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# From “Informatica Umanistica” to Digital Humanities and return

*The methodological foundations of Italian Digital Humanities and their contribution to the evolution of the field*



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## **Introduction**

In the last few years, we have seen a flourishing of the scholarship devoted to the historical dimension of Digital Humanities. The reasons for this attention are manifold: there is of course a genuine interest in the history of the field, now that it has become a mature and recognized area of scientific inquiry, well-established in academic and research institutions. On the other hand, looking at the history and evolution of the field is also a way to deal with the recurring questions of the disciplinary self-definition and self-justifications, and with the more recent debate about inclusivity, multiculturalism and the geopolitical dimension of DH. For all these questions, going back to the roots looks like an effective analytic and argumentative strategy.

However, even this renewed historiographic wave finds it hard to recognize the actual multiplicity and richness of the diverse national and cultural traditions in DH, and to acknowledge their role and contribution in the development of the global DH scene.

In this paper, it is my intention to contribute to the construction of a more pluralistic historiographic perspective of DH, sketching a first draft of a history of the field in Italy. I have neither the ambition nor the intellectual interest in giving an exhaustive evenemential account of this history. So, I will concentrate particularly on the so-called Roman school and on its intellectual history, since I firmly believe that its theoretical and methodological legacy is particularly relevant in this moment.

## **The recent scholarship on the history of Digital Humanities**

DH is a field where the self-reflective stance about its own origins and evolution has always been prominent. However, in the last 5 years this genre has been particularly popular. To cite but a few of the most relevant works in this direction, we can remember the lecture “Getting there from here: Remembering the future of digital humanities”<sup>1</sup> held by Willard McCarty at the DH2013 Conference on the occasion of the awarding of the Busa Prize, where the Canadian scholar outlined a stimulating genealogy of DH, counterpointed by its own personal intellectual biography.

Remarkable also the essay written by Edward Vanhoutte in the miscellany *Defining Digital Humanities*, entitled “The Gates of Hell. History and Definition of Digital | Humanities | Computing”<sup>2</sup>, that retraces this history from its origins up to the first decade of this millennium,

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<sup>1</sup> W. MCCARTY, *Getting there from here. Remembering the future of digital humanities* Roberto Busa Award lecture 20131, «Literary and Linguistic Computing», 29/3 (1/9/2014), pp. 283–306

<sup>2</sup> M. TERRAS – J. NYHAN – E. VANHOUTTE (a cura di), *Defining Digital Humanities - A Reader*, Ashgate, Williston 2013, pp. 119–156

focalizing specifically the sub-fields of digital and computational linguistic and literary studies and offering a detailed account of the transition from the historical English label of “Humanities Computing” to the new and successful one (at least until now) of “Digital Humanities”. An interesting perspective is offered by the more recent book by Julianne Nyhan and Andrew Flynn *Computation and the Humanities: Towards an Oral History of Digital Humanities*<sup>3</sup>, where the outcomes of the traditional archive oriented historiography (digging into the archives and deep analysis of the documents) are combined with an oral self-biographical section where some of the protagonists narrate their experience. The same Nyhan has devoted great attention to the universally acknowledged “father of the field” Father Roberto Busa, working in his personal archive held at the Università Cattolica of Milan<sup>4</sup>; also Steven Jones has recently published an interesting book devoted to the early activity of Busa for the digitalization (via punched cards) and indexing of St. Thomas’ lexicon<sup>5</sup>. Mainly focalized on the intellectual history of American literary studies and computational/digital methods from the advent of the Web onwards is the essay by Amy Earhart *Traces of the Old, Uses of the New: the Emergence of Digital Literary Studies*<sup>6</sup>.

One element that unites all these works, notwithstanding the pervasive and convinced appeals to the necessity of adopting a pluralistic, multicultural and global view of DH, is the fact that they are fundamentally centered around the Anglo-American tradition, that appears as the only one to have achieved relevant results both at the theoretical and at the practical level.

It is not my intention here to even try to make a thorough and detailed reconstruction of this geopolitical debate, which is intertwined with epistemological, methodological, ethical, political and sociological issues, as well as being very often related with personal feelings, points of view

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<sup>3</sup> J. NYHAN – A. FLINN, *Computation and the Humanities. Towards an Oral History of Digital Humanities*, Springer International Publishing, Cham 2016

<sup>4</sup> An outcome of this work will be a book currently in preparation (*Roberto Busa in his own words*), co-authored with Marco Passarotti, pupil of Busa and current director of CIRCSE (Centro Interdisciplinare di Ricerche per la Computerizzazione dei Segni dell’Espressione) in the Università Cattolica of Milan, founded by Busa himself. The common narrative that identifies in Busa’s work on St. Thomas the starting point of what became Humanities Computing and then DH has been recently questioned, especially by scholars working on quantitative and statistical approaches to the humanities (see for instance T. UNDERWOOD, *A Genealogy of Distant Reading*, «DHQ», 11/2 (2017) [<http://www.digitalhumanities.org/dhq/vol/11/2/000317/000317.html>], and G. BABB, *Victorian roots and branches: “The statistical century” as foundation to the digital humanities*, «Literature Compass», 15/9) or by exponent of the digital critical cultural studies (see R. RISAM, *Revise and Resubmit: An Unsolicited Peer Review*, blog, 20/04/2015, [<http://roopikarisam.com/2015/04/20/revise-and-resubmit-anunsolicited-peer-review/>], where the author, in response to A. KOH, *A Letter to the Humanities: DH Will Not Save You*, «Hybrid Pedagogy», 19/02/2015 [<http://www.hybridpedagogy.com/journal/a-letter-to-the-humanities-dh-willnot-save-you/>], complains about limiting the DH “to Father Busa and his punch cards”).

