

## Leveraging Solution with Cognitive Technologies

### What is the problem

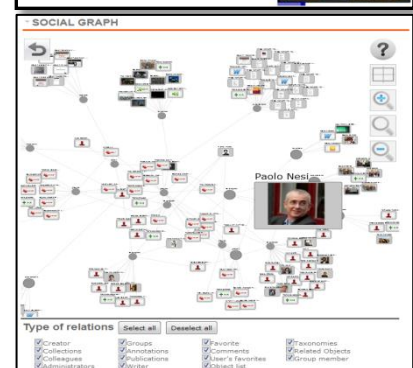
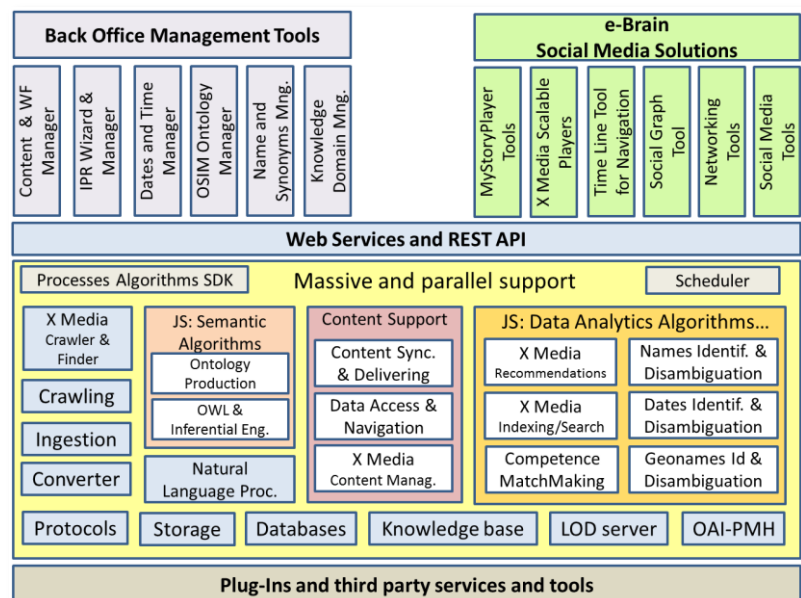
The Cognitive Computing combines data mining, artificial intelligence and parallel and massive computing technologies and solutions to create specific smart solutions to set up and cope with big data. The applicative fields can be: social media, e-health, e-learning, smart city, etc. Applications in which there is needs of collecting and integrating data and big data coming from several different sources that need to be crawled, mined, integrated and disambiguated to create a unified ontological model. In turn, the ontological model has to cope with sophisticated metadata, cross media content and textual information, which have to be indexed and made accessible to be distributed towards users. Cross media have to be specially treated on the basis of their media kind (our solution cope with more than 500 formats), to be indexed, accessed, recommended, etc. Textual information may include person names, VIP names, user names of your portal and archives, geographical names, names of elements, and also dates in several different forms, etc. They need to be identified, synonymous identified, and disambiguated to be manifested as relations browseable by users.

### How it has been solved

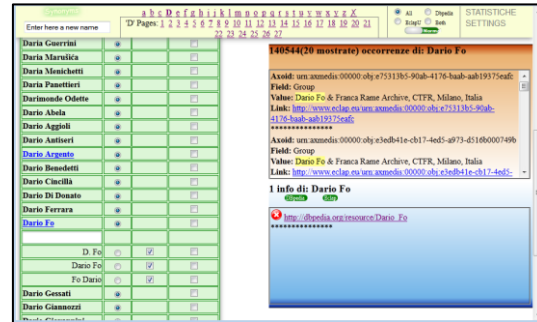
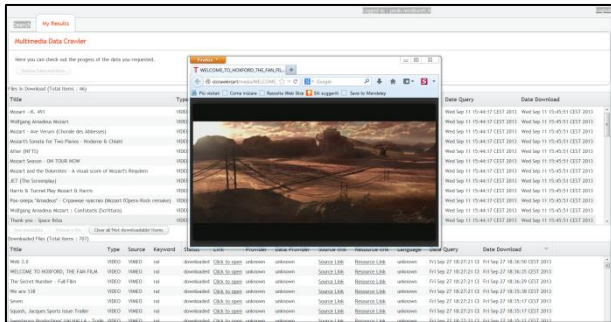
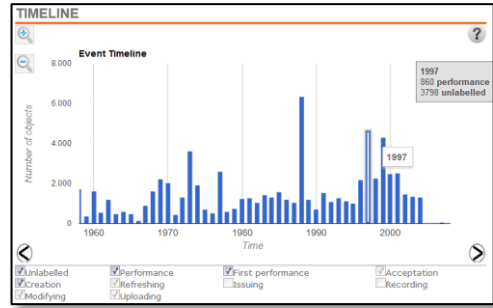
The DiCCoF, DISIT Cognitive Computing Framework is based on **Massive and parallel support** on which one can script processes and their relationships/flows that put in execution algorithms and tools exploiting tools and DiCCoF services (crawling, ingesting, in LOD, indexing, mining, adapting, recognition, etc.), with plugins and tools of third parties. The parallel architecture is grounded on AXCP and Hadoop, and exploitable from any media grid solution. The Massive and parallel support can be called by web services and REST API. The natural language processing algorithms may exploit the support for basic languages: English, Italian, German, Spanish, Francoise, ... With classical tagger, post tagger, etc. The **Back Office Management Tools** of DiCCoF Framework allows to cope with content management and workflow, IPR management, data and time management, names and synonyms management, knowledge domain management via OSIM tool.

