



Development of Language Resource and Automatic Speech Recognition System for Pashto

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Introduction

PASHTO

- ▶ one of the widely spoken languages of the world
- ▶ 55 million speakers approximately
- ▶ no significant research work exists for Pashto
- ▶ deserves the attention of researchers;
 - ▶ to develop language resource
 - ▶ to develop speech recognition system
- ▶ This is the overview of the current work on the development of language resource for Pashto and Automatic Speech Recognition of Pashto.
 - ▶ Isolated words corpus
 - ▶ Speech recognition framework

QUICK FACTS



Image: www.worldatlas.com

Industrial Solutions;

- ▶ Voice Operated Machines
- ▶ Surgical Robots
- ▶ E-health Services
- ▶ Multimodal Biometric Security



▶ **Such applications should also be available for Pashto speakers**

▶ The majority of the population is left unattended, given the poor law and order situations, natural disasters like, tough terrains, strict cultural norms and natural disasters like earth quakes, floods etc.

▶ **LACK OF COMMUNICATION INTERFACE**

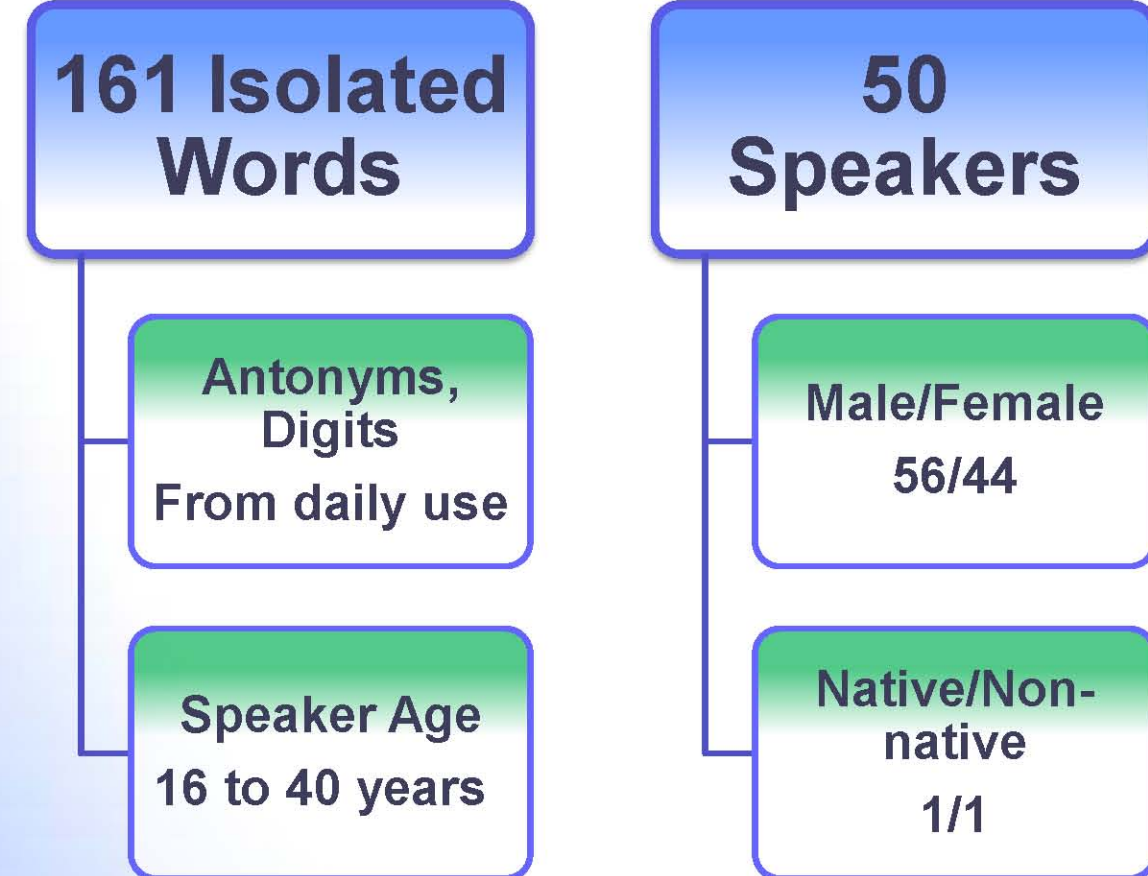
CHALLENGES

Standard Database Development – SPEECH CORPUS

- Dialect**
 - Wide Difference
 - Northern Pashto, Central Pashto, Southern Pashto
- Phonemes**
 - No standard set of phonemes
 - Speech Recognition is Phone Recognition
- Native Speakers**
 - Unfavorable law and order situation
 - Partially addresses by Speakers' Mobility