<sup>5</sup> S. E. JONES, *Roberto Busa, S. J., and the Emergence of Humanities Computing. The Priest and the Punched Cards*, Routledge, London 2016

<sup>6</sup> A. E. EARHART, *Traces of the old, uses of the new the emergence of digital literary studies*, University of Michigan Press, Ann Arbor, Michigan 2015

and psychological moods. These issues, on the other hand, have already been egregiously analyzed, from a political point of view, by Domenico Fiormonte in essays like *Toward a Cultural Critique of Digital Humanities*, a critical assessment of the geopolitical and cultural/linguistic bias in the contemporary DH global scenery, and *Digital Humanities and the Geopolitics of Knowledge* recently published in «Digital Studies / Le champ numérique»<sup>7</sup>. A sociological and empirical approach is instead at the base of the very interesting analysis by Marin Dacos, «La stratégie du sauna finlandais», first published in the author's Blog<sup>8</sup> and recently reissued in the same Canadian DH journal, where the author, in a critical response to a preceding survey by Melissa Terras, points out “une très grande diversité linguistique et géographique, l'existence d'un hors-monde qui n'a pas vu l'enquête ou n'y a pas prêté attention, la marginalité de l'anglais comme première langue, mais sa domination comme second idiome”<sup>9</sup>.

It is hardly deniable that, at least for the success and impact at the implementation level, Anglo-American DH have been historically more effective, if only for the much higher funding that they have received on average. However, the history of the DH has been more pluralist, if not kaleidoscopic, than the scholars we have mentioned wish to recognize (with few exceptions)<sup>10</sup>. A plurality that is also and above all theoretical and epistemological, and that today is manifested repeatedly in the diverse and not always compatible modes of declining the phrase Digital Humanities in the scholarly debate.

In this global framework, the history of the Italian tradition of “Informatica Umanistica” after and beyond father Busa, represents an important *tessera* of that kaleidoscope. In the rest of this article I will give a contribution to the history of this scholarly tradition.

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<sup>7</sup> D. FIORMONTE, *Toward a Cultural Critique of Digital Humanities*, in M. K. GOLD – L. F. KLEIN (a cura di), *Debates in the digital humanities: 2016*, University of Minnesota Press, Minneapolis London 2016, pp. 438–458; D. FIORMONTE, *Digital Humanities and the Geopolitics of Knowledge*, «Digital Studies/Le champ numérique», 7/1 (13/10/2017) [<http://www.digitalstudies.org/articles/10.16995/dscn.274/>].

<sup>8</sup> <http://bn.hypotheses.org/11138>.

<sup>9</sup> M. DACOS, *La stratégie du sauna finlandais: Les frontières des Digital Humanities*, «Digital Studies/Le champ numérique», 0/0 (3/6/2016) [<https://www.digitalstudies.org//article/10.16995/dscn.41/>].

<sup>10</sup> And this stance is more resilient than one would expect: it suffices to give a look at a recent paper presented at the DH2017 conference wishing to reconstruct the “Intellectual Structure of DH” (J. GAO – O. DUKE-WILLIAMS – S. MAHONY – M. RAMDARSHAN BOLD – J. NYHAN, *The Intellectual Structure of Digital Humanities: An Author Co-Citation Analysis*, Vol. Digital Humanities 2017 Conference Abstracts, 1/8/2017, pp. 450–452) by looking at co-citations patterns in the following journals: «Computer in the Humanities», «Digital Humanities Quarterly», «Literary Linguistic Computing/Digital Scholarship in the Humanities». As I pointed out in a Twitter exchange with one of the co-authors, nothing bad with this, should the title have been “the structure of the Anglo-American DH”.

### Prehistory, after Busa

Although this work will concentrate more on the conceptual foundations of that tradition than to a detailed account of its evenemential aspects and institutional contexts, it is important to start with a very factual observation: the Italian tradition in the relationships between computing and humanities has matured and developed for a long time and without solution of continuity. We have already mentioned more than once Busa, and his decennial endeavor of digitalization, lemmatization and concordance generation of Thomas Aquinas' works, started since the late 40s of the last century.

But Busa's work was not at all an isolated one in Italy at least since the 50s. As a proof of this statement it suffices to mention that in 1961 the prestigious annual journal «Almanacco Letterario Bompiani»<sup>11</sup>, a publication whose importance in the Italian cultural debate of the Sixties can hardly be underestimated, issued a number whose main title was *Le Applicazioni dei Calcolatori Elettronici alle Scienze Morali e alla Letteratura*.



**Fig. 1** The cover of *Almanacco Bompiani 1962*

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<sup>11</sup> S. MORANDO (a cura di), *Almanacco letterario Bompiani: 1962*, Bompiani, Milano 1961.

The thematic dossier of that issue, enriched by a luxuriant graphic apparatus designed by Sergio Munari, was composed by a set of articles, both original and reprinted or adapted from preexisting publications, discussing subjects like: the theoretical foundations of computing machines, the first experiences in machine translation, the pioneering research in computational linguistics (with an article by Busa himself) and in digital philology (with an article by the great Romance philologist Aurelio Roncaglia describing a groundbreaking project for aligning two of the most important metric repertoires of Provençal and ancient French); and again, we can mention the foreseeing comparatist essay by Franco Lucentini on the theme of “automata” in the history of literature and the closing essay by Umberto Eco *La forma del disordine* that contains *in nuce* the arguments exposed by the great scholar in the groundbreaking book *Opera aperta*, published one year later<sup>12</sup>; last but not least, the volume contains the transcription of one of the first experiments in electronic literature, probably the first case of computer generated poetry ever: the *Tape Mark I* poem by Nanni Balestrini, generated by an IBM computer randomly juxtaposing verses extracted from Lao Tzu (*Tao Te Ching*), Paul Goldwin (*The Mystery of the Elevator*) and Michihito Hachiya (*Hiroshima Diary*).