The **Social Media Solutions** and **modules** provide support for:

- **MyStoryPlayer** for media annotations and relationships (see <http://www.eclap.eu/super/msp/> )
- **Social Graph** to provide an integrative tool for navigating among Users, Contents and their Relations (see <http://www.eclap.eu/super/sg/> )
- **Time Line Navigator** to navigate among the identified and disambiguated dates contained in textual documents (see <http://www.eclap.eu/177596> )
- **Collaborative tool for SKOS and ontology management** (see <http://openmind.disit.org>)
- **Name Manager** to cope with synonymous and links with dbpedia, geonames, vip names, user names, etc. (see <http://www.eclap.eu/177605> )
- **IPR Wizard** assistive tools for IPR licensing and permission setting according to rights ontologies and relationships (see <http://www.eclap.eu/4021> )



- **Content Based Information Retrieval** for producing search and recommendation algorithms integrating both text and descriptors based algorithms (see <http://www.disit.dinfo.unifi.it/disitcbirdoc.html> )
- **MatchMaking** to support the match from offers and demands (see <http://www.apretoscana.org/5221>)
- **Content Organizer** mobile application for semantic organization of content on your iPhone, iPad in connection with enabled social media and portal solutions (see <http://www.eclap.eu/94220> )
- **Multimedia Crawler** to search and mining media content from social media portals as VIMEO and aggregators connected to Europeana (see <http://www.eclap.eu/177627> )
- **Georesolution and navigation:** geo location, geo distribution, etc.
- **Social integration** with OpenAuth, embedding, citations, etc.



### How to work with

The framework is accessible as single algorithm and tool as well as a suite. The suite of algorithms is accessible via the AXMEDIS AXCP tool that can be installed on a single server as well as on a cloud of servers and nodes to cope with computational intensive problems and big data. All the tools, activities and processes can be integrated by using API: REST and/or Web services.

### Who is using it

The DiCCoF framework is currently in use in e-Brain social media platform to cope with networking, social networking and collaborative work and on OSIM exploiting the above mentioned tools. Examples are:

- **ECLAP** social network and educational tools for performing arts <http://www.eclap.eu>
- **Apertoscana** for networking among researchers in Tuscany area <http://www.apertoscana.org>
- **IUF.CSAVRI** for managing the collaborative and educational portal for the start up incubator at the University of Florence. <http://iuf.csavri.org>
- **First Class** Continuous Medical Education and e-learning support, see <http://fad.fclass.it>
- **Mobile Medicine** for the education and continuous information, see <http://mobmed.axmedis.org>
- **OSIM, Open Space Innovative Mind**, for collecting, indexing and reasoning among knowledge of large multi-domain (departments) institutions (see <http://openmind.disit.org>)
- **Coll@bora** smart city project and services.

### Web links

- <http://www.disit.dinfo.unifi.it>
- <http://www.disit.dinfo.unifi.it/tools.html>

### Technologies

- Natural Language processing languages: English, Italian, German, Spanish, Francoise
- Exploiting: dbpedia, geomances.org, Babelnet, Wordnet, OSIM, ..
- Scalable computing: AXMEDIS AXCP, Hadoop
- Crawling: GATE, AXCP, Nutch
- Database area: SQL, noSQL db HBase
- Flow integrators: Kettle Pentaho, OpenLFlow, ..
- Indexing: Similarity search, Solr, CBIR, XmedialIndexing
- Ontological support: RDF store, OWL, OWLIM, SPARQL

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