across multiple modalities and languages. This strengthens Europe’s commitment to socially responsible AI development.

In addition, this action aims to asset the evaluation practices of AI systems, focusing on multi-faceted evaluation that goes beyond standard performance metrics. By integrating cultural, linguistic, and ethical considerations into evaluation processes, it ensures more comprehensive and fair assessments. This complements and extends the efforts of established international frameworks, aligning them with modern AI ethics and cultural sensitivity.

2.2. ADDED VALUE OF NETWORKING IN IMPACT

2.2.1. SECURING THE CRITICAL MASS, EXPERTISE AND GEOGRAPHICAL BALANCE WITHIN THE COST MEMBERS AND BEYOND

The current network already includes experts that look into AI and information systems from different angles. The action is formed from a multidisciplinary perspective, including computer scientists (e.g., machine learning, information retrieval, natural language processing, computer vision), mathematicians, linguistics, and philosophers, among others. They bring complementary strengths from various fields to address different aspects of fairness and ethics in information access technologies. We already hold a positive balance in regards to the percentage of ITCs, young researchers, innovators, and gender. This represents a very plural and diverse group open for discussion and with extended connections that will allow the action to grow further as it unfolds. The action will seek contact with further members through interaction in well-established annual events such as CLEF, ECIR, and ECCV. It will also target to expand to other communities, such as speech processing.

Great effort has been put into establishing a broad-reaching network, initially comprising 23 scientists from 9 European countries; 55% of which are from Inclusiveness Target Countries (ITCs). TIATT combines people from countries who have typically led in the field, such as the UK, Germany, Spain, and Italy. The selection of countries guarantees the coverage of multiple European languages and language families, as well as diverse cultures. The network has also identified and will seek participants from countries outside Europe, which represents yet another asset. TIATT holds a gender balance typically unseen in STEM-related initiatives, with 35% of the participants being women. Additionally, 21% of the proposers are young researchers and innovators.

2.2.2. INVOLVEMENT OF STAKEHOLDERS

The action will actively encourage and expand the participation of a wide range of stakeholders, aiming to enhance collaboration among researchers across various regions and amplify its social impact. TIATT involves different kinds of stakeholders. **Academics** from computer sciences, gender studies, ethics, and culture, will contribute in widening and strengthening the state of the art. **Young researchers** ---post-docs, PhD and Master students--- will be targeted with a high priority and will benefit from short-term scientific missions (STSMs) with senior researchers to promote both the transmission of established research practices and the adoption of novel approaches across all the members of the action. **Academics in ITCs** will be boosted to play an active role in multiple activities from basic research to the organisation of conferences and events, both hosted by themselves and elsewhere. Special attention will be paid to granting economic support for members from ITCs to attend international events within and beyond the action. Key stakeholders to be considered will include not only academic and research institutions but also **companies and other organisations** dedicated to information access science.

3. IMPACT

3.1. IMPACT TO SCIENCE, SOCIETY AND COMPETITIVENESS, AND POTENTIAL FOR INNOVATION/BREAKTHROUGHS

3.1.1. SCIENTIFIC, TECHNOLOGICAL, AND/OR SOCIOECONOMIC IMPACTS (INCLUDING POTENTIAL INNOVATIONS AND/OR BREAKTHROUGHS)

TIATT will not only advance the scientific understanding of AI-based information access technologies but will also drive technological innovations that promote inclusivity, fairness, and ethical responsibility during all the steps of their life cycle. The action's outcomes will have long-term benefits for both academia and industry, paving the way for more equitable and socially responsible AI systems that reflect and serve Europe's rich cultural diversity.

Scientific Impact. This action will contribute significantly to advancing the field of AI-driven information access technologies by addressing cultural, linguistic, and ethical diversity. The interdisciplinary collaboration fostered by WG1 will bridge gaps between different research initiatives, uniting them under a common framework. This will advance the scientific understanding of how diverse cultural and linguistic perspectives can influence the development and evaluation of information access systems. By addressing ethical and equity considerations in data collection (WG2), the project will establish new paradigms for ethically sound and unbiased AI systems, promoting fairness in AI research and applications. The innovative evaluation methodologies developed in WG3 will provide more comprehensive and reliable assessments of AI systems, ensuring that these systems are robust, transparent, and effective in real-world applications.