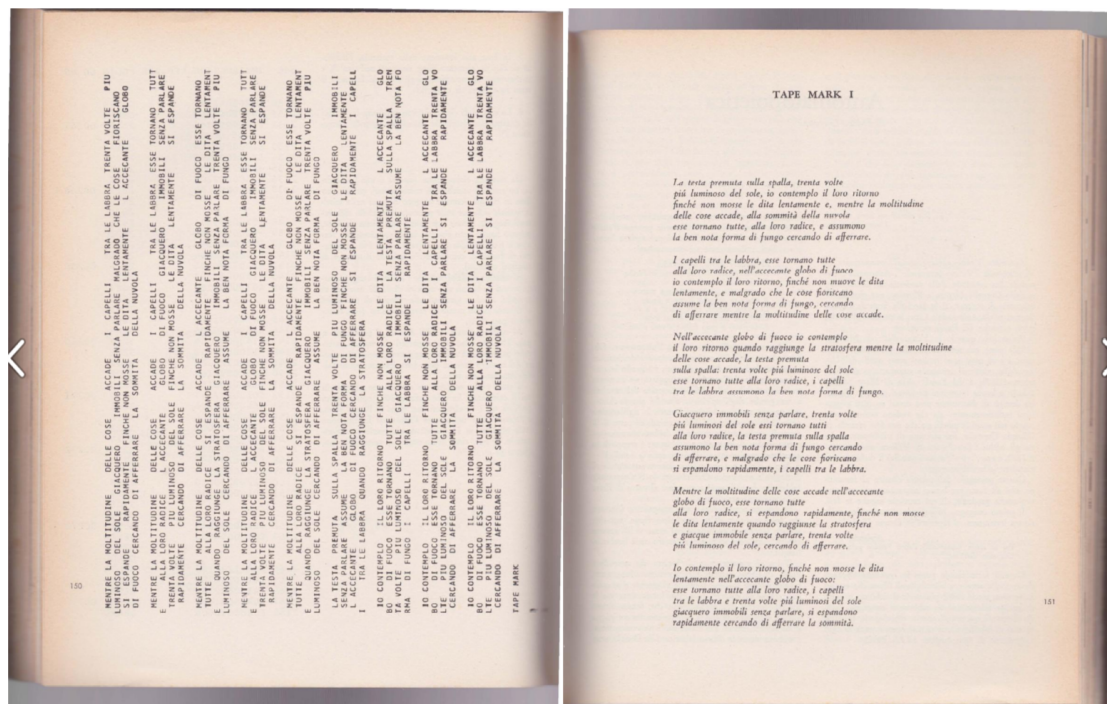


Fig. 2 Balestrini Tape Mark I. Left: plotter print. Right: print version

<sup>12</sup> U. ECO, *Opera aperta: forma e indeterminazione nelle poetiche contemporanee*, Bompiani, Milano 1962.

Since those early years of computation, in short, some of the most innovative and experimentalist Italian intellectuals showed a vision of the relationships between humanities and computing that was at the same time explorative, multifaceted and methodologically rigorous.

On the base of those seminal experiences, between the end of the 60s and the beginning of the 70s, the first research centers where computational methods in the humanities find an institutional collocation were established. It dates back to 1969 the creation of the *Linguistics Department* at CNUCE (National University Centre for Electronic Computing) in Pisa (cradle of the Italian computer science) thanks to the pioneering work of Antonio Zampolli<sup>13</sup>. The Department, that ten years later became the *Institute of Computational Linguistics* (ILC<sup>14</sup>) of CNR, in the following years became a reference center for the automatic processing of language at an international level, and Zampolli played an important role in fostering many international projects at the intersection between Computational Linguistics and Humanities Computing, not last the development of the *Text Encoding Initiative*.

In close connection with the experiences of the ILC, in the early 70s the historian of philosophy Tullio Gregory founded the Center of Study for the European Intellectual Lexicon (that in 2001 became ILIESI<sup>15</sup>), devoted to the development of linguistic and textual data with specific reference to the area of the history of ideas of the early modern age<sup>16</sup>. The preparation of indexes, concordances and lexicons of philosophical and scientific texts was for several years one of the main aspects that distinguished the Institute. In the eighties, the creation of a large textual archive was added, containing dozens of classics of modern philosophical-scientific in various languages, for many years an *unicum* in this field.

### **The foundation of Informatica Umanistica: Tito Orlandi and the “Roman School”**

If the genealogy of the Italian tradition in humanities computing has its roots in those remote pioneering works and early infrastructural and institutional efforts, its more theoretically relevant and far reaching manifestation is placed at the University of Roma La Sapienza during the 80s of the last century: it is there that the idea of “Informatica Umanistica” conceived as a full-fledged autonomous disciplinary field finds its formulation and initial development.

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<sup>13</sup> A. ZAMPOLLI, *Past & On-going Trends in Computational Linguistics - A View from the Institute for Computational Linguistics in Pisa, Italy*, «The ELRA Newsletter», 8/3-4 (2003), pp. 6-16.

<sup>14</sup> <http://www.ilc.cnr.it/>

<sup>15</sup> <http://www.iliesi.cnr.it/>

<sup>16</sup> T. GREGORY, *Il Lessico Intellettuale Europeo. Storia di un progetto*, (12/11/2010) [[http://www.iliesi.cnr.it/materiali/Gregory\\_Lessico\\_intellettuale\\_europeo.pdf](http://www.iliesi.cnr.it/materiali/Gregory_Lessico_intellettuale_europeo.pdf)]

The driving figure of this intellectual path is Tito Orlandi, a scholar coming from Coptic studies. Taking to a synthesis a series of preceding research initiatives, in 1984 Orlandi establishes the research Group “Informatica e Discipline Umanistiche”, where he gathers a group of scholars that in his own words shared the “consapevolezza [...] che le procedure informatiche rappresentavano un naturale completamento delle proprie ricerche”<sup>17</sup>.

