ON-LINE VALIDATION AND ANALYSIS
OF PARTIALLY OCCLUDED IMAGES

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ABSTRACT

This is a theoretical study of partially occluded images. Here we present on-line linear algorithms for validating one dimensional images composed of continuous objects, with some of the objects being partially occluded by other ones. These algorithms can be extended to provide a (not always unique) decomposition of a validated image.

Keywords: pattern matching, automata, image analysis.

1. Introduction

In recent studies [2, 6, 9, 10, 11, 16] of repetitive structures of strings, generalized notions of periods have been introduced. A typical regularity, the period u of a given string x, grasps the repetitiveness of x since x is a prefix of a string constructed by concatenations of u. A substring w of x is called a *cover* of x if x can be constructed by concatenations and superpositions of w. The notion of a "cover" is a generalization of periods in the sense that superpositions as well as concatenations are considered to define it, whereas only concatenations are considered for periods. Here we extend this type of regularity: we want to "cover" a string using a set of "objects" – the objects may "occlude" each other. For example the string (the "image") *ababcabd* is covered by the "objects" $\{abc, d\}$; the "object" *abc* occurs at positions 1 (partially occluded

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