CHIST-ERA Call 2017 Pre-announcement

The CHIST-ERA Call 2017, to be published in October 2017, will target research in the following topics:

- Object recognition and manipulation by robots: Data sharing and experiment reproducibility (ORMR)
- Big data and process modelling for smart industry (BDSI)

The details of the research targeted in the call have been defined by the research community during the CHIST-ERA Conference 2017, an event that was open to all interested researchers.

The present Call 2017 Pre-announcement gives an overview of the research themes that have emerged during the conference (see the following pages).

Anticipated Call deadline: 11th of January 2018

Researchers are encouraged to start discussing possible projects with prospective partners. The call will require that projects are submitted by international consortia with partners in at least three participating countries. Additional partners from other countries may be part of a consortium if they can secure their own funding. The list of countries and funding organisations which have shown preliminary interest in participating in the Call 2017 is provided below.

Country	Funding Organisation	ORMR	BDSI
AT	FWF	Yes	No
BE	FNRS	Yes	Yes
BG	BNSF	Yes	Yes
CA	FRQNT	Yes	Yes
CH	SNSF	Yes	Yes
CZ	TACR	Yes	Yes
EE	ETAg	Yes	Yes
ES	MINECO	Yes	Yes
ES	IDEA	Yes	Yes
FI	AKA	Yes	Yes
FR	ANR	Yes	Yes
GR	GSRT	Yes	Yes
IE	IRC	Yes	Yes
IT	MIUR	Yes	Yes
LT	LMT	Yes	Yes
PL	NCN	Yes	Yes
RO	UEFISCDI	Yes	Yes
SK	SAV	Yes	Yes
TR	TÜBITAK	Yes	Yes
UK	EPSRC	Yes	No

Please note that this pre-announcement is for information purposes only. It does not create any obligation for the CHIST-ERA consortium nor for any of the participating funding organisations. The official call announcement, to be published later, shall prevail. The contact point of your funding organisation remains at your disposal for any further information (see Consortium).

1st Topic: Object recognition and manipulation by robots: Data sharing and experiment reproducibility (ORMR)

The ability to recognise and manipulate objects is central to robotics. For example, it might be useful for a robot to recognise a certain object requested by a user, and to determine if and how the object can be safely grasped in order to fetch it. However, despite decades of research, such abilities remain limited in practice. Some of the limiting factors are a paucity of usable, large data sets for training robust models for the tasks under study, a lack of objective evaluation protocols to test these models in a comparable way, and more generally the challenge of reproducing results.

The purpose of this call is to progress the field of robotic perception and manipulation, building solid scientific foundations of experimental reproducibility through transparent sharing of data and methods. This call challenges researchers to propose collaborative projects, which will simultaneously address the three pillars of recognition, manipulation and reproducibility within this domain.

Target Outcomes

Projects should aim to enable the development of robots, which are able to accurately recognise and appropriately manipulate objects in various environments. Projects should lead to quantitative results which can be reproduced by others. Project teams should in particular make publicly available all the data, protocol description and software metrics needed to reproduce experiments. Appropriate efforts and means for doing so should be foreseen. Projects should address real-world challenges, and record and annotate robotic perceptions in order to experiment with different approaches for these challenges. Enough data from various environments and contexts should be used to show the robustness of the experimented approaches.

Key challenges are expected to be:

- Perceiving or predicting physical properties (shape, orientation, mass, fragility, etc.) of objects or environments;
- Handling of unknown objects and environments;
- Developing systems which are capable of operating in ambiguous contexts;
- Managing the perception-action loop;
- Interaction and cooperation with humans or other robots;
- Designing safe, secure, robust and ethically-sound systems;
- Independent and objective evaluation;
- Criteria and measures for reproducibility.

Approaches to Maximise Expected Impacts

Projects are strongly encouraged to address the following objectives in order to enhance impact:

- Grant access to the training data, evaluation data and metrics set up by the projects where possible, in order to help build momentum beyond the project consortia;
- Support the development of objective benchmarks and evaluation strategies for research in this domain;
- Cross traditional boundaries between disciplines in order to strengthen the community involved in tackling these new challenges. A broad range of disciplines needed to cover the breadth of this topic should be considered and could include expertise and skills in computer vision, embodied cognition, performance evaluation and robot ethics, among others.
- Training and dissemination with a view to strengthening European research, knowledge and expertise in the topic areas;
- Expand understanding and engage with stakeholders on the issues of long-term security, ethical and legal issues associated with the adoption of intelligent and autonomous systems.

2nd Topic: Big data and process modelling for smart industry (BDSI)

Industry is becoming increasingly digitized. Production and operational processes generate growing amounts of heterogeneous data, from simple sensor data to complex 3D video streams. This opens the way for new intelligent, flexible, network-centric production and operational approaches where parts, products and machines are interconnected across equipment, companies and value chains. The goal of these approaches is to enable production and operation at higher yield, higher quality, lower costs, lower environmental footprint and increased flexibility. This evolution is often referred to as the fourth industrial revolution, and it is relevant to most industrial sectors.

The aim of this call is to progress basic research on new information technologies for smart industries. Intelligent context-aware automation systems which are fit for purpose need to be developed. Such systems should be generic enough to be reusable in various settings. Success in this area will strengthen European competitiveness both in science and in industry. This topic is a prime opportunity for science and innovation to benefit by working closely together.

Target Outcomes

Projects should combine big data and process modelling for optimal and accurate operation. The developed models should be reusable across various contexts and application domains. Their performance should be measureable in an objective way.

Key challenges and opportunities are expected to be:

- Large-scale, complex systems in dynamic environments;
- Designing conceptual models for autonomous or semi-autonomous decision support;
- Intelligent fusion of multiple data streams;
- Integration of heterogeneous, structured and unstructured data;
- Combining a priori knowledge and models with empirically derived data;
- Undertaking research in collaboration with industrial partners who can provide representative data;
- Managing to combine the requirements for privacy, security and intellectual property with the need to develop models openly;
- Taking advantage of collaboration to collect data from multiple international environments (physical, cultural and regulatory);
- Implement independent evaluation of systems, data and outputs.

Approaches to Maximise Expected Impacts

Projects are strongly encouraged to address the following objectives in order to enhance impact:

- Where possible, aim to ensure that data used by the project can be made usable beyond the project, in order to help build momentum beyond the project consortia;
- Take advantage of international collaboration to make impact on multiple countries and markets;
- Training and dissemination with a view to strengthening European research, knowledge and expertise in the topic areas;
- Support the development of objective benchmarks and evaluation strategies for research in this domain;
- Expand understanding and engage with stakeholders on the issues of long-term security, ethical and legal issues associated with the adoption of intelligent and autonomous systems.