The intellectual specificity of this experience, what constitutes its foundational role for the conceptual history of our field, is the rejection of the instrumentalist vision of computing in the humanities that was at the time the most widespread, if not predominant, in the scholarly debates both at national and international level, and the adoption of a methodology and epistemology oriented approach. This approach moves from the conception of Informatics/Computer science as a theoretical science devoted to the formal representation of information and to its elaboration by the way of computational formal methods and of formal modeling, rather than as an electronic engineering oriented discipline, interested in the production of concrete computing machinery. In a sense, under this respect Informatics it is in itself, at least partially, a humanistic discipline (as is demonstrated by the role in its origin played by logic, linguistics and psychology), so the path of convergence with the humanities is shorter than commonly seen. Of course, the level where this convergence occurs is a theoretical and methodological one. Humanities fields can adopt computational and informational methods as far as they can translate their traditional objects and methods into their formal corresponding digital objects and processes<sup>18</sup>:

il rapporto tra informatica e discipline umanistiche si può esprimere nella questione se vi sia un modo “informatico” di vedere (anche) le discipline umanistiche, che si differenzia a seconda delle discipline (e che dunque, in questo caso, rappresentano l'oggetto di questa disciplina), ma che rimane unitario nel modo di considerarle. Il modo informatico prevede la formalizzazione dei dati [...] e la formalizzazione delle procedure per analizzarli e valutarli<sup>19</sup>.

The first synthesis of Orlandi's thought finds a systematic definition in its fundamental book *Informatica Umanistica*<sup>20</sup>, published in 1990, at the same one of the first handbooks ever published in the field and a manifesto of a determined conception of the field itself. The conception of

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<sup>17</sup> “consciousness that the computational procedures constituted a **natural** extension of their own research activity” [translation my own]. *Introduzione* in G. GIGLIOZZI (a cura di), *Studi di codifica e trattamento automatico di testi*, Bulzoni, Roma 1987, p. IX.

<sup>18</sup> T. ORLANDI, *Informatica umanistica: realizzazioni e prospettive*, in *Calcolatori e scienze umane: archeologia e arte, storia e scienze giuridiche e sociali, linguistica, letteratura*, Etaslibri, Milano 1992, p. 17

<sup>19</sup> The relationship between informatics and humanities can be expressed as the problem if a “computational” mode of seeing the humanities exists, differentiated according to the specific disciplines (that are the objects of this discipline) but unified on the way it considers them. The computational mode requires the formalization of the data and the formalization of the procedures adopted to analyze and evaluate them [translation my own].

<sup>20</sup> T. ORLANDI, *Informatica umanistica*, Nuova Italia scientifica, Roma 1990.



Informatica Umanistica and of its role in the Humanities professed by Orlandi is perfectly epitomized by the series of seminars that he organized at the Accademia dei Lincei in 1994, where he invited scholars like Walter Belardi, Cesare Segre, Aurelio Roncaglia, Claude Bremond and J.-C. Gardin, besides his younger colleagues of the Roman group.

In the introductory essay of the volume gathering those lectures, entitled *Informatica, formalizzazione e discipline umanistiche*, Orlandi clearly identifies the conceptual underpinnings that are at the basis of his vision of humanities computing:

- 1) The notion of *formalization*, adopted and adapted from the tradition of logic and meta-mathematics, that is determined by the nature of the abstract computational machines, as shown by Turing<sup>21</sup>:

Le caratteristiche di queste formule, e dunque del formalismo, mi sembra si possano sintetizzare in quattro punti:

- L'uso di simboli al posto dei contenuti concreti, così come in algebra si usano simboli al posto di numeri.
- La definizione di poche operazioni essenziali per la manipolazione di tali simboli.
- L'assunzione di un piccolo numero di assiomi convenzionali.
- L'uso di simboli per indicare le operazioni sui simboli.

Con ciò si passa da un concetto intuitivo, e da una definizione alquanto vaga di formalizzazione come precisione o rigore, ad un criterio obiettivo per stabilire quando propriamente si possa parlare di formalismo, e dunque anche si arriva a stabilire la correttezza della formalizzazione in sé<sup>22</sup>.

- 2) The notion of *model*, that in Orlandi's view is fundamentally the outcome of a phenomenological analysis (in the Husserlian sense) of the object of scrutiny and is the basis of the formalization process<sup>23</sup>:

Mi sembra che il concetto di modello sia molto importante anche nell'ambito delle discipline umanistiche come base dei procedimenti di formalizzazione, a patto che si mettano in evidenza due componenti essenziali del modello, che in altri ambiti hanno minore importanza, e dunque vengono lasciati come impliciti e non discussi. La prima componente è la necessità di individuare i dati, cioè di identificare precisi elementi singoli della realtà, in una realtà che di per sé si presenta alla coscienza come un flusso continuo di esperienze. La seconda è quella di esprimerli mediante simboli, chiarendo fino in fondo il rapporto fra i simboli e i dati reali.

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<sup>21</sup> T. ORLANDI (a cura di), *Discipline umanistiche e informatica: il problema della formalizzazione (Ciclo di seminari, febbraio-giugno 1994)*, Accademia Nazionale dei Lincei, Roma 1997, p. 10.

<sup>22</sup> The characteristics of these formulas and of the formalism can be synthesized in four points: the usage of symbols instead of concrete contents, as in algebra symbols stay in place of numbers; the definition of few essential operations to manipulate those symbols; the assumption of a small set of axioms; the adoption of symbols to indicate also the operations on symbols. In this way we move from an intuitive concept and from a vague definition of formalization to a strict criterion to establish what a formalism is and to what extent a formalization process can be validated [translation my own].

<sup>23</sup> *Ibid.*, p. 12.

3) The necessity to build a semiotics of the computational representations of humanistic artifacts, which explains the great importance given to the “encoding problem”, and the criticism to the Text Encoding Initiative, that in Orlandi’s view lacked a clear theoretical background<sup>24</sup>.

It comes as natural consequence of the preceding points the belief in the autonomy of *Informatica Umanistica* as a full-fledged discipline that can be conceived as a general formal semiotics and computational methodology for the humanities<sup>25</sup>.

