

Handbook of Research on

Natural Language Processing and Smart Service Systems



Rodolfo Abraham Pazos-Rangel, Rogelio Flores-Juarez,
Mario Andres Paredes-Valverde, and Gilberto Rivera

IGI Global

Information Science Publishing

Handbook of Research on Natural Language Processing and Smart Service Systems

Rodolfo Abraham Pazos-Rangel

Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico

Rogelio Florencia-Juarez

Universidad Autónoma de Ciudad Juárez, Mexico

Mario Andrés Paredes-Valverde

Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Orizaba, Mexico

Gilberto Rivera

Universidad Autónoma de Ciudad Juárez, Mexico



A volume in the Advances in Computational
Intelligence and Robotics (ACIR) Book Series

Published in the United States of America by
IGI Global
Engineering Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: <http://www.igi-global.com>

Copyright © 2021 by IGI Global. All rights reserved. No part of this publication may be reproduced, stored or distributed in any form or by any means, electronic or mechanical, including photocopying, without written permission from the publisher. Product or company names used in this set are for identification purposes only. Inclusion of the names of the products or companies does not indicate a claim of ownership by IGI Global of the trademark or registered trademark.

Library of Congress Cataloging-in-Publication Data

Names: Pazos-Rangel, Rodolfo Abraham, 1951- editor.
Title: Handbook of research on natural language processing and smart service systems / Rodolfo Abraham Pazos-Rangel, Rogelio Florencia-Juarez, Mario Andrés Paredes-Valverde, Gilberto Rivera, editors.
Description: Hershey, PA : Engineering Science Reference, an imprint of IGI Global, [2020] | Includes bibliographical references and index. | Summary: "This book is a collection of innovative research on the integration and development of intelligent software tools and their various applications within professional environments"-- Provided by publisher.
Identifiers: LCCN 2019058351 (print) | LCCN 2019058352 (ebook) | ISBN 9781799847304 (hardcover) | ISBN 9781799847311 (ebook)
Subjects: LCSH: Natural language processing (Computer science) | Natural language generation (Computer science) | Computational linguistics.
Classification: LCC QA76.9.N38 H3645 2020 (print) | LCC QA76.9.N38 (ebook) | DDC 006.3/5--dc23
LC record available at <https://lccn.loc.gov/2019058351>
LC ebook record available at <https://lccn.loc.gov/2019058352>

This book is published in the IGI Global book series Advances in Computational Intelligence and Robotics (ACIR) (ISSN: 2327-0411; eISSN: 2327-042X)

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

For electronic access to this publication, please contact: eresources@igi-global.com.

List of Contributors

Aguirre L., Marco A. / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico</i>	289
Aldana-Bobadilla, Edwin / <i>Conacyt, Mexico & Cinvestav Tamaulipas, Mexico</i>	393
Almanza Ortega, Nelva Nely / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Tlalnepantla, Mexico</i>	289
Alor-Hernández, Giner / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Orizaba, Mexico</i>	135
Ameer, Iqra / <i>Instituto Politécnico Nacional, Mexico</i>	245
Bonilla, Juan Carlos / <i>Universidad Autónoma del Estado de Morelos, Mexico</i>	266
Bustos-López, Maritza / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Orizaba, Mexico</i>	445
C., Namrata Mahender / <i>Dr. Babasaheb Ambedkar Marathwada University, India</i>	46
Castillo, German / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico</i>	196
Castro-Pérez, Karina / <i>Tecnológico Nacional de México, Mexico & IT Orizaba, Mexico</i>	445
Contreras-Masse, Roberto / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Juárez, Mexico</i>	180, 266
Fernández-Avelino, Jesús / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Orizaba, Mexico</i>	135
Florencia-Juárez, Rogelio / <i>Universidad Autónoma de Ciudad Juárez, Mexico</i>	1
Frausto Solís, Juan / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico</i>	70
García, Alonso / <i>Universidad Autónoma de Ciudad Juárez, Mexico</i>	309
García, Vicente / <i>Universidad Autónoma de Ciudad Juárez, Mexico</i>	427, 481
Gaspar, Juana / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico</i>	1
Gelbukh, Alexander / <i>Instituto Politécnico Nacional, Mexico</i>	157
González, Martha Victoria / <i>Universidad Autónoma de Ciudad Juárez, Mexico</i>	101, 309
González-Barbosa, Juan Javier / <i>Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico</i>	70, 196
Guzmán Mendoza, José Eder / <i>Universidad Politécnica de Aguascalientes, Mexico</i>	327
Hernández Gómez, Antonio / <i>Tecnológico Nacional de México, Mexico & CENIDET, Mexico</i> ...	289
Jiménez, Rafael / <i>Universidad Autónoma de Ciudad Juárez, Mexico</i>	427, 481
Kumari, Namrata / <i>National Institute of Technology, Hamirpur, India</i>	368
Lopez Contreras, Irvin Raul / <i>Universidad Autónoma de Ciudad Juárez, Mexico</i>	379