Technological Impact. This action will drive innovations in how AI-based information access systems are developed, trained, and evaluated. WG1's efforts in harmonising collaboration between global and local initiatives will streamline the integration of diverse data sets and evaluation methods, leading to more adaptable and inclusive AI technologies. WG2 will ensure that data collection practices are aligned with ethical standards, resulting in AI systems that better represent the needs of diverse populations. The novel assessment techniques proposed by WG3 will enhance the performance and trustworthiness of AI systems, ultimately enabling the deployment of cutting-edge technologies in areas such as multilingual information retrieval, digital libraries, and cultural heritage preservation. This could lead to breakthroughs in how AI is applied across industries, from education to health and beyond.

Socio-economic Impact. The TIATT action will have a profound socio-economic impact by promoting the inclusion of underrepresented cultures and languages in AI systems, thereby reducing digital inequality. WG1's efforts to integrate diverse cultural perspectives will ensure that AI technologies serve a wider array of populations, particularly cultural minorities, fostering social cohesion and equity. By improving ethical standards in data collection and ensuring fairness in AI systems (WG2), the action will contribute to the development of more socially responsible AI technologies. This is particularly critical as AI becomes embedded in decision-making processes across industries, influencing sectors such as education, healthcare, and public administration. The action focus on transparency and fairness will enhance public trust in AI technologies, making them more widely accepted and accessible.

3.2. MEASURES TO MAXIMISE IMPACT

3.2.1. KNOWLEDGE CREATION, TRANSFER OF KNOWLEDGE AND CAREER DEVELOPMENT

This action aims to not only advance the state of AI-based information access technologies but also to create a community that fosters knowledge creation, seamless knowledge transfer, and career development opportunities for researchers and practitioners across Europe and beyond. These efforts will ensure the long-term sustainability and impact of research outputs while building a robust, ethically aware, and inclusive information access community.

In terms of **knowledge creation**, this action will push the boundaries of current AI research, particularly in relation to information access systems. By addressing the ethical, cultural, and linguistic challenges associated with these technologies, it aims to develop new frameworks and methodologies that promote fairness, transparency, and inclusivity. These insights will contribute to the growing body of work in responsible AI, influencing future technological developments and policy frameworks.

For the **transfer of knowledge**, TIATT will encourage the exchange of ideas across disciplines, bringing together experts in computer sciences and social sciences. This interdisciplinary collaboration will lead to innovations that address Europe's diverse cultural and linguistic challenges. Additionally, the action will promote the open sharing of research outputs through open-access publications, open datasets, and open-source tools, ensuring that the findings are accessible to a broad audience. By engaging with the industry partners and fostering channels with academia, the action will also facilitate the practical application of research results, ensuring that the knowledge generated contributes to societal needs and influences policy decisions.

Career development is a core component of this action, with a focus on empowering early-career researchers. Through structured mentoring, hackathons and networking opportunities, participants will gain skills in information access technologies and interdisciplinary collaboration, preparing them for leadership roles in academia and industry. The action will also promote international collaboration by supporting researcher mobility, offering exchange programs to foster diverse professional experiences and broaden networks. In doing so, it will create new career pathways in information access technologies, helping to meet the growing demand for expertise in these areas.

3.2.2. PLAN FOR DISSEMINATION AND/OR EXPLOITATION AND DIALOGUE WITH THE GENERAL PUBLIC OR POLICY

The action will seek contact with members of large scale European Research Infrastructures such as CLEF, ECIR, EACL, and ECCV. These links will serve several purposes. They will facilitate the dissemination of the results, foster engagement with experts outside TIATT, and help align our efforts with the needs of practitioners.