Current Research

DEVELOPMENT OF SPEECH CORPUS

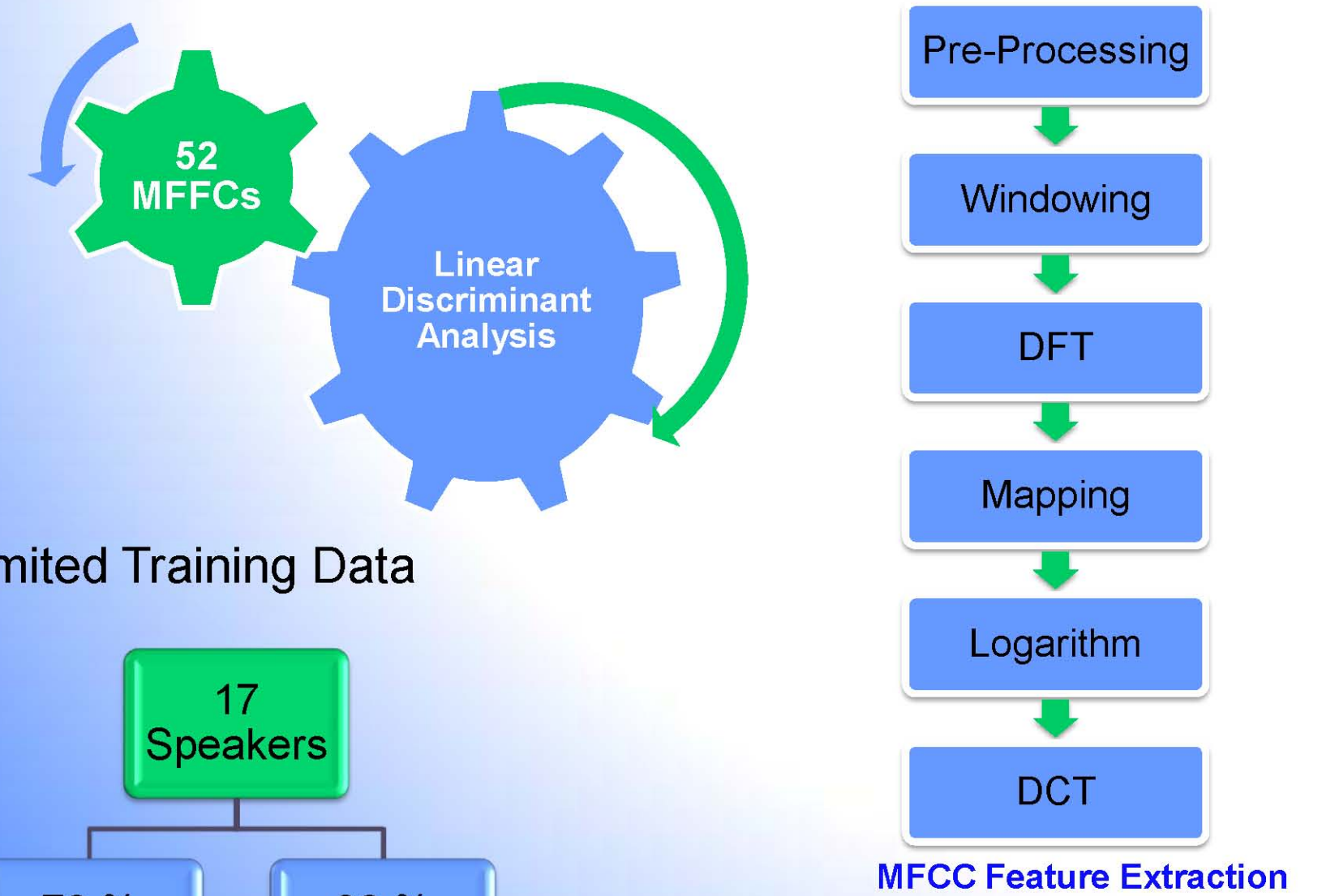


Representation

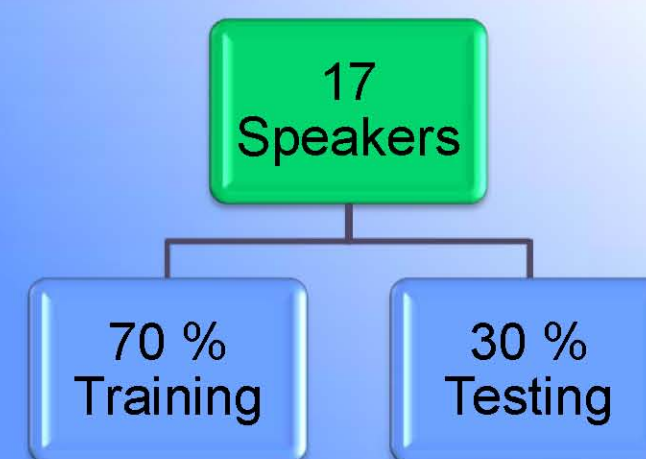
AaMY001					Group	Age (Years)	Letters
First Speaker	Age Group G2	Male	Native	Word 001	G1	16 - 25	aa
					G2	26 - 30	Aa
					G3	31 - 35	aA
					G4	36 - 40	AA

AUTOMATIC SPEECH RECOGNITION

- ▶ 52 Mel-Frequency Cepstral Coefficients (MFCCs)
- ▶ Linear Discriminant Analysis for Classification



Limited Training Data



RESEARCH SIGNIFICANCE

Free Interaction and Communication for Pashto to Non-Pashto Speakers

- ▶ E-health facilities
- ▶ Education Technology Services
- ▶ Cultural Exchanges



References

- [1] Arbab Waseem Abbas, Nasir Ahmad, and Hazrat Ali, "Pashto Spoken Digits Database for the Automatic Speech Recognition research," in 18th International Conference on Automation and Computing Research, Loughborough University, Leicestershire, UK, September 8, 2012, pp. 363-366.
- [2] Irfan Ahmad, Nasir Ahmad, Hazrat Ali, and Gulzar Ahmad, "The Development of Isolated Words Pashto Automatic Speech Recognition System," in 18th International Conference on Automation and Computing Research, Loughborough, Leicestershire, UK, September 8, 2012, pp. 348-351.
- [3] Hazrat Ali, Nasir Ahmad, Khawaja Yahya, and Omar Farooq, "A Medium Vocabulary Urdu Isolated Words Balanced Corpus for Automatic Speech Recognition", in 2012 International Conference on Electronics Computer Technology (ICECT 2012), Kanyakumari, India, 2012, pp. 473-476.