Speaker Models Database

Training

Testing

Create Speaker Models
(Template Generator)

Matching

Feature Extraction

Match Score

Pre-Processing

Accepted/Rejected

Voice Recorder

Automatic Speaker Recognition System

William J. J. Roberts,Defence science and technology organisation canberra (Australia),Electronics and Surveillance Research Laboratory (Australia)

Automatic Speaker Recognition System:

Automatic Speaker Recognition System for Telephone Speech Chiwei Che,1998   *Automatic Speech & Speaker Recognition* N. Rex Dixon,Thomas B. Martin,1979   Development of a Text-independent Automatic Speaker Recognition System Tumisho Billson Mokgonyakne,2021   **Automatic Speech and Speaker Recognition** Chin-Hui Lee,Frank K. Soong,Kuldip Paliwal,1996-03-31 Research in the field of automatic speech and speaker recognition has made a number of significant advances in the last two decades influenced by advances in signal processing algorithms architectures and hardware These advances include the adoption of a statistical pattern recognition paradigm the use of the hidden Markov modeling framework to characterize both the spectral and the temporal variations in the speech signal the use of a large set of speech utterance examples from a large population of speakers to train the hidden Markov models of some fundamental speech units the organization of speech and language knowledge sources into a structural finite state network and the use of dynamic programming based heuristic search methods to find the best word sequence in the lexical network corresponding to the spoken utterance Automatic Speech and Speaker Recognition Advanced Topics groups together in a single volume a number of important topics on speech and speaker recognition topics which are of fundamental importance but not yet covered in detail in existing textbooks Although no explicit partition is given the book is divided into five parts Chapters 1 2 are devoted to technology overviews Chapters 3 12 discuss acoustic modeling of fundamental speech units and lexical modeling of words and pronunciations Chapters 13 15 address the issues related to flexibility and robustness Chapter 16 18 concern the theoretical and practical issues of search Chapters 19 20 give two examples of algorithm and implementational aspects for recognition system realization Audience A reference book for speech researchers and graduate students interested in pursuing potential research on the topic May also be used as a text for advanced courses on the subject

Automatic Speaker Recognition System Alan Higgins,Joe Naylor,ITT DEFENSE COMMUNICATIONS DIV SAN DIEGO CA.,1984 The Defense Communications Division of ITT ITTDCD has developed an automatic speaker recognition ASR system that meets the functional requirements defined in NRL s Statement of Work This report is organized as follows Chapter 2 is a short history of the development of the ASR system both the algorithm and the implementation Chapter 3 describes the methodology of the system testing while Chapter 4 summarizes the test results In Chapter 5 we discuss some further testing that was performed using the GFM test material Conclusions derived from the contract work are given Chapter 6 Speech recognition JES   Text-independent, Automatic Speaker Recognition System Evaluation with Males Speaking Both Arabic and English Safi S. Alamri,2015   *Automatic Speaker and Speech Recognition* Joke Badejo,Tunji Ibiyemi,2013 Automatic speech recognition and speaker recognition have a lot of applications in personal identification access control and in the new man machine interface paradigm The existing applications in voice activated embedded systems solve the problem of recognition of the spoken words only or the problem of recognition of a speaker through the words uttered only The goal of

