CALL FOR PARTNERS

Brief Introduction of the intended application proposal for the ICT 3.5-2017 Call within **HORIZON 2020:**

π-Mind

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Acronym and Title:

π -Mind: The Mind-Robots-Driven Platform for "Sharing Brains" for the Collective Intelligence

π (PI) – "Patented Intelligence", with the meaning of formalizing, licensing, sharing, reuse and integration of the personal values / decision culture for quality, transparency and automation of the decision-driven processes.

Intended Call

- **ICT3.5 – 2017: Collective Awareness Platforms for Sustainability and Social Innovation**

Specific Challenge: … little models and blueprints are available to lead to new ways to produce collective intelligence in key sustainability areas, leveraging on open data, knowledge networks, open hardware and Internet of things. Current platforms … lack critical mass and measurable global impact.

Scope: Pilots of Collective Awareness Platforms: demonstrating new forms of bottom-up innovation and social collaboration exploiting digital hyper-connectivity and collaborative tools based on open data, open knowledge and open source software and hardware, potentially harnessing crowdsourcing/crowdfunding models.

Initiators

- University of Jyvaskyla, Finland (Dep. of Mathematical Information Technology).
- Kharkiv National University of Radioelectronics, Ukraine (Dep. of AI).

Introduction

New socioeconomic models working in various domains e.g., business, politics, education, etc. are based on people collaboration meaning shared activities, self-organization and responsible decision making. They imply collective awareness of problems and possible innovative solutions requesting collective efforts, enabling new forms of social innovation. Coordination of peers within such models is quite complicated due to the distributed decentralized network structure. A requirement of open and transparent decision making within such models becomes crucial. Transparency is a key for informed, consistent decisions

making and best practices/knowledge sharing, a powerful motivating aspect fostering collective behavioral changes towards human and society development, a precondition for trust and thus sustainability and effectiveness of collaboration. The utilities of Web are today widely used to reach transparency and openness in various processes though correspondent Web-systems are significantly limited; they show the fact of the decision at best, while the whole procedure and the motives of a person responsible for the decision stays hidden.

> Imagine the situation: you need to make a decision (e.g., whom to appoint for a position) or solve a problem (e.g., to choose a department to be closed or create a new company) and you want to get a scheme of decision making from somebody who was in the same situation; even better if you can obtain and compare various, probably different opinions. At the same time there are experts who can explicitly describe how they make decisions in various situations. Such descriptions can help automating resource-intensive similar processes for the experts, possibly make them transparent, clear and trusted for others and give an example for those who make or check own decisions.

So what type of the system can support truly informed decision making?

Decision support systems are well studied by AI. Such systems are the knowledge-based ones; the quality of the knowledge is measured by its objectivity and accuracy. However decision making in real life is neither open nor transparent process. It is well known that each human being may have his/her own way of reasoning and deciding, at least at the preference level. A human is influenced by not only knowledge but also consciousness formed by his/her vision or value systems. That is why usually decision making is quite subjective and biased and we want to keep this subjectivity in our system.

Solution

A digital ecosystem for automated explicit value-driven decision making process can encourage cooperation and participation of governments, industry, academia and citizens to launch effective and open processes.
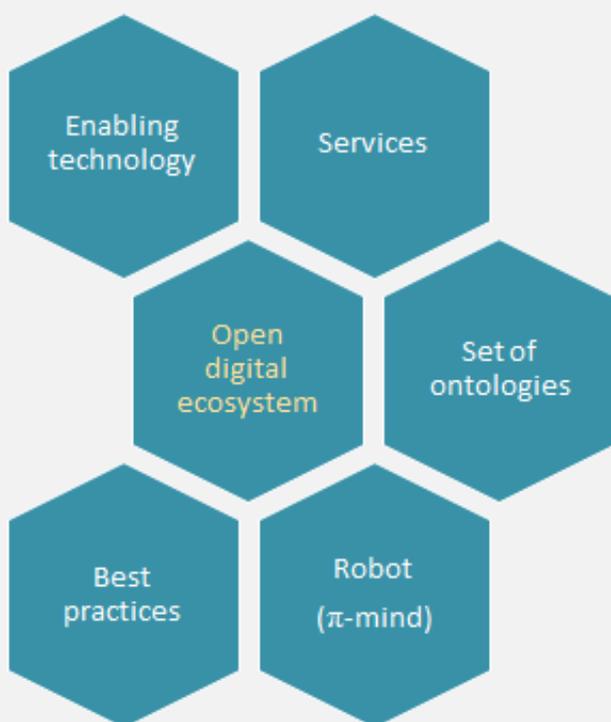
Open digital ecosystem: an environment gathering those who know how to solve problems and are ready to share the best practices online - *providers of decision scenarios* and those who need successful solutions - *consumers*, their digital representatives (π-mind), supporting infrastructure, best practices: decision scenarios (processes), values systems for various domains and tasks. The ecosystem is based on the technological solutions provided by an ontology-based portal (portal.dovira.eu).

