APPENDICE

SPOKE 10: Sustainable Bio-Socio-Cognitive AI

Cascading Grants Objectives

SPOKE 10: Sustainable Bio-Socio-Cognitive AI

OBJECTIVES

1. Application of AI techniques addressing time-varying observations and transfer learning
2. Multi-Grounded AI models (ONLY SOUTH)
3. AI systems for human-environment interaction analysis (ONLY SOUTH)
4. Lifelong Learning for Robotic Applications (ONLY SOUTH)

DETAILS

❑ Minimum cost per project: 80.000 €
❑ Maximum contribution per project: 300.000 €

✓ Maximum funded projects – Objective #1: 3
✓ Maximum funded projects – Objectives #2, #3, #4: 4

ALLOCATED FUNDS

TOTAL (cost)	South (cost)
2.564.015,87 €	2.106.972,73 €

TOTAL (contribution)	South (contribution)
1.794.811,11€	1.474.880,91 €

CONTRIBUTION per OBJECTIVE

- Objective #1: 319.930,20 €
- Objectives #2, #3, #4: 1.474.880,91 €

#1 AI techniques addressing time-varying observations and transfer learning

Description of the objective: the project is intended at studying the feasibility, testing and use cases of advanced machine learning techniques in industrial context. Emphasis is given, but not limited to 1) techniques of non-linear time series analysis 2) data-driven dynamical systems, 3) transfer and meta-learning. Possible industrial contexts include finance, energy forecasting, robotics, numerical simulation of complex systems, drug discovery and image analysis. In any case comparison to currently available methodologies should be investigated, indicating the advancement over the state-of-the-art.

Scientific principal(s): Massimiliano Pontil (IIT)

Reference WPs/Tasks: WP 10.4, WP 10.5.

Link to Transversal Projects (if any):No

Typology : Use cases, Technology testing

Funding Type: Industrial research 28%, Feasibility studies 52%, Experimental development 20%

#2 Multi-Grounded AI modes

Description of the objective: the project aims at studying the industrial feasibility, testing, use cases, and business models for designing/training/reinforcing grounded world models and hybrid neuro-symbolic methods to produce industrial-scale models with the ability to ground AI functions in physical, social and cognitive realities, including human-centric practices, norms, ethical principles. For example, whether a company creates applications for enterprise data analysis, or domestic social robots, the AI models that make them work must be grounded in those realities, by embedding/integrating multiple layers and modalities.

Scientific principal(s): Aldo Gangemi (CNR)

Reference WPs/Tasks: WP10.7, WP10.8

Link to Transversal Projects (if any):No

Typology : Use cases, Technology testing

Funding Type: Industrial research 28%, Feasibility studies 52%, Experimental development 20%

#3 AI systems for human-environment interaction analysis

Description of the objective: AI systems tailored for holistic human-environment interaction analysis using multimodal data. This objective encompasses two sub-objectives:
1) Validation of AI systems enhancing precision in human-object interaction understanding and near-miss detection in diverse settings, leveraging both real-world and synthetic egocentric visual data, from safety at workplace to health to cultural heritage.
2) Validation of methods and technologies capable of analyzing multimodal signals to characterize human dynamics across indoor and outdoor environments by integrating data from various sources such as wearables, environmental sensors, and surveillance systems. We also call for use cases of multimodal data analysis on health monitoring, urban planning, and personalized user experiences.

Scientific principal(s): Concetto Spampinato (UNICT)

Reference WPs/Tasks: WP10.2, WP10.3

Link to Transversal Projects (if any):No

Typology : Use cases, Technology Validation

Funding Type: Industrial research 28%, Feasibility studies 52%, Experimental development 20%

#4 AI systems for human-environment interaction analysis

Description of the objective: Innovative projects at the intersection of artificial intelligence (AI) and robotics, with a focus on integrating lifelong learning techniques into outdoor, indoor, legged, and industrial robots. By merging AI capabilities with robotic systems, the objective is to drive advancements across industries such as manufacturing, healthcare, and environmental monitoring. Projects should aim to optimize operations, enhance safety, and facilitate intelligent systems management, thereby promoting technological progress and innovation.

Scientific principal(s): Concetto Spampinato (UNICT)

Reference WPs/Tasks: WP10.1, WP10.6

Link to Transversal Projects (if any):TP6

Typology : Use cases, Technology Validation

Funding Type: Industrial research 28%, Feasibility studies 52%, Experimental development 20%