

Preface

Voice-based call centers or business process outsourcing units generate huge amounts of speech data everyday during their day-to-day operations. Large and diverse types of information are hidden in these natural language conversations, which is begging to be exploited. The whole area of voice analytics deals with the aspect of deriving *usable* information from the audio data.

Conventionally, speech data converted to text followed by natural language text processing has been used to derive analytics. However, this traditional process of analyzing audio conversations has several major limitations. On one hand, the fact remains that conversion of natural language spoken conversation into text is still maturing even for languages which are well researched and rich in language resources, like English, which hampers the process of analyzing call center audio conversations. On the other hand, understanding aspects of audio conversations by text analysis is not comprehensive. How does one distinguish a */thank you/* spoken in jest and sarcasm versus */thank you/* spoken with gratitude by analyzing just the text “*Thank You*”? Further from a call center perspective, many a times the audio conversation needs to be analyzed with the simple requirement to spot an abnormal call from a normal call in which case the process of speech to text conversion would be an overkill.

In this short monograph, we will dwell on how non-linguistics features associated with spoken conversation can be used to infer information embedded in the call conversation. While the use of non-linguistic analysis can give insight into important aspects of how the conversation happened without worrying about what is the actual linguistic content of the conversation. Additionally, non-linguistic analysis eliminates the need to adopt a not-so-reliable speech to text conversion process, which gives us the flexibility of being able to analyze conversation with little dependency on the content and language of conversation.

This monograph is divided into six chapters. Chapter 1 gives an overview of the process of spoken articulation from an idea or a thought and tries to bring out the different facets of information that is embedded in spoken speech like the owner of the speech, the content of the speech and style of speech. The second part shifts to give an idea of why people still use telephone channel to sort out

their problems even under the scenario of several channels being available to them. This motivates the need for analyzing call center conversation and gives some insight into how the enterprise can benefit by deep diving into audio conversation data.

Chapter 2 covers the general process adopted for voice analytics after giving an idea of how a typical audio conversation at a call center is initiated and recorded for analysis. We also cover the entire process to convert the recorded audio conversation to make the audio data suitable for analysis. There is a section on music voice separation, speaker separation, and speech to text conversion. We portray the challenges involved in the process of speech to text.

Chapter 3 is brief and dwells into the constituent of a typical call conversation and highlights the drawback of a manual analysis which points toward the need for an automated analysis of the call conversation.

Chapter 4 talks of the non-linguistic speech processing of call center audio conversation. We specifically speak in detail of two speech features, the speaking rate, and the emotion in speech.

Chapter 5 is essentially a case study which gives details of how non-linguistic features can be used to distinguish a normal call from an abnormal audio conversation based on some analysis of some real call center audio conversation recordings and we conclude in Chap. 6. All the chapters are amply supported by additional reading material in the form of Appendices and references.

Call Center Voice Analytics is an important area of work and constantly evolving, especially with (a) significant growth in services industry and (b) people sticking to telephone channel and not demonstrating any sign of shifting to other channels for customer care interaction. We believe this monograph will be of use to practicing engineer as well as researchers working on speech signal processing. You should be able to follow updates at <https://sites.google.com/site/nlccanalytics/>.

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Sunil Kumar Kopparapu

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Kopparapu, S.K.

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