Dissemination strategy. (i) Creating and regularly updating the website of the action, including direct access to the deliverables (Section 4.1.1) and contacts to stakeholders of the action. (ii) Establishment of social network accounts for the swift communication of affairs within and beyond the action. (iii) Disseminating the scientific outcomes at scientific and industry conferences and workshops in the relevant areas: NLP and Language Technologies (EACL, ACL*, COLING, LREC), Information Retrieval and data mining (SIGIR, ECIR, CLEF, WSDM), Computer Vision (CVPR, ICCV, ECCV), and scientific journals (Computational Linguistics, Language Resources and Evaluation, Information Processing and Management, IEEE Transactions on Pattern Analysis and Machine Intelligence, International Journal of Computer Vision). TIATT will seek to bring into the action organisers of such

events to further permeate the outcomes of the action. (iv) Offering structure mentoring and exchange visits to empower early-career researchers and interdisciplinary knowledge exchange.

In order to promote the outcomes and principles of the action to a wider academic audience, (v) TIATT will organise two training schools to educate target groups on the principles of equity and cultural-aware dataset creation and system evaluation, and two datathons for the joint curation an enhancement of datasets and two hackathons for the joint production of solutions, and two tutorials on the related topics at reference conferences. The produced mass will drive to (vi) the successful organisation of two multilingual and multi-modality shared tasks. (vii) The action will organise dedicated sessions and tracks for dissemination of the results with the participants coming from the industry. The goal of the action's dissemination efforts is to establish the network as a focal point for both academic and industrial parties interested in producing inclusive datasets for inclusive AI models.

Communication strategy. TIATT i will maintain social media accounts designed to engage with the general public and a website with up-to-date contents and links to resources and events. The results of the action will be promoted every year of the action at the European Researchers' Night, allowing communication with citizens in all the countries involved.

4. IMPLEMENTATION

4.1. COHERENCE AND EFFECTIVENESS OF THE WORK PLAN

4.1.1. DESCRIPTION OF WORKING GROUPS, TASKS AND ACTIVITIES

Action TIATT is organised around 5 working groups (WG) that are interconnected and interrelated in the proposed action. Fig. 2 offers an overview. The leaders of WG1-4 will run monthly online meetings for organisation purposes. The meetings gathering together the whole WGs will be organised twice per annum, with one edition occurring online and one in person.

WG1. **Fostering Synergy in European Research.** This WG is dedicated to fostering strategic cooperation and synergy among various research initiatives, projects, and organisations that share common goals in science, technology, and innovation. Globally recognised information access evaluation campaigns such as TREC, CLEF, FIRE, and NTCIR have set a strong foundation. Europe is home to one transnational (CLEF) and a range of local initiatives, including BSNLP (for Balto-Slavic languages), Evalita (Italy), GermEval (Germany), IBERLEF (Spain), and NB-REAL Workshop (for Nordic and Baltic languages), which reflect the region's rich cultural and linguistic diversity. Collaboration between these initiatives ---which is so far anecdotal--- is essential not only for maximising resources and avoiding redundancy, but also for embracing and amplifying Europe's unique cultural landscape. By strengthening European efforts, this working group will highlight underrepresented cultures and languages, advancing research into cultural minorities and ensuring that AI systems and information access technologies are inclusive of Europe's diverse heritage.

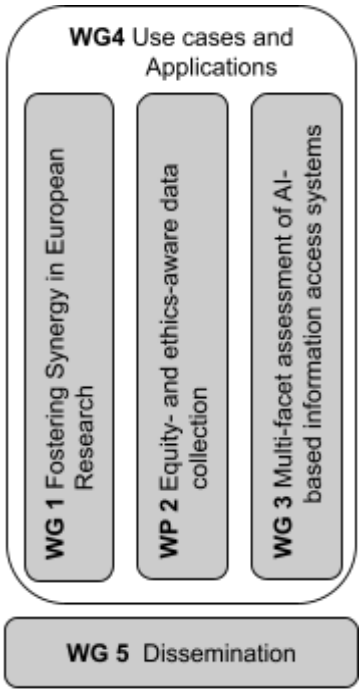

Fig. 2 Working packages

This working group seeks to identify opportunities for coordination, harmonise processes, and ensure the sharing of knowledge and results across initiatives, with a focus on integrating diverse cultural perspectives and methodologies. In doing so, it aims to drive innovation while promoting the richness and diversity of European cultures in the development of cutting-edge solutions.