Building on Orlandi’s teaching, some of the members of the Roman group have further elaborated this methodological approach and have adapted it to specific scholarly fields. I wish to recall in particular the important work of Giuseppe Gigliozzi, a scholar coming from theory of literature and literary criticism. His early scholarship was deeply rooted in structuralism and semiotics of literature and, throughout his research activity, he has always tried to build a bridge between that theoretical tradition and the digital literary studies. His early work was devoted to the application of Artificial Intelligence methods to the analysis of narrative texts. Moving from the narratological theories of Greimas and Bremond<sup>26</sup> (but also of less known authors such as T. Van Dijk and the Group  $\mu$ ) and from the notion of *script* and *semantic primitives* defined by Roger Schank<sup>27</sup>, he developed two applications written in LISP<sup>28</sup>. The first was SEBNET<sup>29</sup>, an expert system capable of analyzing and generating fairy tales, starting from a paradigmatic description of the stereotypical characters and situations and from a story grammar. The second, SEB, was a semantic network application to analyze the relations between the characters in more complex narratives, which was applied to study some short stories by Luigi Pirandello<sup>30</sup>.

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<sup>24</sup> I think that the concept of model is very important also in the humanities and that it is at the basis of the formalization process, provided that two of its essential components, usually considered less relevant in other contexts and hence left implicit, are highlighted. The first component is the need to individuate the data, that is the single elements of the reality, which in itself appears to the consciousness as a continuous flow of experiences. The second one is the need to express those data by the way of symbols, stating explicitly the relationship between symbols and real data [translation my own].

<sup>25</sup> T. ORLANDI, *Is Humanities Computing a Discipline?*, «Jahrbuch für Computerphilologie», 4 (2002), pp. 51–58

<sup>26</sup> A. J. GREIMAS, *La semantica strutturale; ricerca di metodo*, Rizzoli Editore, Milano 1968.

<sup>27</sup> R. C. SCHANK – R. P. ABELSON, *Scripts, Plans, Goals, and Understanding: An Inquiry Into Human Knowledge Structures*, Lawrence Erlbaum Associates, 1977.

<sup>28</sup> The language of choice of symbolic Artificial Intelligence at the time, invented by John McCarty: cfr. J. MCCARTHY – B. LISKOV – P. ABRAHAM, *LISP SESSION*, in *History of Programming Languages*, Elsevier, 1981, pp. 173–197.

<sup>29</sup> G. GIGLIOZZI – S. GIULIANI – P. SENSINI, *SEB – Sistema esperto per l’analisi di brani. Per un’analisi automatica di fiabe*, in G. GIGLIOZZI (a cura di), *Studi di codifica e trattamento automatico di testi*, Bulzoni, Roma 1987.

<sup>30</sup> G. GIGLIOZZI – S. GIULIANI, *Una parola che non dice nulla. Le «Novelle per un anno» di Luigi Pirandello. Due letture critiche e un esperimento d’analisi computazionale and La rete delle formiche. Un’applicazione di SebNet*, in C. CAZALÉ (a cura di), *Fine della storia e storie senza fine*, Université Paris 10, Nanterre 1993.

At the same time, Gigliozzi developed a deep epistemological awareness about the theoretical role of computational methods in literary criticism, that in his view are internal to the cycle that moves from the theory to the analysis of the object (via an experimental phase), and goes back to the theoretical level<sup>31</sup>:

La macchina - ma anche le discipline che stanno dietro l'elaboratore - devono essere utili in due fasi. In un primo momento, quello dell'implementazione del sistema e della riflessione teorica, il nuovo ambiente di ricerca e i più freschi apporti devono garantire un passo ulteriore alla teoria e all'analisi. Per la seconda fase la possibilità di gestire grandi quantità di materiali con un sistema ormai in grado di funzionare consentirà di sondare con estrema precisione l'oggetto della ricerca e di tornare con risultati non altrimenti ottenibili a un'ulteriore fase di riflessione teorica<sup>32</sup>.

In this context, he, like Orlandi, assumed the concept of model as the epistemological foundation of computational methods in the humanities. His notion of modelling was based on the methodological works of the cyberneticists N. Wiener and A. Rosenblueth<sup>33</sup> and on the notion of isomorphism as defined by D. Hofstadter in his famous book *Gödel, Escher, Bach*<sup>34</sup>:

Il modello è quindi qualcosa di "più piccolo" del testo [...] Costruire qualcosa di più piccolo significa modificare delle dimensioni, operare una trasformazione, e se vogliamo ottenere, dopo questa trasformazione, uno strumento che risulti minimamente utile dobbiamo costruire un modello che rispetti le leggi dell'*isomorfismo*. Possiamo definire l'*isomorfismo* come una trasformazione che mantiene l'informazione<sup>35</sup>.

Later in the same article, he uses a classical work by Marvin Minsky<sup>36</sup> to describe the *operationalizing* role of the model and its intrinsic perspectivism<sup>37</sup>:

Deve essere quindi possibile compiere degli esperimenti e questi esperimenti devono portare conoscenze nuove, altrimenti il modello sarebbe inutile. Da questo punto di vista, il modello vede amplificata e messa in evidenza la sua caratteristica strumentale, mentre fondamentale diventa il ruolo dell'osservatore. Il modello funziona in quanto struttura sperimentale dotato di un *punto di vista* intrinseco che dona prospettiva alle sue parti<sup>38</sup>.

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<sup>31</sup> G. GIGLIOZZI (a cura di), *Studi di codifica e trattamento automatico di testi*, cit., p. 152.

<sup>32</sup> The machine – and the disciplines behind the computational machines – are useful in two phases. First, during the theoretical reflection and the development of the system, the new environment should guarantee an advancement in the theory and in the analysis. In a second phase, the possibility the manage a big quantity of materials with a working system will allow to accurately probe the object of inquiry and to go back, with otherwise unobtainable results, to further theoretical reflections [translation my own].

<sup>33</sup> A. ROSENBLUETH – N. WIENER, *The Role of Models in Science*, «Philosophy of Science», 12/4 (10/1945), pp. 316–321.

<sup>34</sup> D. R. HOFSTADTER, *Gödel, Escher, Bach: an eternal golden braid*, Basic Books, New York 1979.

