



Ministero
dell'Università
e della Ricerca

EQUAL

EQUitable ALgorithms

Promoting Fairness and Countering Algorithmic Discrimination Through Norms and Technologies

Project Overview

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Unibo

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Bologna



CENTRO DI RICERCA
INTERDIPARTIMENTALE
ALMA MATER RESEARCH
INSTITUTE FOR HUMAN
CENTERED ARTIFICIAL
INTELLIGENCE



UNIVERSITÀ
DI TORINO



Università
degli Studi
di Palermo

Brief Description of the Project

The project addresses algorithmic evaluations, decisions, and predictions to promote fairness and counter discrimination that affects individuals and groups. The core of the project is to provide a comprehensive, interdisciplinary methodological framework for understanding and tackling algorithmic unfairness, bridging concepts from social sciences, law, statistics, and Artificial Intelligence.

Research Units

Università di Bologna

Members:

- Francesca Lagioia
- Ruta Liepina
- Andrea Loreggia
- Riccardo Rovatti
- Giovanni Sartor
- Sinan Gultekin
- Matteo Rossi Reich
- Francesca Galloni

Università di Palermo

Members:

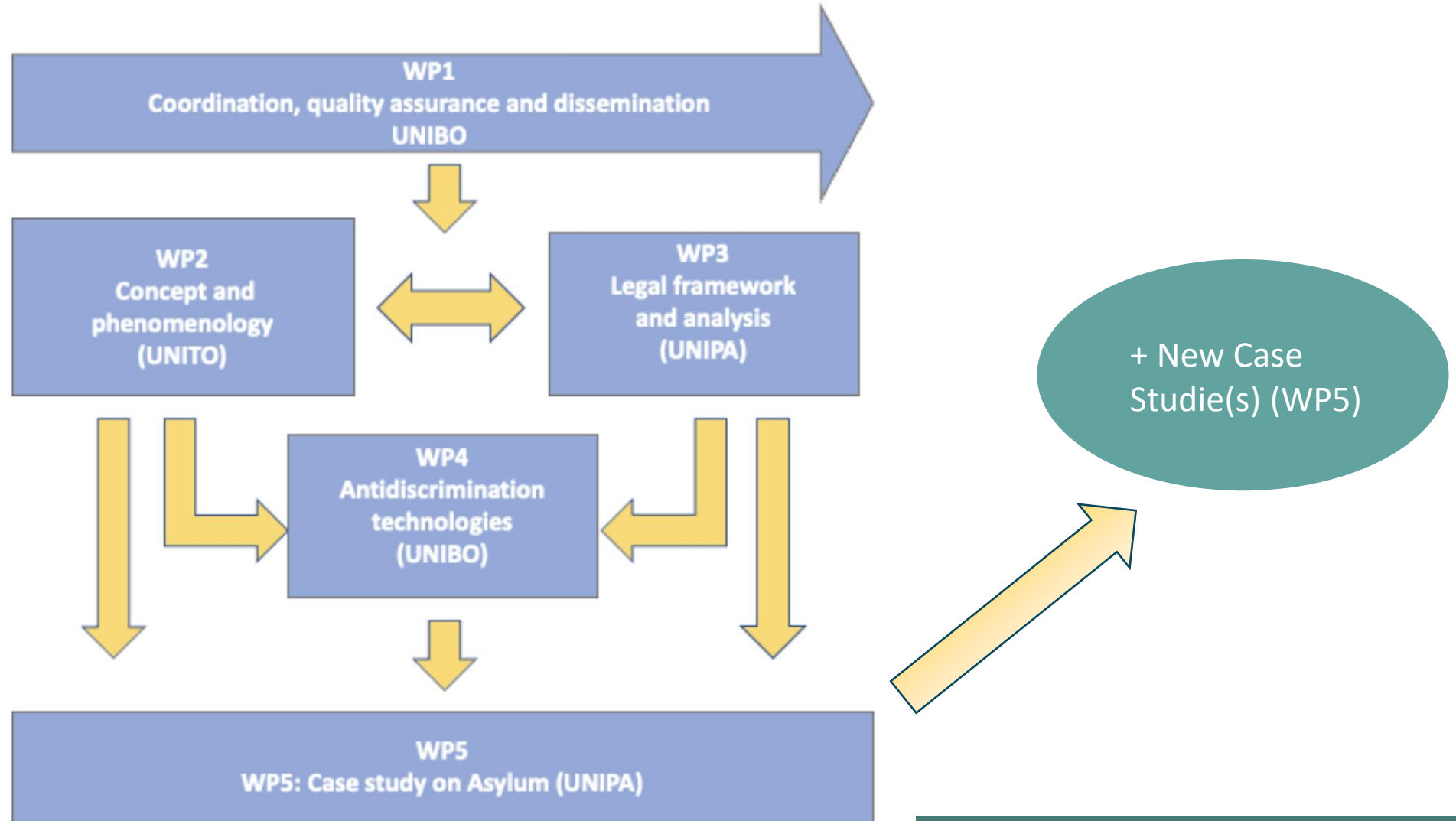
- Elena Consiglio
- Sonia Arduini
- Clelia Bartoli
- Guido Gorgoni
- Sara Bagnato
- Lorenzo Acconciamesa
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- Giorgio Mattarella