this project therefore is the development of a robust algorithm for both speech recognition and speaker verification An example of a target application of this work is speech dialing of mobile phones with a speaker verification front end in order to effect access control In view of the memory and computational constraints of embedded systems the dynamic time warping algorithm is used This project only considers isolated spoken digits The developed algorithm is coded in C language and can be ported to firmware for Arabic numeral digit recognition with a speaker verification front end for an embedded system like mobile phones The system produced a FAR of 13 33% and a FRR of 24 3% for a total of 70 true claims and 30 false claims It also had a word accuracy of 96 7%   *Hardware Implementation of an Automatic Speaker Recognition System Using Artificial Neural Networks* Viresh Moonasar,2002   Automatic Speaker Recognition Using Statistical Models William J. J. Roberts,Defence science and technology organisation canberra (Australia),Electronics and Surveillance Research Laboratory (Australia),1998 This report describes the automatic identification of speakers from their voices This process has application in forensics and in voice actuated security systems The implementation and theoretic underpinnings of a statistical based speaker recognition system are presented in addition to the performance of the system on standard speech corpora In a speaker verification experiment the system yielded an error rate of under 5 per cent when identical microphones are used for testing and training   *Human and Automatic Speaker Recognition over Telecommunication Channels* Laura Fernández Gallardo,2015-08-17 This work addresses the evaluation of the human and the automatic speaker recognition performances under different channel distortions caused by bandwidth limitation codecs and electro acoustic user interfaces among other impairments Its main contribution is the demonstration of the benefits of communication channels of extended bandwidth together with an insight into how speaker specific characteristics of speech are preserved through different transmissions It provides sufficient motivation for considering speaker recognition as a criterion for the migration from narrowband to enhanced bandwidths such as wideband and super wideband   *Information Security for Automatic Speaker Identification* Fathi E. Abd El-Samie,2011-06-07 The author covers the fundamentals of both information and communication security including current developments in some of the most critical areas of automatic speech recognition Included are topics on speech watermarking speech encryption steganography multilevel security systems comprising speaker identification real transmission of watermarked or encrypted speech signals and more The book is especially useful for information security specialist government security analysts speech development professionals and for individuals involved in the study and research of speech recognition at advanced levels   *Finding Difficult Speakers in Automatic Speaker Recognition* Lara Lynn Stoll,2011 The task of automatic speaker recognition wherein a system verifies or determines a speaker s identity using a sample of speech has been studied for a few decades In that time a great deal of progress has been made in improving the accuracy of the system s decisions through the use of more successful machine learning algorithms and the application of channel compensation techniques and other methodologies aimed at addressing sources of errors such as noise or data

mismatch In general errors can be expected to have one or more causes involving both intrinsic and extrinsic factors Extrinsic factors correspond to external influences including reverberation noise and channel or microphone effects Intrinsic factors relate inherently to the speaker himself and include sex age dialect accent emotion speaking style and other voice characteristics This dissertation focuses on the relatively unexplored issue of dependence of system errors on intrinsic speaker characteristics In particular I investigate the phenomenon that some speakers within a given population have a tendency to cause a large proportion of errors and explore ways of finding such speakers There are two main components to this thesis In the first I establish the dependence of system performance on speakers building upon and expanding previous work demonstrating the existence of speakers with tendencies to cause false alarm or false rejection errors To this end I explore two different data sets one that is an older collection of telephone channel conversational speech and one that is a more recent collection of conversational speech recorded on a variety of channels including the telephone as well as various types of microphones Furthermore in addition to considering a traditional speaker recognition system approach for the second data set I utilize the outputs of a more contemporary approach that is better able to handle variations in channel The results of such analysis repeatedly show variations in behavior across speakers both for true speaker and impostor speaker cases Variation occurs both at the level of speech utterances wherein a given speaker s performance can depend on which of his speech utterances is used as well as on the speaker level wherein some speakers have overall tendencies to cause false rejection or false alarm errors Additionally lamb ish speaker behavior where the speaker tends to produce false alarms as the target is correlated with wolf ish behavior where the speaker tends to produce false alarms as the impostor On the more recent data set 50% of the false rejection and false alarm errors are caused by only 15 25% of the speakers The second component of this thesis investigates a straightforward approach to predict speakers that will be difficult for a system to correctly recognize I use a variety of features to calculate feature statistics that are then used to compute a measure of similarity between speaker pairs By ranking these similarity measures for a set of impostor speaker pairs I determine those speaker pairs that are easy for a system to distinguish and those that are difficult to distinguish A variety of these simple distance measures could successfully select both easy and difficult to distinguish speaker pairs as evaluated by differences in detection cost and false alarm probability across a large number of systems Of those tested the best feature measure at finding the most and least difficult to distinguish speaker pairs was the Euclidean distance between vectors of the mean first second and third formant frequencies Even greater success was attained by the Kullback Liebler KL divergence between pairs of speaker specific GMMs Furthermore an examination of the smallest and biggest distances as computed by the KL divergence revealed individual speaker tendencies to consistently fall among the most or least difficult to distinguish speaker pairs I then develop an approach for finding those individual speakers who will be difficult for the system using a set of feature statistics calculated over regions of speech In particular a support vector machine SVM classifier is trained to