<sup>35</sup> The model is therefore something “smaller” than the text [...] Building something smaller means modifying dimensions, making a transformation and if, after this transformation, we want to obtain a tool that is minimally useful, we need to build a model that respects the laws of *isomorphism*. We can define *isomorphism* as a transformation that maintains information [translation my own]. G. GIGLIOZZI, *Modellizzazione delle strutture narrative*, in *Calcolatori e scienze umane: archeologia e arte, storia e scienze giuridiche e sociali, linguistica, letteratura*, Etaslibri, Milano 1992, p. 306.

<sup>36</sup> M. L. MINSKY, *Matter, minds, models*, in M. L. MINSKY (a cura di), *Semantic Information Processing*, MIT Press, 1968. This article, as the one by Rosenblueth and Wiener, were introduced in the Italian debate thanks to the famous anthology V. SOMENZI – R. CORDESCHI (a cura di), *La filosofia degli automi*, Boringhieri, Torino 1986.

<sup>37</sup> G. GIGLIOZZI, *Modellizzazione delle strutture narrative*, cit., p. 308.

<sup>38</sup> It must therefore be possible to perform experiments and these experiments must bring new knowledge, otherwise the model would be useless. From this point of view, the model's role as an analytic tool is amplified, and the role of the

During the 90s, his interests moved to the theory and applications of text encoding and markup languages, and to the adoption of quantitative and statistical methods in literary criticism. His wonderful essay on Volponi's *Memoriale*, included in the prestigious encyclopedia *Letteratura Italiana* published by Einaudi, is a masterpiece of computational criticism<sup>39</sup>.

Another important exponent of the school is Raul Mordenti, historian and philologist of Italian literature. His main contributions were in the field of digital philology. In a seminal article entitled *Appunti per una semiotica della trascrizione nella procedura ecdotica computazionale* he gave a semiotic account of the digital transcription of a text moving from the notion of *diasistema* proposed by Segre<sup>40</sup>. Thus, he managed to point out the constitutive role of the reader/copyist/editor in the transcription process (of which the digital encoding is an intrinsic part) and to put into question the metaphysical legitimacy of the notion of "original text", hence changing the statute itself of the critical edition<sup>41</sup>:

[...] tale prospettiva comporta, se non ci inganniamo, la necessità di spingere ancora più avanti la distinzione segriana fra "il testo critico come luogo del reale" e "l'apparato come luogo del virtuale", poiché il cosiddetto apparato interferendo di continuo e in modo sempre diverso nelle diverse letture darà in effetti luogo a *diversi testi critici*. In questa prospettiva l'elemento di invarianza si ridurrebbe dunque non ad uno tra i tanti testi ma a quella sorta di *infra-testo* che è il *testo-trascritto*, cioè ad un testo, con l'iniziale decisamente minuscola, quale c'è stato effettivamente materialmente consegnato in un [manoscritto] determinato<sup>42</sup>.

In the following years Mordenti has deepened his reflection on the foundations of digital philology. Although he acknowledges the crisis of the traditional foundations of philology in a digital context, he does not accept the post-modernist and relativist outcomes of New Philology (at least, in the more radical variants). On the contrary, he firmly believes that the editor has the responsibility of producing a critical text that must be a step in the asymptotic approximation to the intentional message of the author<sup>43</sup>:

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observer becomes fundamental. The model works as an experimental structure with an intrinsic point of view that gives perspective to its parts [translation my own].

<sup>39</sup> G. GIGLIOZZI, *Memoriale*, in A. ASOR ROSA (a cura di), *Letteratura italiana. Le opere. Il Novecento: La ricerca letteraria*, Vol. 4 2, Einaudi, Torino 1996.

<sup>40</sup> C. SEGRE, *Semiotica filologica*, Einaudi, Torino 1979, p. 58.

<sup>41</sup> R. MORDENTI, *Appunti per una semiotica della trascrizione nella procedura ecdotica computazionale*, in G. GIGLIOZZI (a cura di), *Studi di codifica e trattamento automatico dei testi*, Bulzoni, Roma 1987, p. 115.

<sup>42</sup> [...] this perspective implies the need to push still further the distinction proposed by Segre between "the critical text as the place of reality" and "the apparatus the place of the virtual", since the so-called apparatus, interfering continuously and in different ways in different readings, will actually give rise to *different critical texts*. In this perspective the element of invariance would therefore be reduced not to one of the many texts but that sort of *infra-text* which is the *transcribed-text*, that is, to a text which was actually materially delivered in a given [manuscript] [translation my own].

<sup>43</sup> R. MORDENTI – C. CAZALÉ, *La costituzione del testo e la «comunità degli interpreti»*, in P. NEROZZI BELLMAN (a cura di), *Internet e le Muse*, Mimesis Edizioni, Milano 1997, p. 23.

A ben vedere è proprio questa duplice responsabilità che configura [...] la posizione *di mediazione* che caratterizza la figura del filologo (critico ed ermeneuta): il filologo *media* fra il testo e il pubblico, e svolge tale ruolo sulla base di una duplice sua responsabilità deontologica: egli infatti *garantisce* al Lettore che il testo costituito e offerto alla lettura [...] corrisponda effettivamente al testo voluto dall'Autore e alla sua intenzione; e d'altra parte, facendo questo il filologo garantisce anche all'Autore [...] il rispetto del suo messaggio presso il lontano e sconosciuto destinatario<sup>44</sup>.

Later, he has also applied his theoretical reflections to the digital diplomatic edition of the *Zibaldone Laurenziano*<sup>45</sup>, a famous autograph of Boccaccio, a work that is still ongoing.

### **The season of the digital archives and the long path toward the institutional recognition**

After this seminal period, the theoretical work has progressively been associated with digital resources production and project oriented activities. Tito Orlandi founded, in 1991, the CISADU (Centro Interdipartimentale di Servizi per l'Automazione nelle Discipline Umanistiche) which was the first proper DH center in Italy, and has concentrated his efforts, among the other, to the problem of the institutional recognition of IU/DH as a discipline and on its place in the academic teaching. Due to the peculiar situation of Italian university, the chance of having a formal discipline has not been successful, but at least after the University reform that introduced the BA/MA articulation also in Italy, an MA degree in DH has been introduced as a possibility in the ministerial tables, and as of now, there are three Master courses activated.

