

PROSODIC FEATURED BASED AUTOMATIC LANGUAGE IDENTIFICATION



NIRAJ SINGH

SIGNAL PROCESSING AND COMMUNICATION TECHNOLOGY

Prosodic Featured Based Automatic
Language Identification

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PREFACE

Imagine how would be the life of mankind without 'speech'; for the primary function of *speech* is *communication*. This book reflects the importance of speech for communication from a technical and signal processing view. Stress, rhythm and intonation of speech which reflects various properties of the speaker including the state of speaker, form of the utterance, the existence of sarcasm or irony are discussed in this book. Prosody and prosodic features of linguistics are explored in the chapters of this book. Prosody includes elements of speech and languages which may not be analyzed by choice of grammar or vocabulary. These suprasegmental features occur at higher level of an utterance and are not fixed within any one segment, proving it to form units as the chunks of speech or some real phonetic spurts. Ambiguity in sentences is resolved using prosody as because it performs parsing. From the two classifications, text-based language recognition and spoken language recognition, the latter is comparatively challenging and has been discussed in this book. The book is designed with an express interest as to build an automatic language identification system based on prosodic features.

ABOUT THE BOOK

Living beings inherently have the ability to differentiate languages as a part of human intelligence. Language Identification (LID) had been a science fiction in 1970's but today; it has been deployed in practical usage. The prosodic features of a speech are relatively simpler in their structure and are accredited to be very affective in some Language Recognition (LR) or LID tasks; irrespective of these features to be biased on numerous factors, as speaker's way of speaking, the culture and background of speaker. The book includes a series of experiments on several speech corpus with different classification or/and identification technique. At the end of each chapter, few review questions have been included and at the verge of the book, a short list of projects for research scholars has been mentioned in addition to a set of MCQs and Important questions. This book motivates for developing a multilingual LID system which can be widely used for betterment of mankind, particularly in the fields of Intelligence (Police/Military) services and medical care. In an overview, we may assert that the book explores various experimental datasets, for, performance analysis of LID system with News speech and Natural Conversation speech; Joint Factor Analysis for LR on prosodic featured models and for automatic LID using i-Vector based prosodic system.

ACKNOWLEDGEMENT

"I acknowledge the privilege of being alive in a human body at this moment, endowed with senses, memories, emotions, thoughts and the space of mind in its wisdom aspect".

- Alex Grey

This book would have always remained incomplete and unjustified without the acknowledgement of the ones and all who in one way or the other have made immense contribution in completion of this work.

Foremost, with benevolence I venerate My *Parents*, who taught me the art of living and My *Teachers*, who taught me the art of exploration. Above all, I extend my deepest gratitude with benevolent thanks to my mentor Prof. Anoop Singh Poonia, Pro-President (Pro-Vice Chancellor) VGU, Jaipur for constant encouragement, support and cooperation in addition to his technical support in all aspects.

I would express my heartfelt thanks to my friends and 'participants-of-this-work' who have supported in all possible measures I expected. Endless and inexpressible 'thanks' in my family who supported me with patience for upbringing of this book. I thank all my well-wishers.

Niraj Singh
Author

Dedicated To
Prof. Anoop Singh Poonia
Pro-President (Pro-Vice Chancellor)
Vivekananda Global University, Jaipur

TABLE OF CONTENTS

1	Introduction	01
1.1	Motivation	02
1.2	Scope and Aim	04
1.3	Review of Research Literatures	05
1.3	Executive Summary of Research	15
	Review Questions	21
2	Linguistics and Language Identification	22
2.1	Speech Signal and Linguistics	23
	2.1.1 Creation of Speech	24
	2.1.2 Language Distinction	25
2.2	Issues in Speech Processing	28
2.3	Fundamentals of Language Identification	31
2.4	Designing An LID System	35
	Review Questions	38
3	Prosodic Features of Speech and Its Analysis	39
3.1	Introduction	40
3.2	Prosodic Feature Extraction	44
3.3	I Vector Based Prosodic Features Extraction	45
3.4	Prosodic Analysis and	47

	Algorithms	
3.5	Prosodic Features With ASR Free Approaches	49
3.6	Prosodic Features With ASR Based Approaches	51
3.7	Prosodic Attribute Model	54
3.8	Prosodic Features and JFA Analysis	56
	Review Questions	59
4	LID Using Gaussian Mixture Analysis	60
4.1	Introduction	61
4.2	GMM and UBM	63
4.3	Maximum A-Posterior Parameter Estimation	67
4.4	Algorithm Used In Classification	73
4.5	Pictorial representation of the built LID system	75
	Review Questions	84
5	Design of a typical LID system	85
5.1	Database Development	86
5.2	Classification and Identification	89
5.2.1	Experimental Dataset 1	89
5.2.2	Experimental Dataset 2	90
5.2.3	Experimental Dataset 3	92
	Review Questions	94

6	Experiments And Results	95
6.1	Results	96
6.1.1	Experimental Dataset 1	96
6.1.2	Experimental Dataset 2	97
6.1.3	Experimental Dataset 3	99
6.2	Conclusion Of Research	101
6.3	Future Scope Of Work	106
	Review Questions	108
	Bibliography	109
	Appendix	113

Chapter 1

INTRODUCTION

1.1 Motivation

Speech based biometric system may qualify to be the best feasible approach in applications such as remote access control. This research broadly focuses on 'Linguistics and Language Identification' with an objective to build an Automatic Language Identification system to correctly and accurately identify the language being spoken. This research is being motivated by the recent advancement in the Signal Processing Communities having a wide vision of developing a society with highly robotic nature incorporated with lots of IT-Communications and Signal Processing Concepts.

Prosody is regardless one of the most important property inherent in speech, particularly in human auditory system. Prosody includes elements of speech and languages which may not be analyzed by choice of grammar or vocabulary. The stress, rhythm and intonation of speech reflecting the different properties of the speaker including the state of speaker, form of the utterance, the existence of sarcasm or irony.

The piece of work is motivated for developing an Automatic Language Identification to be applicable in Health Care or Medical Processes,

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Emergency Services, Investigations, Intelligence
and Security Service.

About the Author

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An alumnus of the prestigious Manipal Group, Niraj Singh, hails from the North Eastern states of India and is a research scholar in the field of digital communication at Vivekananda Global University, Jaipur. He has presented more than Twenty Five Research Articles in various International and National Conferences or Journals.

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