distinguish between difficult and easy speaker examples in order to produce an overall measure of speaker difficulty as a target or impostor The resulting precision and recall measures were over 0 8 for difficult impostor speaker detection and over 0 7 for difficult target speaker detection Depending on the application the detection threshold can be tuned to improve precision recall or specificity in order to best suit the needs of a particular task The same approach can be taken with single conversation sides as with a set of conversation sides corresponding to the same speaker since the input feature statistics can be calculated over any number of speech samples   Forensic Speaker Recognition Amy Neustein,Hemant A. Patil,2011-10-05 Forensic Speaker Recognition Law Enforcement and Counter Terrorism is an anthology of the research findings of 35 speaker recognition experts from around the world The volume provides a multidimensional view of the complex science involved in determining whether a suspect s voice truly matches forensic speech samples collected by law enforcement and counter terrorism agencies that are associated with the commission of a terrorist act or other crimes While addressing such topics as the challenges of forensic case work handling speech signal degradation analyzing features of speaker recognition to optimize voice verification system performance and designing voice applications that meet the practical needs of law enforcement and counter terrorism agencies this material all sounds a common theme how the rigors of forensic utility are demanding new levels of excellence in all aspects of speaker recognition The contributors are among the most eminent scientists in speech engineering and signal processing and their work represents such diverse countries as Switzerland Sweden Italy France Japan India and the United States Forensic Speaker Recognition is a useful book for forensic speech scientists speech signal processing experts speech system developers criminal prosecutors and counter terrorism intelligence officers and agents   **Automatic Speech and Speaker Recognition** Chin-Hui Lee,Frank K. Soong,Kuldip K. Paliwal,2012-12-06 Research in the field of automatic speech and speaker recognition has made a number of significant advances in the last two decades influenced by advances in signal processing algorithms architectures and hardware These advances include the adoption of a statistical pattern recognition paradigm the use of the hidden Markov modeling framework to characterize both the spectral and the temporal variations in the speech signal the use of a large set of speech utterance examples from a large population of speakers to train the hidden Markov models of some fundamental speech units the organization of speech and language knowledge sources into a structural finite state network and the use of dynamic programming based heuristic search methods to find the best word sequence in the lexical network corresponding to the spoken utterance Automatic Speech and Speaker Recognition Advanced Topics groups together in a single volume a number of important topics on speech and speaker recognition topics which are of fundamental importance but not yet covered in detail in existing textbooks Although no explicit partition is given the book is divided into five parts Chapters 1 2 are devoted to technology overviews Chapters 3 12 discuss acoustic modeling of fundamental speech units and lexical modeling of words and pronunciations Chapters 13 15 address the issues related to flexibility and robustness Chapter 16 18

concern the theoretical and practical issues of search Chapters 19 20 give two examples of algorithm and implementational aspects for recognition system realization Audience A reference book for speech researchers and graduate students interested in pursuing potential research on the topic May also be used as a text for advanced courses on the subject