López, Abraham / Universidad Autónoma de Ciudad Juárez, Mexico	227, 427
Lopez-Arevalo, Ivan / CINVESTAV Tamaulipas, Mexico	393
López-Orozco, Francisco / Universidad Autónoma de Ciudad Juárez, Mexico	31, 309
Lopez-Veyna, Jaime I. / Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Zacatecas, Mexico	393
Mar, Ricardo / Universidad Autónoma de Ciudad Juárez, Mexico.....	347
Martínez F., José A. / Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico	1, 157, 196
Martinez, Marcos E. / Universidad Autónoma de Ciudad Juárez, Mexico	31
Martinez-Rodriguez, Jose L. / Universidad Autónoma de Tamaulipas, Mexico	393
Mejia, Jose / Universidad Autónoma de Ciudad Juárez, Mexico	180, 266
Mendoza Carreón, Alejandra / Universidad Autónoma de Ciudad Juárez, Mexico	379, 427
Montes Rivera, Martín / Universidad Politécnica de Aguascalientes, Mexico	327
Ochoa, Alberto / Universidad Autónoma de Ciudad Juárez, Mexico	157, 180, 266, 327
Oliva, Diego / Universidad de Guadalajara, Mexico.....	180
Olmos-Sánchez, Karla / Universidad Autónoma de Ciudad Juárez, Mexico	31, 481
Ortiz Hernandez, Javier / Tecnológico Nacional de México, Mexico & CENIDET, Mexico	289
Paredes-Valverde, Mario Andrés / Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Orizaba, Mexico	135
Pazos-Rangel, Rodolfo A. / Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico	1
Pérez Ortega, Joaquín / Tecnológico Nacional de México, Mexico & CENIDET, Mexico.....	289
Ponce Gallegos, Julio César / Universidad Autónoma de Aguascalientes, Mexico.....	327
Ponce, Alan / Universidad Autónoma de Ciudad Juárez, Mexico	427, 481
Porras, Raul / Universidad Autónoma de Ciudad Juárez, Mexico	227
Porras, Raúl / Universidad Autónoma de Ciudad Juárez, Mexico	347
Ramirez López, Carlos Manuel / Universidad Politécnica de Aguascalientes, Mexico	327
Requejo Flores, Alejandro / Universidad Autónoma de Ciudad Juárez, Mexico.....	227, 347
Rios-Alvarado, Ana B. / Universidad Autónoma de Tamaulipas, Mexico	393
Rivera, Gilberto / Universidad Autónoma de Ciudad Juárez, Mexico.....	1
Rodas-Osollo, Jorge / Universidad Autónoma de Ciudad Juárez, Mexico	379, 481
Rodríguez-Mazahua, Lisbeth / Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Orizaba, Mexico	445
Ruiz, Alejandro / Universidad Autónoma de Ciudad Juárez, Mexico	227, 347
Salas-Zárate, María del Pilar / Tecnológico Nacional de México, Mexico & ITS Teziutlán, Mexico	445
Sánchez-Cervantes, José Luis / CONACYT, Mexico & Instituto Tecnológico de Orizaba, Mexico	445
Sánchez-Hernández, Juan Paulo / Universidad Politécnica del Estado de Morelos, Mexico.....	70
Sánchez-Morales, Laura Nely / Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Orizaba, Mexico	135
Sanchez-Solís, Julia Patricia / Universidad Autónoma de Ciudad Juárez, Mexico	70
Sánchez-Solís, Julia Patricia / Universidad Autónoma de Ciudad Juárez, Mexico	31
Sayyed, Sanah Nashir / Dr. Babasaheb Ambedkar Marathwada University, India	46
Sidorov, Grigori / Instituto Politécnico Nacional, Mexico	245
Singh, Pardeep / National Institute of Technology, Hamirpur, India	368
Varela, Maritza / Universidad Autónoma de Ciudad Juárez, Mexico.....	101