Giuseppe Gigliozzi – who left us prematurely in 2001 – founded in the late 90s the CRILET (Centro Ricerche Informatica e Letteratura), where he gathered a group of younger researchers, among which the author of this article. This group played a leading role in fostering the adoption of formalisms and standards like the *Text Encoding Initiative* (TEI) and other SGML based markup language for the creation of humanistic digital resources. It goes back to that period the first mid-size digitalization project based on TEI in Italy, *Testi Italiani in Linea* (TIL)<sup>46</sup> that was coordinated by Roberto Mercuri and Gigliozzi himself (with my collaboration) and the translation of the TEI Lite Guidelines, later published as a book<sup>47</sup>. The influence of this theoretical, pedagogical and

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<sup>44</sup> On closer inspection, it is precisely this dual responsibility that [...] configures the position *of mediation* that characterizes the figure of the philologist (critic and hermeneut): the philologist mediates between the text and the public, and plays this role on the basis of a dual deontological responsibility: in fact, he *guarantees* to the Reader that the constituted text offered for reading [...] actually corresponds to the text wanted by the author, to his intention; on the other hand, by doing this the philologist also guarantees the Author [...] the respect of his message by the distant and unknown recipient [translation my own].

<sup>45</sup> Plut. XXIX, 8, Biblioteca Medicea Laurenziana di Firenze. Cfr. R. MORDENTI, *Filologia digitale (a partire dal lavoro per l'edizione informatica dello Zibaldone Laurenziano di Boccaccio)*, «Humanist Studies & the Digital Age», 2/1 (30/11/2012) [<http://journals.oregondigital.org/hsda/article/view/2991>].

<sup>46</sup> CIOTTI F., *Teoria, progetto e implementazione di una biblioteca digitale. Testi Italiani in Linea*, in FIORMONTE DOMENICO (a cura di), *Informatica Umanistica. Dalla Ricerca all'insegnamento*, Bulzoni Editore, Roma 2003.

<sup>47</sup> CIOTTI F., *TEI Lite: introduzione alla codifica dei testi*, in CIOTTI F. (a cura di), *Il manuale TEI Lite. Introduzione alla codifica elettronica dei testi letterari*, Edizioni Sylvestre Bonnard, Milano 2005.

practical activity was very deep, although not without criticism<sup>48</sup>, and in the end, most textual digitalization programs in Italy have adopted XML and TEI.

The history of DH or IU in Italy, obviously, cannot be exhausted by the so-called “Roman School”. Since the 90s, with the introduction of the Web technologies, many other scholars have been attracted by the possibilities of the new digital methods and tools in various field of the Humanities. Some of them have shared a similar theoretical and methodological approach, like Dino Buzzetti whose contribution to the theory of digital textuality have had a deep impact, and for once not only at the national level<sup>49</sup>. Others scholars and schools have devoted their attention to different areas of the field, like the hypertextual studies, fostered in particular in Turin by Mario Ricciardi, who has progressively moved his focus from DH to New Media Studies<sup>50</sup>.

Finally, many important scholars, although not sharing (or sharing only partially) the view that the computational turn would have determined a methodological transformation of the Humanities, have nonetheless worked to produce important digital resources of outstanding relevance in various fields of the Humanities. For Italian studies is to be mentioned Pasquale Stoppelli that starting from the early 90s created LIZ (Letteratura Italiana Zanichelli) a CDROM based corpus of Italian literature texts supported by a proprietary textual analyzer, DBT<sup>51</sup>. The same corpus was later extended by CIBIT project (Centro Interuniversitario Biblioteca italiana Telematica), headed by Amedeo Quondam and, after the conversion of the texts into TEI/XML, formed the principal asset of the *Biblioteca Italiana* digital library<sup>52</sup>. Around the first decade of 21th century, Professor Paolo Mastandrea started his projects of digitalization and on-line publishing of Latin poetry, *Musisque Deoque*, a work that is still ongoing and developing<sup>53</sup>. It is almost coeval the project ALIM (*Archive of the Italian Latinity of the Middle Ages*), aimed at creating an on-line

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<sup>48</sup> Tito Orlandi, Dino Buzzetti and Domenico Fiormonte, one of the early member of CRILeT, have repeatedly raised important and sound criticism to the adequacy of TEI and XML like markup for the representation of textuality. Cfr. D. FIORMONTE, *The Text As a Product and As a Process. History, Genesis, Experiments*, in E. VANHOUTTE – M. DE SMEDT (a cura di), *Manuscript, variant, genes, genesis*, Koninklijke Academie voor Nederlandse taal- en letterkunde, Gent 2006, pp. 109–128; D. BUZZETTI, *Digital Representation and the Text Model*, «New Literary History», 33/1 (2002), pp. 61–87.

<sup>49</sup> D. BUZZETTI, *Digital Representation and the Text Model*, cit.; D. BUZZETTI – J. MCGANN, *Electronic Textual Editing: Critical Editing in a Digital Horizon*, in L. BURNARD – K. O'BRIEN O'KEEFFE – J. UNSWORTH (a cura di), *Electronic Textual Editing*, Modern Language Association of America, New York 2006 [[http://www.tei-c.org/About/Archive\\_new/ETE/Preview/mcgann.xml](http://www.tei-c.org/About/Archive_new/ETE/Preview/mcgann.xml)]

<sup>50</sup> M. RICCIARDI – F. BONADONNA (a cura di), *Oltre il testo: gli ipertesti*, F. Angeli, Milano 1994; M. RICCIARDI (a cura di), *Lingua letteratura computer*, Bollati Boringhieri, Torino 1996.

