

Accepted Manuscript

Fuzzy system for intelligent word recognition using a regular grammar

David Álvarez, Ramón Fernández, Lidia Sánchez

PII: S1570-8683(16)30079-9

DOI: <http://dx.doi.org/10.1016/j.jal.2016.11.023>

Reference: JAL 454

To appear in: *Journal of Applied Logic*



Please cite this article in press as: D. Álvarez et al., Fuzzy system for intelligent word recognition using a regular grammar, *J. Appl. Log.* (2016), <http://dx.doi.org/10.1016/j.jal.2016.11.023>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Fuzzy System for Intelligent Word Recognition using a Regular Grammar

David Álvarez^{a,*}, Ramón Fernández^a, Lidia Sánchez^a

^a*Department of Mechanical, Computer and Aerospace Engineering. University of León. Spain.*

Abstract

We present a new approach for off-line intelligent word recognition based on a fuzzy classification model. First, we segment a word into its single characters, and label each pixel as vertical or as horizontal so that we can group all the pixels into vertical or horizontal strokes. Then, we use dynamic zoning to obtain the locations of the connections between the vertical strokes – which are the main strokes – and the horizontal ones. These features let us construct the representative string of a character using a regular grammar and, subsequently, use a Deterministic Finite Automaton to check them out. To accomplish the recognition, we use a Fuzzy Lattice Reasoning classifier. The combination of the representative strings and the fuzzy classifier provides promising performance rates.

Keywords: Handwritten recognition, Deterministic finite automaton, Regular grammar, Fuzzy lattice reasoning, Fuzzy system

1. Introduction

The effort for automatic recognition of handwritten text is still a challenge with more than forty years of history [1, 2]. Commonly, two general approaches can be considered to address the problem: on-line recognition and off-line recognition.

On-line recognition is usually raised meanwhile the writing is performed. Therefore, parameters like position, velocity or acceleration are evaluated in real time to predict the introduced text. This kind of recognition is desired to be used as text acquisition in smart-phones or tablets [3]; but it is also widely used in numerous other fields, including mathematical symbols interpretation [4], signature verification [5, 6], educational [7, 8] or therapeutic purposes [9, 10].

Furthermore, off-line recognition is achieved from an image that contains the handwritten text. After image acquisition, several pre-processing steps are involved to normalize the input and for getting accurate results. Techniques such as attribute filtering [11], thresholding [12],

*Corresponding author.

Email addresses: dalvl@unileon.es (David Álvarez), ramon.fernandez@unileon.es (Ramón Fernández), lidia.sanchez@unileon.es (Lidia Sánchez)

Download English Version:

<https://daneshyari.com/en/article/5778210>

Download Persian Version:

<https://daneshyari.com/article/5778210>

[Daneshyari.com](https://daneshyari.com)