<u>Automatic Speaker Recognition Over Military Communication Systems. A Feasibility Evaluation</u> S. S. Everett,NAVAL RESEARCH LAB WASHINGTON DC.,1985 Automatic speaker recognition ASR offers potential benefit for numerous Navy situations including indentification of users of communication channels such as the telephone and channels using processed or vocoded speech Currently the user must subjectively determine whether the person on the other end of the line is who he or she claims to be However past research has shown that ASR systems are capable of higher recognition accuracy than human listeners under certain circumstances This report discusses a series of tests conducted to evaluate the feasibility of performing ASR using vocoded speech The analog outputs of six different Department of Defense voice processors were used as input to a real time ASR system Data transmission rates of these processors ranged from 2400 to 64 000 bits per second Recognition accuracy results for the processed speech were 70 to 95% using a 2500 Hz bandwidth input filter and 75 to 95% using a 4000 Hz input filter These results indicate that ASR using vocoded speech is definitely possible though further research is needed to determine which speech parameters are best suited for use with each voice processor *Automatic Speaker Recognition for Military Applications: Applications Survey and Operational Requirements* S. S. Everett,NAVAL RESEARCH LAB WASHINGTON DC.,1985 Automatic speaker recognition ASR systems capable of identifying a person based on voice input alone have a wide range of potential applications in Navy environments They could provide access control to restricted areas equipment and information They could verify the identity of users of various communication channels or verify computer users through terminals accepting voice input This report presents the results of a survey conducted to determine which type of application offers the best potential use of ASR for the Navy The survey results also give a rough indication of the operational requirements of ASR systems in Naval environments In designing an ASR system for a particular application there are a number of factors regarding the user and the environment that must be taken into consideration These factors and their impact on the operational requirements are discussed in detail The appendix of this report outlines the various approaches to ASR and the major ASR systems described in the literature Author <u>Speaker Recognition</u> Bandar Hezam,2023-12-06 Bachelor Thesis from the year 2019 in the subject Engineering Computer Engineering grade A National University of Malaysia Apu course Mechatronics language English abstract Voice recognition is a computer software program or hardware device with the ability to decode the human voice Voice recognition is a system that allows for a secure method of authenticating speakers the system work in such a way that it general speaker model during the enrollment phase which based on the speaker characteristics The system testing phase typically involves making a claim on the identity of an unknown speaker using the given speech characteristics and the trained models However speaker

identification is known to be one among the two categories of speaker recognition system because speaker recognition can be categorized also as speaker verification whereas the main difference between both speaker identification and speaker verification ensure to known if the person speaking and claim to be is fully verified while speaker identification make multiple decision by comparing of the person speaking with the one trained or store in database as an attempt to identify the speaker The interest of the assignment is speaker identification therefore speaker identification is the main focus for this study   *Robust Automatic Speech Recognition* Jinyu Li,Li Deng,Reinhold Haeb-Umbach,Yifan Gong,2015-10-30 Robust Automatic Speech Recognition A Bridge to Practical Applications establishes a solid foundation for automatic speech recognition that is robust against acoustic environmental distortion It provides a thorough overview of classical and modern noise and reverberation robust techniques that have been developed over the past thirty years with an emphasis on practical methods that have been proven to be successful and which are likely to be further developed for future applications The strengths and weaknesses of robustness enhancing speech recognition techniques are carefully analyzed The book covers noise robust techniques designed for acoustic models which are based on both Gaussian mixture models and deep neural networks In addition a guide to selecting the best methods for practical applications is provided The reader will Gain a unified deep and systematic understanding of the state of the art technologies for robust speech recognition Learn the links and relationship between alternative technologies for robust speech recognition Be able to use the technology analysis and categorization detailed in the book to guide future technology development Be able to develop new noise robust methods in the current era of deep learning for acoustic modeling in speech recognition The first book that provides a comprehensive review on noise and reverberation robust speech recognition methods in the era of deep neural networks Connects robust speech recognition techniques to machine learning paradigms with rigorous mathematical treatment Provides elegant and structural ways to categorize and analyze noise robust speech recognition techniques Written by leading researchers who have been actively working on the subject matter in both industrial and academic organizations for many years

Behavioral Biometrics for Human Identification: Intelligent Applications Wang, Liang,Geng, Xin,2009-08-31 This edited book provides researchers and practitioners a comprehensive understanding of the start of the art of behavioral biometrics techniques potential applications successful practice and available resources Provided by publisher

Handbook of Communication in the Legal Sphere Jacqueline Visconti,2018-09-24 This volume explores communication and its implications on interpretation vagueness multilingualism and multiculturalism It investigates cross cultural perspectives with original methods models and arguments emphasizing national EU and international perspectives Both traditional fields of investigations along with an emerging new field Legal Visual Studies are discussed Communication addresses the necessity of an ongoing interaction between jurilinguists and legal professionals This interaction requires persuasive convincing and acceptable reasons in justifying transparency visual analyses and dialogue with the relevant

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Enjoying the Melody of Expression: An Emotional Symphony within **Automatic Speaker Recognition System**

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