

# Digital Humanities: An Explication

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## Abstract

The relationship between computer science and digital humanities and the potential contributions of computer science to digital humanities cannot be reasonably discussed without defining what we mean by “digital humanities.” With a view to enabling this important discussion, we propose a concise definition of digital humanities centered around the construction of formal models.

## 1 Introduction

When discussing the relationship between computer science and digital humanities—or, as the call for this workshop put it, “where and how computer science can play a part in the fast-growing field of digital humanities”—it is essential to define this field. The definition of digital humanities has been discussed at length, in books, articles, blog posts, and on social media. Kirschenbaum (2012) argues that the “network effects” of blogs and Twitter have turned the term *digital humanities* into a “free-floating signifier.” The multifariousness of its understandings is succinctly summarized by Ramsay: “the term can mean anything from media studies to electronic art, from data mining to edutech, from scholarly editing to anarchic blogging, while inviting code junkies, digital artists, standards wonks, transhumanists, game theorists, free culture advocates, archivists, librarians, and edupunks under its capacious canvas” (Ramsay, 2013, p. 239f). Some go as far as to claim that “we will never know what digital humanities ‘is’ because we don’t want to know nor is it useful for us to know.” (Kirschenbaum, 2014, p. 59)

In fact, the question is neither what digital humanities *is* ontologically, nor how to exhaustively describe “the disparate activities carried on under its banner” (Kirsch, 2014), but rather how we *want* to define it—what Carnap called an *explication*.<sup>1</sup> We also contend that it is not only “useful” to explicate, but crucial: the creation of academic positions, departments, and programs requires a consensus around an explicit definition—otherwise, how would one ensure the relevance and quality of research, the comparability of degree programs (and thus student mobility), or the adequate evaluation of research programs and thus their financing? And clearly no meaningful collaboration will be possible if the field refuses to define itself.

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<sup>1</sup>“By the procedure of *explication* we mean the transformation of an inexact, prescientific concept, the *explicandum*, into a new exact concept, the *explicatum*. Although the explicandum cannot be given in exact terms, it should be made as clear as possible by informal explanations and examples.” (Carnap, 1950, p. 3)

## 2 Approach

We think the problem of defining digital humanities is unnecessarily exacerbated by confounding a number of related, but actually distinct issues. In short, we posit that any field of research (regardless of whether one wants to consider it a discipline or not) is ultimately defined by a unique combination of (1) a *research object* and (2) a *research objective*. *Research methods* are secondary in that they are contingent on the research object and the research objective, as well as on technical and scientific progress, which both requires them to adapt and permits them to evolve, whereas the research object and the research objective remain stable. Furthermore, disciplines have always used a variety of methods; for example, while qualitative methods are certainly “typical” for many humanities disciplines, quantitative methods have always been used as well. This means that it is not useful to attempt to define digital humanities (or any other field or discipline for that matter) by way of the methods it happens to use at some point.

Despite the hype currently surrounding the digital humanities, it is neither the first nor the only encounter of computer science with other disciplines. In our context, computational linguistics may be a particularly relevant example. Linguistics is the study of human language; like any other field of research, it studies its research object by creating models of it. Computational linguistics essentially only differs from “traditional” linguistics by creating *computational* models of language—which have the important advantages that they (a) are formal and (b) executable, and can thus—among other things—be automatically tested against large amounts of actual linguistic utterances. Note, however, that the research object and the research objective remain the same. The construction of computational models of human language poses a number of specific challenges that differ from other domains, including related ones, such as formal languages. We can thus identify *two* subfields: *applied* computational linguistics, which creates formal models of particular languages, and *theoretical* computational linguistics, which serves as a kind of “metascience” for the former, studying the means and methods of constructing computational models in linguistics *in general* and providing the “building materials.” While applied computational linguistics is essentially linguistics, theoretical computational linguistics can thus (regardless of its disciplinary or institutional status) be considered a part of computer science rather than linguistics: it does not study human language, but rather computational issues in modeling human language.<sup>2</sup>

If we apply these considerations to digital humanities, we can define *digital humanities* in the following precise fashion:

1. research on and development of means and methods for constructing formal models in the humanities (*theoretical digital humanities*), and
2. the application of these means and methods for the construction of *concrete* formal models in the humanities disciplines (*applied digital humanities*).

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<sup>2</sup>This characterization is obviously an abstraction; in practice the boundaries are often less clear, and theoretical and applied computational linguistics frequently overlap with each other and with natural language processing, the engineering discipline based on computational linguistics.

From a computer science perspective this definition seems obvious. While others, in particular McCarty (2014), Thaller (2017), and Meunier (2017) (and to some extent Flanders and Jannidis, 2016) have expressed similar views, we are still far from a general consensus. The focus is generally on “tools,” reflections on modeling remain relatively rare; Beynon et al. (2006), Stokes (2012), Bradley and Pasin (2013), or Ciula and Eide (2016) are notable exceptions.

The construction of models in the humanities is not per se new—all research is based on models, and the choice “is not whether to build models; it’s whether to build explicit ones.” (Epstein, 2008) In contrast to much of the natural and engineering sciences, however, models in the humanities are traditionally not formal (and thus explicit) but rather tend to be expressed informally in natural language. Consequently, they do not lend themselves to computational implementation as directly as mathematical models. Furthermore, research questions in the humanities are primarily qualitative rather than quantitative, which, too, has held back the full adoption of the computer as a *modeling tool* rather than just as a writing tool and a “knowledge jukebox.” (McCarty, 2014, p. 27)

Obviously many types and forms of relationships between computer science and digital humanities can be envisaged, but from our above definition two basic scenarios—corresponding to the two subfields—can be identified.

First, applied digital humanities is driven by humanities research questions. In order to study a question computationally, scholars need to construct formal models of their research object. This is a new task for the humanities, but a task that cannot be delegated—the construction of the model is a central part of the research process. Here computer science can support the formalization by proposing adequate modeling frameworks. *Adequacy* here concerns two main aspects: (1) whether the modeling framework is applicable and provides the necessary “building materials,” and (2) whether the modeling framework is computationally feasible.

Second, if no adequate framework exists, we move to the domain of theoretical digital humanities. Research in theoretical digital humanities (which is as yet rare) is obviously motivated by the requirements of research in the humanities, but has its own research object: the means and methods for constructing formal models in the humanities. Regardless of its disciplinary or institutional status, it is a field close to computer science, operating, by definition, on a higher level of abstraction than applied digital humanities, aiming to address *classes* of problems. These can, in principle, concern all areas of computer science; some likely focus areas are uncertainty, sparse data, qualitative modeling, or graph algorithms—areas in which the requirements of the humanities differ from those of other fields of application.

### 3 Conclusion

In many disciplines, e.g., physics, biology, chemistry, engineering, and computer science itself, but also in some disciplines in the humanities and social sciences (computational linguistics, computational social science), computational modeling has demonstrated that it can significantly *advance* (and not just accelerate or automate) research.

We believe that the (double) definition of digital humanities centered around formal modeling we have proposed above offers a foundation for its sustainable development by clarifying its relationship to other disciplines, notably computer science. This will help to identify potential contributions of computer science but also to identify roles and responsibilities in interdisciplinary collaborations, some of which we have briefly outlined.

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