# The Shape of Doubt:
## Employing data visualization to inquiry stylistic features in the narrative works of Italo Calvino

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The contribution will present transdisciplinary research that employs data and visualization to inquire a stylistic feature named "dubitative text" in the *oeuvre* of Italo Calvino, one of the most influential authors of the Italian twentieth century (cf. Barenghi 2009, Serra 2006). The results of the research are part of *Atlante Calvino. Literature and Visualization* (https://atlantecalvino.unige.ch/), an online platform consisting of several interactive visualizations, organized over three research itineraries that explore different critical dimensions of the author's work: the doubt, the space, and the plot.

Around the 1960s Italo Calvino began to adopt a particular strategy to articulate its narrations (cf. Mengaldo 1987, p. 279): stories develop through an accumulation of doubts and hypothetical constructions that systematically question what has been previously stated. The itinerary dedicated to doubt studies precisely this stylistic attitude which has been proposed to be defined as "dubitative text". In particular, the second stage of this itinerary is named *Doubting* and shows the presence of dubitative text in the author's *oeuvre*.

While "the first wave of digital humanities work was quantitative, mobilizing the search and retrieval powers of the database, automating corpus linguistics", "the second wave is qualitative, interpretative" (Schnapp Presner 2009; cf. Burdick et al. 2012). Nevertheless, except for a recent contribution that openly addresses the notion of ambiguity in the work of Thomas Pynchon (Ketzan 2021), studies dedicated to the more elusive aspects of literature are scarce in this field of research. Yet one of the most interesting fronts to explore at present remains precisely the articulation between "les préoccupations propres aux « vieilles » humanités (les notions d'ambiguïté, de variation, de subjectivité, etc.) à des modes de pensée propres au numérique (simulation, modularité, automatisation, variabilité, transcodage, etc.)" (Masure 2017, p. 39; cf. Citton 2010). The *Doubting* visualization attempts to openly address this stumbling block.

The presentation will be structured in three phases. The first is dedicated to explaining how an elusive research concept such as the dubitative text is translated into a visualization. The very definition of what a dubitative style might be, as well as its different forms within a text, involves several hermeneutic obstacles (cf. Herrmann 2015). Therefore, one of the first challenges was to define a theoretical model that would allow the collection of data from each of the author's stories and novels in a structured and effective way (cf. Owens 2011). The schema of the dataset will be presented, as well as the process for data collection which is based on markup rather than a text mining technique, resonating with the concept of constructivism related to humanistic data (cf. Drucker 2011). The reasoning was supported by visualization drafts, in a fashion similar to what happens in *Research through Design* (Stappers and Giaccardi 2017; cf. Frayling 1993), enabling the identification of a series of categories that appropriately describe the presence of dubitative text within the narrative work. In particular, four different types of text have been identified: dubitative text, text object of doubt, dubitative text also object of doubt, non-dubitative text.

The second part aims at discussing the design and development of the interactive visualization. *Doubting* has different levels of reading that strictly depend on the theoretical model followed during the data collection: the presence of the aforementioned four categories was highlighted in the totality of Calvino's *oeuvre* (i.e. more than 200 short stories and about ten novels). Through a series of practical examples of navigation within the platform, it will be shown how this tool works and which analysis it enables. As attempted by previous research (e.g. Cheema et al. 2016; Dörk et al. 2014), the visualization tries to combine

two ways of reading: a distant one, linked to a vision "from afar" of the presence of the dubitative phenomenon in the whole work; and at the same time a gaze on individual texts. Indeed, each of them can be selected and "opened", showing in detail the distribution of occurrences.

In the third part, the contribution will present an example of critical reading, focusing on a specific case study. Here the goal will be to demonstrate the value of the visualization, emphasizing its contribution to the research process and showing how it has been integrated into a critical reading of the literary text. More generally, the contribution will discuss the research process from a critical perspective, reflecting on the benefits derived from the process of cross-pollination between literary scholars and visualization researchers.

Traditionally "a literary critic is a reader who writes about what he or she reads" ["Un critico letterario è un lettore che scrive di quel che legge"] (Onofri 2008, p. 9). The presented research, *Doubting*, modifies this paradigm of thinking, trying to unravel some critical issues through visualizations. Applying Data Visualization techniques to problems of literary criticism is an attempt to change perspective, pushing research to renew itself on two fronts. From a methodological point of view, it means to adopt a grammar of thought completely different from the traditional one; and at the same time, from a content point of view, it allows to investigate in unseen directions an author and his narrative work on the wave of these new tools. Visualization, on the other hand, also benefited from the collaboration and expanded its visual and methodological registry to better deal with the elusiveness of the partner discipline.

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