Tasks:
T1.1: Mapping and exploration of European Research Initiatives (month 1-3)

T1.2: Identifying synergies within and across global and local initiatives, paying particular attention to their cultural and linguistic diversity (month 2-8).
T1.3: Analysing the level of inclusiveness of standard practices with respect to Europe's cultural and linguistic diversity (month 4-12).
T1.4: Creation of platforms for researchers to discuss challenges and share best practices for integrating these diverse perspectives into their work, ensuring inclusivity and equity in the development of new technologies.

WG2. The impact of data collection into AI-based information access systems: equity and ethics awareness. This WG aims to address the ethical and equity considerations in data collection processes and their subsequent influence on AI-based information access systems. As AI systems increasingly shape decision-making processes across multiple domains, it is essential to ensure that the data used for training and evaluation are representative, unbiased, and aligned with ethical and social standards.

Tasks:
T2.1: Compile datasets in different languages and modalities and from different origins to study principles of collection, annotation, and (lack of) protocols for the creation of fair and unbiased data.
T2.2: Investigate how data collection practices can perpetuate or mitigate unfairness and bias in AI-based information access systems.
T2.3: Analyse how bias and inequity in data collection affect the performance, fairness, and reliability of AI-based information access systems (month 14-22).

WG3. **Multi-facet assessment of AI-based information access systems.** This WG focuses on critically analysing and refining the methodologies used to evaluate AI-based information access systems. As AI systems become more pervasive in various applications, the rigour and validity of evaluation processes play a crucial role in determining their reliability, fairness, and overall effectiveness. This WG seeks to systematically assess the strengths and limitations of existing AI evaluation metrics and frameworks, to propose enhancements to ensure comprehensive and transparent assessments, and to explore innovative methods for evaluating AI in diverse contexts and applications.

Tasks:
T3.1: Investigate the current challenges in benchmarking AI information access systems across diverse domains, such as natural language processing, computer vision, and decision support systems (month 16-24).
T3.2: Explore how existing evaluation practices may (inadvertently) introduce or reinforce biases (month 17-28).
T3.3: Investigate methodologies to detect and mitigate biases in the evaluation process, ensuring that performance assessments are equitable and reflective of diverse user groups.

WG4. Use cases and applications. This WG is dedicated to translating the findings and methodologies developed by working groups WG1, WG2, and WG3 into practical, real-world use cases and applications. WG4 will apply interdisciplinary insights, ethical considerations, and advanced evaluation methodologies into AI-based information access systems that can be deployed across various domains. WG4 focuses on demonstrating how the outcomes of the action can impact fields such as digital multimodal and multilingual information retrieval, and AI-driven decision-making processes, ensuring that these systems are inclusive, fair, and effective.

In particular, WG4 will leverage existing resources, such as European- and national-level shared tasks, to identify and develop relevant use cases that reflect the project's goals. By building on well-established evaluation campaigns, such as CLEF, WG4 aims to showcase the practical applications of AI technologies while fostering collaboration and innovation within the research community.

Tasks:
T4.1: Identification of use cases from European and national evaluation campaigns , ensuring that these applications reflect the rich cultural and linguistic diversity within Europe and beyond.
T4.2: Analysing potential biases in datasets, ensuring equitable treatment of different languages and cultures, and promoting transparency and fairness in AI systems.
T4.3: Establishing continuous feedback loops between the use case implementations and the other working groups (WG1, WG2, and WG3). This will facilitate the refinement of interdisciplinary methodologies, improve ethical standards, and optimise evaluation techniques based on real-world insights.
T4.4: Organise joint evaluation campaigns that bring together multiple European initiatives to assess the performance and fairness of AI systems and information access technologies.