Essential components of the ecosystem:

Core:

- *host/owner* of the product who hosts the Portal to get profit from the Portal services,

- *end-users* (providers and consumers) who benefit from the Portal services.

Functional support:

- *IT-partners* developing, supporting and modifying of the upper ontology,

- *IT-partners and business-partners* supporting, exploiting and expanding domain ontologies.

Auxiliary components:

- *law support* for protection of intellectual property rights and the division of responsibilities for decision-making;

- *business model* as a roadmap for startup and its development;

- *financing* the development and startup evolution;

- *promotion* on the target market.

π-mind (patented mind): a digital patented copy of a human`s decision system providing formalization of his or her values system and a decision scheme used for a specific task. π-mind helps keeping and sharing an explicit ontological model of a human`s value system for its further use by users of the ecosystem. π-mind characterizes deliberate and formalized rules used by a person for decision making in situations defined by a state of the environment to achieve specific goals. Usually in decision support systems it`s a knowledge base which stores expert knowledge in some domain but we propose a more subjective entity: value base which stores specific opinions of a concrete person about the importance of various things and phenomena which he/she uses during decision making - so called π-mind. Values space is a complex structure - non-linear and multidimensional.

Upper ontology: a basic system ontology modeling decision processes as a whole;

Domain ontologies: a constantly growing set of ontologies describing the structure of decision scenarios in specific domains.

Services: decision making services which get value systems deployed over the upper and domain ontologies as input.

Enabling technology: decision emulating Web-system based on agent technologies, ontology modeling, AI, Semantic Web technologies.

A simplified model of value-driven transparent decision making was developed and implemented for evaluation of academic achievements` evaluation within Tempus-project TRUST (dovira.eu) on the National Portal of Higher Education Quality Assurance (portal.dovira.eu). The Portal allows creating and applying different value systems in the form of flexible multidimensional and multicontextual HE-quality indicators weighted by their

importance to the ranking query. Thus each user can evaluate the relative quality of some HE resources from different points of view (representing, for instance, different stakeholders or different world-ranking systems). Such a procedure is based on the information regarding the relative importance of different achievements which are taken into account when evaluating the "owner" of the achievements registered directly in the Portal or imported from trusted sources. A vector of numbers from 0 to 1 shows the importance of the achievement to the person creating the rank. Reed more in: Terziyan V., Golovianko M., Shevchenko O., Semantic Portal as a Tool for Structural Reform of the Ukrainian Educational System, In: Information Technology for Development, Vol. 21, No. 3, 2015, Taylor & Francis, pp. 381-402. (doi: 10.1080/02681102.2014.899955). See also: http://www.mit.jyu.fi/ai/Quality-3_en.pptx

Asset		End-user
PRODUCT →	An ecosystem based on Portal	→ BUSINESS, THOSE WHO "MAKE MONEY"
SERVICE →	Ability to get profit from own mind and use other minds	→ DECISION MAKERS
ONTOLOGIES →	a constantly growing set of problem domain ontologies	→ IT-DEVELOPERS
TECHNOLOGY →	A way to make informed decisions based on explicit π-minds and problem domain ontologies	→ THOSE WHO CREATE AND MANAGE BUSINESS PROCESSES

Academic challenge and potential excellence of the idea

Self-modeling of own mind, which takes part in the decision making. The correspondent ICT technology (mind robots) will make the decision making mechanism explicit.

Possible applications

A "Mind Robot" Market

Collective (Humans + Robots) Intelligence based on integrated minds

Technology of agile software development

Optimized and automated organizational processes

Optimization of client services by automating and distributing processes

Applications of π-mind

Collaborative consumption and production

Conservation and reuse of expert experiences in industry (Organizational Intelligence Management)

Virtual council of experts

… etc.

Effective involvement of citizens and their authorized virtual agents into decision making, collective governance

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