<sup>51</sup> P. STOPPELLI, *Dentro la LIZ, ovvero l'edizione di mille testi*, «Ecdotica», 2 (2005), pp. 42–59.

<sup>52</sup> The project is currently available at <http://www.bibliotecaitaliana.it/>.

<sup>53</sup> The web site is <http://mizar.unive.it/mqdg>; cfr. F. B. MASSIMO MANCA LINDA SPINAZZÈ, PAOLO MASTANDREA, LUIGI TESSAROLO, *Musisque Deoque: Text Retrieval on Critical Editions*, «JLCL», 26/2 (2011), pp. 127–138.

archive of all the Latin texts produced in Italy during the Middle Ages, promoted by Francesco Stella, and still ongoing<sup>54</sup>.

### **From Informatica Umanistica to Digital Humanities... and return**

With the new millennium, the landscape of the Italian digital scholarship in the humanities has become more and more complex and varied, and today it is totally integrated into the global Digital Humanities scene<sup>55</sup>. Also from the point of view of the institutional “placement” (both in teaching and research), the situation is satisfying, given the peculiar rigidity of the Italian academic system.

It is undeniable, though, that most of our theoretical elaboration and experimentation lacks visibility and recognition in the global debate, as we have noticed in the first paragraph. Undoubtedly, the linguistic barrier has been and still is a hard obstacle to overcome, notwithstanding the relevance that the issue of multilingualism and multiculturalism has gained in recent DH debates. For this reason, I think, it is important to tell the many different histories and to enhance the various intellectual traditions of this field. In this sense, the awarding of the prestigious ADHO Busa Prize to Professor Tito Orlandi in 2019 is a significant step forward<sup>56</sup>.

It is even more important in this historical moment, in my opinion. For a long time, notwithstanding the diversity, the methodological issues have played a foundational role in the scholarly activity at the intersection between computing and humanities<sup>57</sup>. They have been the *principium individuationis* of the field that, in a sense, could aspire to the status of *quasi-discipline* by the way of its common methodological underpinnings<sup>58</sup>.

During the last fifteen years, with the expansive phase initiated with the terminological switch from “Humanities Computing” to “Digital Humanities”, this centrality has failed. It has

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<sup>54</sup> The project website is <http://www.alim.dfl.univr.it/>; cfr. E. FERRARINI, *ALIM ieri e oggi*, «Umanistica Digitale», 1 (10/2017) [<https://umanisticadigitale.unibo.it/article/view/7193>]

<sup>55</sup> This “expansive” context has been facilitated by the creation in 2011 of a national scholarly association, the *Associazione per l'Informatica Umanistica e la Cultura Digitale* (AIUCD), whose main objectives are supporting the coordination among the scholars active in the field and making advocacy and outreach activity both at the national and international level. AIUCD (<http://www.aiucd.it>) regularly organizes an annual conference and since 2017 has started the publication of an online open access journal, *Umanistica Digitale* (<https://umanisticadigitale.unibo.it>). It has been the first of the national DH associations recently established in European countries to become an associated organization to the European Association of Digital Humanities (EADH).

<sup>56</sup> <https://adho.org/awards/roberto-busa-prize>.

<sup>57</sup> M. KIRSCHENBAUM, *What Is Digital Humanities and What's It Doing in English Departments?*, «ADE Bulletin», 150 (2010), pp. 55–61.

<sup>58</sup> W. MCCARTY – H. SHORT, *Mapping the field*, (2002) [<http://www.eadh.org/mapping-field>]; J. UNSWORTH, *Scholarly Primitives: what methods do humanities researchers have in common, and how might our tools reflect this?*, (2000) [<http://people.brandeis.edu/~unsworth/Kings.5-00/primitives.html>].

progressively been superseded by a sociological oriented conception of DH, which has been explicitly theorized by Ray Siemens using the anthropological notion of community of practice<sup>59</sup>:

[...] the notion of the community of practice here offers us a framework to consider and understand *who* we are via *what* it is we do, *where* we do what we do, and *why* we do it in the way that we do it. What is most unique about this frame is how it focuses us on the set of practices we share, who we share the practices with and where, on what we apply them, and to what end we do so. If we are willing to view ourselves from this perspective, through those practices in our community that make us unique and bring us together in that way, we can readily begin a move toward taking action that is less problematic than larger strategies of definition—a move that clarifies our understanding of the sorts of initiatives we might engage in together, that might bring us together, and the shapes that those sorts of initiatives and endeavors might take.

This is the theoretical justification of a vision of the field that has been labelled “Big Tent DH”, following the influential motto adopted for the DH2011 Conference at Stanford University<sup>60</sup>, a vision that has characterized the evolution and success of DH all over the globe in the last decade.

It is not possible in this context to delve further into this debate, and my account here is necessarily oversimplified and apodictic. I think, nonetheless, that if the “inclusive stance” of the “Big Tent DH” has been fruitful in the phase of the expansion, there is now the need for tracing both the internal and external borders of the DH field, borders that are not neat line but fuzzy regions. My personal favorite metaphor for describing DH is that of a galaxy. In a galaxy, especially if you are immersed in it, it is impossible to identify clear borders. Nevertheless, if you look at it from a distance, it is possible to identify a core, a disk with its spiral structure, and an outer rim.

The theory and epistemology-oriented Italian tradition in digital scholarship can offer a substantial contribution to define the shape of that core in the DH galaxy, a core that we could define *computational theory and methodology of the Humanities*. After more than a decade from the “DH turn”, I think that, at least for some of the members of this vast scholarly community, it is time to return to *Informatica Umanistica*.

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<sup>59</sup> R. SIEMENS, *Communities of practice, the methodological commons, and digital self-determination in the Humanities*, in C. CROMPTON – R. J. LANE – R. SIEMENS (a cura di), *Doing Digital Humanities: Practice, Training, Research*, Taylor & Francis, 2016, p. XXIV. This text follows the Antonio Zampolli Prize Lecture given on 2 July 2014 at the University of Lausanne

<sup>60</sup> <https://dh2011.stanford.edu/>.



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