WG5. Dissemination. All initiatives regarding both dissemination and exploitation will be coordinated by this working group. Their input comes from the rest of the WPs. This WG will be responsible for coordinating the dissemination efforts. This includes the coordination of summer courses and events as well as engaging with stakeholders, and ensuring the alignment with other projects and communities.

Tasks:
T5.1: Collaborate with related projects, working groups, and international initiatives that focus on fairness, accountability, and transparency in AI.
T5.2: Align the WGs' outputs with ongoing interdisciplinary efforts.
T5.2: Organisation of learning schools, workshops and shared tasks to spread and showcase the good practices in data creation and model evaluation.
T5.3: Publishing the research findings and recommendations on equitable and ethical data collection.
T5.4: Dissemination of guidelines and best practices through online forums.

4.1.2. DESCRIPTION OF DELIVERABLES AND TIMEFRAME

D1.1: Outreach plan including report on existing global and regional initiatives about AI applied to information systems and related areas.
D1.2: Report on commonalities and potential complementarities among existing initiatives, such as TREC, CLEF, FIRE, and NTCIR, and regional initiatives such as BSNLP, Evalita, GermEval, and IBERLEF.
D1.3: Report including strengths and weaknesses as well as guidelines with good practices to support research that addresses the needs of underrepresented communities and languages.
D1.4: A collaborative online portal or community hub where researchers can engage in discussions, share resources, and participate in workshops or webinars.

D2.1: Blueprint with dos and don'ts for data collection practices that mitigate biases, as well as guidelines for equitable data collection that account for diversity in terms of gender, race, socio-economic status, and other demographic factors.
D2.2: Compilation of representative datasets with qualitative and quantitative analyses about the extent of equity and ethical principles, or lack of, considered during compilation and curation.
D2.3: Technical report on the extent of mid- and long-term societal impact of these systems when trained on data that do not adequately account for diversity and inclusion.

D3.1: Repository of single-modal and multimodal tasks that can benefit from the inclusion of multi-facet evaluation.
D3.2: Technical report on the impact of current evaluation standards in bias.
D3.3: Collection of formal evaluation metrics (and their implementation as software packages) that bring equitable and inclusive factors into the assessment of systems.

D4.1: Bias mitigation strategies document outlining actionable steps to address identified biases, promote transparency, and ensure fairness in AI models.
D4.2: Technical report on the outcomes and lessons learned out of the organisation of each of the evaluation campaigns.

D5.1: Reference book on fairness and ethics in AI data collection, offering a comprehensive view of the action's findings and recommendations.
D5.2: Two summer schools and two winter schools; two workshops and one shared task.
D5.3: Two shared tasks with editions at the national and the international level where all stages see the identified good principles and strategies applied.
D5.4: Open-access reports, webinars, infographics, and policy briefs to inform both the scientific community and the public.

Table 1. Measurability of research coordination objectives (RCO) and the capacity-building objectives (CBO) in terms of the deliverables.

		Deliverable																
		1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	3.3	4.1	4.2	5.1	5.2	5.2	5.3	5.4
RCO	1	■				■			■					■				
	2					■	■	■						■		■		
	3		■	■					■	■	■	■	■					
	4		■	■	■	■		■	■	■		■	■	■	■	■	■	■
CBO	5	■			■										■	■	■	■
	6																	
	7	■														■	■	

4.1.3. Risk analysis and Contingency Plans

Table 2. Overview of risks and contingency measures.

Risk	**Contingency measure**
Unlikely	
Possible	

4.1.4. GANTT DIAGRAM

Activity	**YEAR 1**				**YEAR 2**				**YEAR 3**				**YEAR 4**			
Management Committee meetings																
Online		■				■				■				■		
In-person				■				■				■				■
Working Groups meetings																
Online	■	■	■		■	■	■		■	■	■		■	■	■	
In-person				■				■				■				■
Training schools																
Summer							■								■	
Winter				■								■				
Workshops and Conferences							■					■				
Shared tasks																
National							■				■					
International															■	
Other disseminations ??																
Short-Term Scientific Missions	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■