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Members:

- Ugo Pagallo
- Jacopo Ciani
- Jacopo Cianisciolla

Project Overview and WPs Interaction



Four Main Research objectives

➤ **Socio-technical objective(s):**

- Analysis of methods, contexts and implementation of AI decision making, to identify sources of unfairness and discrimination
 - Review the currently deployed systems
 - Identify advantages and disadvantages
 - Identify and analyse risky-factors potentially leading to unfair decisions
 - Identify possible mitigations and remedies

➤ **Conceptual objective:**

- Analysis of the different concepts of algorithmic fairness and discrimination, bridging the notions adopted in statistics, social sciences, law and AI.
 - Identify commonalities, differences, inconsistencies and gaps among such concepts
 - Address both substantial and procedural fairness

Four Main Research objectives

➤ Legal objective:

- Analysis of the way in which the law currently addresses or fails to address algorithmic unfairness and discrimination (ITA, EU, extra-EU)
- Proposing appropriate measures to implement or upgrade existing laws
 - Analysis of the applicable legal framework (norms, guarantees, arguments, and remedies) as well as forthcoming legislation (e.g., AI Act)
 - Developing a methodological analysis and a set of guidelines for the ethical and lawful deployment of effective AI applications

➤ Legal-informatics objective:

- Developing algorithmic approaches for assessing the viability of AI decision-making and methods to identify and remedy unfairness and discrimination under 2 perspectives
 - *AI ex post* to assess human decision-making
 - *AI ex ante* to suggest new decisions, or interim, as a component of an ongoing decision-making process
- Case study on asylum applications
- Defining a methodology to assess fairness in human and AI decisions

Results

- **Theoretical framework** to address algorithmic unfairness and discrimination, which connects ethical, legal, statistical and computational concepts
- Definition of **best practices** and **ethical and legal guidelines**
- **Computational methods** to detect instances of unfairness
- **Findings** on the asylum decision making process and **methodology** to assess fairness
- **Observatory designed to:** raise awareness of algorithmic decision-making risks and create methods to address unfairness and discrimination

Timeline (M1-M24) + 6M

EquAI project GANTT

Work Package/Task	Leader	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WP1: Coordination, quality assurance and dissemination	Bologna	█																							
T1.1: Coordination and management		█																							
T1.2: Quality assurance and monitoring		█																							
T1.3: Website, dissemination and Observatory		█																							
WP2: Concept and phenomenology	Torino	█																							
T2.1: Analysing the techno-social features of algorithmic decision making		█																							
T2.2: Deconstructing/reconstructing fairness		█																							
T2.3: Accountability criteria		█																							
WP3: Legal framework and analysis	Palermo	█																							
T3.1: Collection and analysis of legal sources		█																							
T3.2: Discussion of present and foreseeable issues												█													
T3.3: Legal innovations												█													
WP4: Antidiscrimination technologies	Bologna	█																							
T4.1: Survey and analysis of methods and		█																							
T4.2: Development of methodological framework for algorithmic fairness								█																	
T4.3: Implementation of computational methods												█													
WP5: Case study on Asylum	Palermo	█																							
T5.1: Study of the general normative framework		█																							
T5.2: Document collection and selection				█																					
T5.3: Computational analysis of the data set												█													
T5.4: Development of a prototype application												█													
T5.5: Automation in the asylum process												█													

WP 4: Antidiscrimination Tech (M1-24)

OBJECTIVE: develop a methodological framework for AI fairness, a model to detect unfairness and technical solutions compliant with legal and ethical principles

- **Task 1: Data collection and Legal Analysis (M1-6)**
- **Task 2: Development of methodological framework for algorithmic fairness (M6-M18)**
- **Task 3 Implementation of computational methods (M12-M24)**

Most Relevant Publications

- Gultekin, Sinan, et al. *A Two-Dimensional Evaluation Framework for Factual and Reasoning Assessment of LLMs in Legal Question Answering*. Legal Knowledge and Information Systems. IOS Press, 2025. 86-97.
- Lagioia, F., Loreggia A., Mangia, M., Rovatti, R., Sartor, G., *Pragmatic Normalized Group-Fairness and Fairness-vs-Performance Trade-Off in Binary Classifiers*, IJCAI-ECAI 2026, the 35th International Joint Conference on Artificial Intelligence. (Under Review)
- Lagioia, F., Loreggia A., Mangia, M., Rovatti, R., Sartor, G., *Algorithmic Governance and legal compliance; A Pragmatic and Normalized Group-Fairness and Fairness-vs-Performance Trade-Off* . AI & Law, Springer-Nature (Working)
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