Varela, Martiza Concepción / Universidad Autónoma de Ciudad Juárez, Mexico.....	379
Vega Villalobos, Andrea / Tecnológico Nacional de México, Mexico & CENIDET, Mexico	289
Verastegui, Andres / Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico	157
Villanueva-Mendoza, Ossiel / Universidad Autónoma de Ciudad Juárez, Mexico	101
Zamora, Lucero / Universidad Autónoma de Ciudad Juárez, Mexico.....	101, 309
Zavala Díaz, Crispín / Universidad Autónoma del Estado de Morelos, Mexico.....	289

Table of Contents

Foreword	xxiv
Preface.....	xxv
Acknowledgment	xxxii
Section 1 Smart Interactive Systems	
Chapter 1	
Natural Language Interfaces to Databases: A Survey on Recent Advances	1
<i>Rodolfo A. Pazos-Rangel, Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico</i>	
<i>Gilberto Rivera, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>José A. Martínez F., Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico</i>	
<i>Juana Gaspar, Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Ciudad Madero, Mexico</i>	
<i>Rogelio Florencia-Juárez, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
Chapter 2	
Mispronunciation Detection and Diagnosis Through a Chatbot.....	31
<i>Marcos E. Martinez, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Francisco López-Orozco, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Karla Olmos-Sánchez, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Julia Patricia Sánchez-Solís, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
Chapter 3	
Story Summarization Using a Question-Answering Approach	46
<i>Sanah Nashir Sayyed, Dr. Babasaheb Ambedkar Marathwada University, India</i>	
<i>Namrata Mahender C., Dr. Babasaheb Ambedkar Marathwada University, India</i>	

Chapter 14	
Pronominal Anaphora Resolution on Spanish Text	309
<i>Alonso García, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Martha Victoria González, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Francisco López-Orozco, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Lucero Zamora, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
Chapter 15	
Geospatial Situation Analysis for the Prediction of Possible Cases of Suicide Using EBK: A Case Study in the Mexican State of Aguascalientes.....	327
<i>Carlos Manuel Ramírez López, Universidad Politécnica de Aguascalientes, Mexico</i>	
<i>Martín Montes Rivera, Universidad Politécnica de Aguascalientes, Mexico</i>	
<i>Alberto Ochoa, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Julio César Ponce Gallegos, Universidad Autónoma de Aguascalientes, Mexico</i>	
<i>José Eder Guzmán Mendoza, Universidad Politécnica de Aguascalientes, Mexico</i>	
Chapter 16	
Location Extraction to Inform a Spanish-Speaking Community About Traffic Incidents.....	347
<i>Alejandro Requejo Flores, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Alejandro Ruiz, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Ricardo Mar, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Raúl Porras, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
Chapter 17	
Text Summarization and Its Types: A Literature Review	368
<i>Namrata Kumari, National Institute of Technology, Hamirpur, India</i>	
<i>Pardeep Singh, National Institute of Technology, Hamirpur, India</i>	
Chapter 18	
Extractive Text Summarization Methods in the Spanish Language	379
<i>Irvin Raul Lopez Contreras, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Alejandra Mendoza Carreón, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Jorge Rodas-Osollo, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
<i>Martiza Concepción Varela, Universidad Autónoma de Ciudad Juárez, Mexico</i>	
Section 3	
Text Mining Systems	
Chapter 19	
NLP and the Representation of Data on the Semantic Web	393
<i>Jose L. Martinez-Rodriguez, Universidad Autónoma de Tamaulipas, Mexico</i>	
<i>Ivan Lopez-Arevalo, CINVESTAV Tamaulipas, Mexico</i>	
<i>Jaime I. Lopez-Veyna, Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Zacatecas, Mexico</i>	
<i>Ana B. Rios-Alvarado, Universidad Autónoma de Tamaulipas, Mexico</i>	
<i>Edwin Aldana-Bobadilla, Conacyt, Mexico & Cinvestav Tamaulipas, Mexico</i>	

the authors offer an alternative to allow citizens to be informed about this kind of event so they can take preventive actions.

