

An approach to “Filamento®”, an Internet of Things [IOT] framework devoted to link a grid of cultural digital smart-items

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Abstract.

Filamento® is an original engine, currently under patent procedure on behalf of the inventors of ThePrimate®, devoted to link and reference the places of cultural heritage, through a logic-physical lattice of points traced both in the real world and virtual, self-transmitting position and poly-dimensional open data through the Internet, thus building a “talking-” or “smart-objects” grid.

Mechanism.

Filamento® is composed in two layers of functions:

- the former [Engine (E)] is an intelligent machine, a semantic-reasoning engine, processing axioms and assertions made by the user of ThePrimate® website. It infers *folksonomic* rules while automatically cataloguing new properties and logic-language-resources, posting them into the networked-machine.
- The latter [Robot (Bot)] is a distributed robot who physically references real objects of the cultural heritage, precisely inferring to each item a dynamic code about position and intrinsic poly-properties, thus giving them a treatment “*as a subjectivity*”.

Its process is implemented in a functional social partnership with humans and their organizations: Filamento®, in fact, is able to receive updates by relying on a *fractal* lattice, considering as *significant* both the information that objects can give about itself [etiology and physical properties and changes], as well as the reports that users send from the real physical place where the object resides.

UDC+, a dynamic perpetual identifier code.

According to Filamento® technology, cultural Heritage, both scientific, humanistic and artistic, can always be rendered *immaterial* through the virtual collection of digital information, interpolation and *fractalisation* of the real entity - whatever the state of its property is [tangible or incorporeal, static or dynamic, bi-or tridimensional paintings]. Clusters of information can be stored in accordance with a potentially perpetual code, which will return an unambiguous identification of its properties, in a *poly-dimensional quality*¹ way of measurement and management [according to the rules of: *accessibility, accuracy, comparability, completeness, consistency, relevance, timeliness*].

¹ DAMA *Notions of Data Quality Management - CMS Sommersemester (30.4.2010 ff)* - B. Thalheim, Computer Science Institute, Kiel University, Germany - 2010 - also cfr. [1, 2, 3, 4, 5]

Harvester Robot and the talking objects.

On the front-end, Filamento® is represented as an expert *subject-engine*, talking in similar-natural language, and able to make intelligent interpretation of user requests providing adequate responses in terms of services, function and - in some cases - in *conversational mode*². Alternatively, applications or functions are launched, corresponding to the instances invoked by the users.

In the logical architecture, indeed, the distributed robot of Filamento® transposes the items in the computerized catalog; it uses an adaptive criterion for growth, coupling items to itself, interpreting the increase of properties, and employing a so-called "*genetic learning*"³ of their new size. The *magnitude* around which all the growing system is based is the "*Catalog gist*", without which the memory of the graph and its self-subjectivity would be dispersed into a myriad of precise information not connected nor significant - even not made coherent in any thread.

The catalogue.

With its *Catalogue*, Filamento® determines a network of transmitter items [the *talking objects*], and it combines three pillars of logic subjectivities: **(A)** the set of physical resources of the cultural, humanistic, scientific and artistic domain, present at a given moment in the global, real Cultural Heritage environment; **(B)** the abstract and dematerialized resources cataloged into ThePrimate® and/or the interoperable digital archives; **(C)** the unique lattice infrastructure, based on the consistence of an intelligent operator that assigns to each real element in **(A)**, and to its digital corresponding in **(B)** an unique identifier (**_ID**), called **UDC⁺**. This (**_ID**) **UDC⁺** is dynamic, and it brings in its map the information for recognition, identification, *storyfication*, and 4-dimensional placing of each item. The networked hardware infrastructure uses to transmit the own signal of every geospatial position, even dynamically with the order of position changing. Thus determining that Filamento® is able to constantly produce an alive map of the active environment of the available Cultural Heritage for every given time. The signal transmitted is not to be barely considered just as a physical quantity, because the **UDC⁺** is a carrier of several structured information: in its language, a shell supports the self-diagnosis of the conditions of maintenance of the transmitting item [temperature, pressure, compaction, density, color, vibratory compaction, amplitude, frequency, other comparative forces], a-etiological information [reasons for occurring changes], sociality coefficients and data rendering.

Synthetic DNA and remote sensing.

Filamento® can use a combined technology for:

- (i) deep coding items, through the application of artificial DNA tending to infinity number of unique codes;
- (ii) ultrasonic sensor transponder for complex active sensing.

² Dana Quade, Vol. 39, No. 3, pp. 343, 345 - cfr. [6]

³ *Evolutionary algorithms* - cfr. [7, 11, 16, 17, 18, 19, 20, 26, 27]

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