Chapter 7
Automatic Identification of the Writer of Ancient Greek Inscriptions, Employing Methods of Computer Engineering and Mathematics

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ABSTRACT
Automatic handwriting identification/classification is a major problem in graphology analysis. In this chapter the authors present an automated writer identification system applied to ancient Greek inscriptions. The need of such a system which classifies the hands that carved the inscriptions is important, because it helps scholars

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to date these inscriptions and deduce proper historical conclusions. The proposed system consists of two different and quasi complementary approaches. The first approach is based on pattern recognition methods in order to help us compute an ideal representative (platonic prototype) of each letter symbol in every inscription. Next, pair wise comparisons, based on statistical criteria, are made and the final decision for the classification of the inscriptions to the corresponding hands, is taken. The second approach also uses statistical criteria to accept/reject statistical hypotheses; nevertheless this methodology employs geometric characteristics of all letters in hand and computes specific values in order to make the decision for the writer identification. Both methods were applied to 33 ancient Athenian inscriptions of the classical era and offered 100% correct classification into 8 different hands. The combination of the application of both approaches and the fact that their results are consistent in themselves and agree with prominent epigraphists’ opinion, show that the system may substantially contribute to ancient inscriptions’ dating, in a robust and reliable manner.

1. INTRODUCTION: THE PROBLEM OF DATING THE CONTENT OF ANCIENT INSCRIPTIONS: A NOVEL APPROACH

Ancient inscriptions form one of the most important primary sources for information about ancient world and in particular ancient Greece (Tracy, 2003). Those surviving from Athens and Attica number in the tens of thousands and more are found almost daily. These inscriptions preserve writing from ancient times and give us direct access to the past. The main difficulties in studying and interpreting inscriptions on stone are that, as a rule, they are unsigned, non-dated and very fragmentary; for example, most were broken up in antiquity for use as building material. As a consequence, they are often difficult to date; yet dating them, being able to give them their correct historical context, is crucial to unlocking the valuable information they contain. As one of the most prominent historians Professor Christian Habicht has recently written, “proper historical use of inscriptions can only be made if they can be dated”.

Identifying the writer that carved an inscription, allows for correct and unambiguous dating of it. For example, in Attica, in Classical era individual inscribers of decrees had working careers of limited duration. Suppose that one can identify, via Image Processing and Pattern Recognition, the characteristics of the writing of a certain workman and that at least one of the inscriptions carved by this writer can be dated on the basis of the inscription context and/or archaeological arguments. Then any other inscription or fragment which can be identified that was carved by the same writer, “gains a date”. Thus, the development of an information system that
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