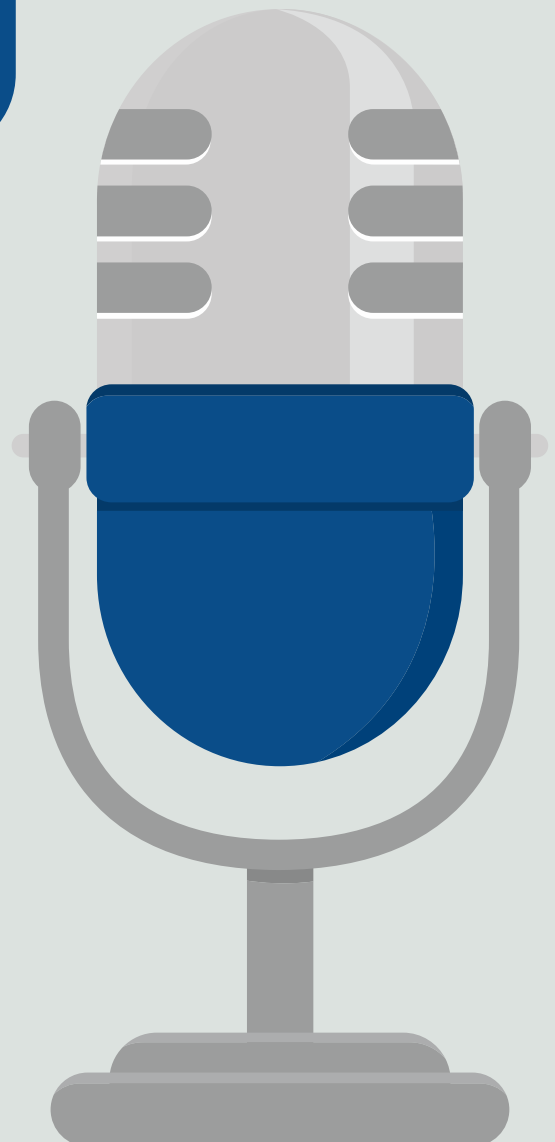
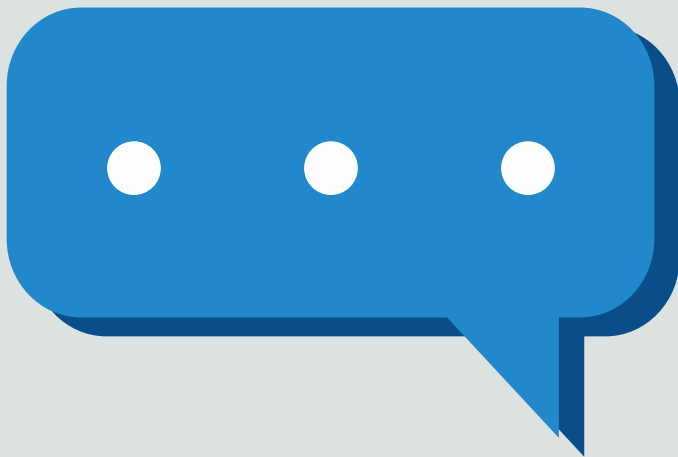




THE GROWING RELEVANCE, DEMAND, AND BENEFITS OF SPEECH RECOGNITION TECHNOLOGY



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Executive Summary

Technology continues to advance at lightning speed, contributing immensely to social and economic well-being. Over the last decade or so, Speech Technology has grown leaps and bounds, redefining the way humans interact with devices. It has helped the likes of individuals and enterprises to get access to curated information and insights without hassles.

This paper throws light on one of the fastest growing subjects in recent times and aims to get you acquainted with the historical aspects along with latest developments in this field. For decision makers exploring latest technologies to drive business growth and influence consumer behavior, this article also talks about disruptive products in Speech-Tech. The case studies followed by details of popular products from the industry is aimed at contributing to the knowledge base ■

Introduction

The development of speech as a form of communication evolved parallelly with the evolution of life. Out of the various forms of communication, speech is the most sought after since it aids exchange of information in an easy manner. Humans speak in a little over 6,500 languages around the world, most of which carry a rich legacy and following. It is one of the oldest academic disciplines in the history of formal education.

The intriguing aspects of speech such as its ability to relay information have been put under the technological scanner by inventors and technologists since the 1930s ■

What is Speech Recognition Technology?

A broad-based term, Speech Tech is a multi-disciplinary approach that primarily deals with recognition of human voice to aid a specific purpose. The technology is primarily driven by disciplines such as **Linguistics, Computer Science, Electrical Engineering** and **Statistics**. This field evolved in the 1930s with a project from Bell Labs where researchers worked on analyzing the science of speech perception.

Application of Speech Tech in day-to-day life

1) Voice Assistant: The most visible use of speech recognition is led by Voice Assistant on cellular and computer devices. Here, computer programs respond to the voice of the speaker by offering intelligent functions such as performing tasks or locating a service online.