Chapter 17

Text Summarization and Its Types: A Literature Review 368

Namrata Kumari, National Institute of Technology, Hamirpur, India

Pardeep Singh, National Institute of Technology, Hamirpur, India

Text summarization is a compressing technique of the original text to form a summary which will provide the same meaning and information as provided by the original version. Summarizer helps in saving time and increasing efficiency. This chapter gives the full insight of text summarizers, which can be categorized based on methodology, function and target reader, dimension, and language. Various researches have been conducted in the field of text summarization using different approaches. Consequently, the chapter aims to provide an overview of how text summarizers work with different methods and state their domain-oriented applications. Additionally, the authors discuss multi-lingual text summarization in detail. This chapter focuses on showing the effectiveness and shortcomings of text summarization approaches by comparing them.

Chapter 18

Extractive Text Summarization Methods in the Spanish Language 379

Irvin Raul Lopez Contreras, Universidad Autónoma de Ciudad Juárez, Mexico

Alejandra Mendoza Carreón, Universidad Autónoma de Ciudad Juárez, Mexico

Jorge Rodas-Osollo, Universidad Autónoma de Ciudad Juárez, Mexico

Martiza Concepción Varela, Universidad Autónoma de Ciudad Juárez, Mexico

The quantity of information in the world is increasing every day on a fast level. This fact will be an obstacle in some situations; text summarization is involved in this kind of problem. It is used to minimize the time that people spend searching for information on the web and in a lot of digital documents. In this chapter, three algorithms were compared; all of them are an extractive text summarization algorithm. Popular libraries that influence the performance of these kinds of algorithms were used. It was necessary to configure and modify these methods so that they work for the Spanish language instead of their original one. The authors use some metrics found in the literature to evaluate the quality and performance of these algorithms.

Section 3

Text Mining Systems

Chapter 19

NLP and the Representation of Data on the Semantic Web 393

Jose L. Martinez-Rodriguez, Universidad Autónoma de Tamaulipas, Mexico

Ivan Lopez-Arevalo, CINVESTAV Tamaulipas, Mexico

Jaime I. Lopez-Veyna, Tecnológico Nacional de México, Mexico & Instituto Tecnológico de Zacatecas, Mexico

Ana B. Rios-Alvarado, Universidad Autónoma de Tamaulipas, Mexico

Edwin Aldana-Bobadilla, Conacyt, Mexico & Cinvestav Tamaulipas, Mexico

One of the goals of data scientists and curators is to get information (contained in text) organized and

Chapter 18

Extractive Text Summarization Methods in the Spanish Language

Irvin Raul Lopez Contreras

Universidad Autónoma de Ciudad Juárez, Mexico

Alejandra Mendoza Carreón

Universidad Autónoma de Ciudad Juárez, Mexico

Jorge Rodas-Osollo

 <https://orcid.org/0000-0001-6588-8336>

Universidad Autónoma de Ciudad Juárez, Mexico

Martiza Concepción Varela

Universidad Autónoma de Ciudad Juárez, Mexico

ABSTRACT

The quantity of information in the world is increasing every day on a fast level. This fact will be an obstacle in some situations; text summarization is involved in this kind of problem. It is used to minimize the time that people spend searching for information on the web and in a lot of digital documents. In this chapter, three algorithms were compared; all of them are an extractive text summarization algorithm. Popular libraries that influence the performance of these kinds of algorithms were used. It was necessary to configure and modify these methods so that they work for the Spanish language instead of their original one. The authors use some metrics found in the literature to evaluate the quality and performance of these algorithms.

DOI: 10.4018/978-1-7998-4730-4.ch018