

AN ALGORITHM FOR ANALYSIS OF IMAGES IN SPATIAL INFORMATION SYSTEMS¹

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ABSTRACT

This paper begins with a brief overview of formal concepts involved in specification of images in spatial information systems. It is shown how several efficient string processing algorithms can be used for approximation, compression and analysis of images. We discuss main adjustments required for applying string algorithms in order to analyze spatial data. A first basic practical polynomial algorithm for finding all maximal repeated rectangular patterns in an image is included to illustrate our general approach.

Keywords: String algorithms, formal languages, weighted automata

1. Introduction

The aim of this paper is to show how string processing algorithms can be used for solving various problems that arise in analysis of data in spatial information systems, to discuss main adjustments to the algorithms involved in this method, and to present a polynomial algorithm for finding all maximal repeated rectangular patterns in a 2 dimensional image. For some recent results on string algorithms the reader is referred, for example, to [4, 5, 6, 7, 11], and [16]. The first section is devoted to several formal concepts involved in applications of string processing algorithms to specification, compression and analysis of 2D images in spatial information systems. Our fairly basic algorithm not only solves the problem of finding repeated rectangular patterns, but also illustrates main circumstances and changes to be taken care of in this general approach. Achieving a complete set of useful practical optimal algorithms

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