2) Car Systems: In a similar function, as above, In-Car systems convert voice prompts/keywords from the speaker to operate and control the infotainment device. Some of the most common functions are switching the audio/playlist, making phone calls etc

Business Applications

1) Voice Biometrics: A fool-proof authentication system which uses voice based password to authorize access to the system. Voice prints of humans are unique and therefore, this technology harnesses the power of speech to authenticate and prevent fraud.

2) Voice Documentation: In industries, such as Healthcare, medical documentation is a critical juncture where dictators such as doctors and specialists use speech technology to relay medical information. It gets converted to text and goes into the file of the patient.

3) Speech Analytics: A form of business analytics which is gaining momentum in the business world. This multi-dimensional aims to gather intelligent insights from agent-customer interactions ■

History of Speech Recognition Technology



- The history of **Speech Recognition** dates to the early **1930s** where prominent researchers from Bell Labs initiated a project to understand speech perception as a form of science.
- In just under two decades, a breakthrough was achieved where speech recognition machines started interpreting numbers. This was led by the **Audrey System**, conceptualized and designed by Bell Labs.
- Following a series of significant achievements, major labs across USA, Soviet Union, and Japan started experimenting with customized hardware which could recognize spoken sounds. This was evident from lab trials conducted in the **1950s and 60s**.
- The field of Speech Recognition moved to the next level in the U.S with the government funded **DARPA** Speech Understanding Research (SUR) program. Sponsored by the U.S Department of Defense, this project was carried out between 1971 to 1976 and set a benchmark for private researchers.
- The era of **1980s** was all about increasing the ability of speech recognition machines to understand thousands of words from the hundreds they understood previously.
- In the 1990s, **Dragon Dictate**, a speech recognition product for end users brought about a tectonic shift in the usage of speech recognition by the masses.
- During the early years of 21st century, tech behemoths **Google** and **Apple** integrated voice recognition technology in the products they sold to the masses.

In the current scenario, **Siri** and **Cortana** have become a household name. On the sidelines, enterprises have also been heavily adopting **Speech Analytics** to drive customer engagement and enhance revenue ■

Major achievements in the field since the 1950s

- The **Shoebbox** machine from IBM which comprehended 16 English words (1961).
 - **Harpy** – A system from Carnegie Mellon that understood 1011 words (1976).
 - **Hidden Markov Model** – A Pathbreaking statistical method (1970s).
 - **Dragon Dictate** – Speech recognition suite for consumers (1997).
 - **VAL**, A voice portal from BellSouth helped in boosting the IVR system (Interactive Voice Response) (1996).
 - **Google's Voice Search** feature on Android phones & **Siri** from Apple (2010).
-

Relevance & the need to harness Speech for Business Augmentation, Profitability & Cost Optimization

Customer's Voice - The Importance of Each Interaction

A customer facing organization encounters multiple challenges in servicing and retaining the customer base. As companies grow bigger by means of customer acquisition and expansion, it is paramount for business leaders to maintain a fool-proof and robust servicing system to cater to the ever-growing needs.

If the business organization works on a B2C model, the necessity to utilize the power of speech as a formidable medium is paramount. Here are a few perks of digging into the voice interactions of the existing and potential clientele ■

Business Augmentation

The need to augment existing business operations and venture into scalable opportunities has never been so evident before. Here is how **“Voice of the customer”** helps in this regard.

- Since speech happens to be the most prolific form of communication, you get finer insights into loyalty and expectations from the brand. By using Speech Analytics, you can easily gauge the feedback and offer additional products/services.
- It helps in customizing, tweaking and improving an existing product/service and design new ones, adding monetary value to the business.
- The reports generated by enterprise tools help in training customer-facing representatives, thereby contributing to the quality of service offered.
- Most importantly, it offers intriguing insights which humans may not be able to detect during interactions with the customers. This feature helps a business effectively plan product launches and venture into newer avenues ■

Profitability

The revenues earned and profits made speaks volumes of the brand image and the expectations of shareholders. Here is how **giving an ear to customer's voice** helps in this regard.

- Customer retention and loyalty can be a painstaking process for the business owner. Customers do not sign off a product/service purely on the merits of competitive pricing. Since most of the interactions happen over the phone, knowing his/her intent can do wonders in this area.
- It helps in improving critical operations such as “Customer Service”, thereby equipping representatives with resources to confidently sell additional products.
- A happy and satisfied customer does not shy away from “referring” members of family and friends, offering incentives in the form of an extra sale for the company.
- Deploying this technology also helps in tweaking the existing product portfolio by way of insights from feedback from the customer base, helping in positioning and boosting profits ■

Cost Optimization

Over the last few decades, companies of all sizes have been pushing cost control under the spotlight. It's paramount for organizations to detail and scrutinize the standard processes to mine cost cutting opportunities.

Speech Technology is one such formidable option which helps in cost optimization.

- It helps a Contact Center in identifying and plugging the issues which lead to a high AHT (Average Handling Time) and thereby directly helping in controlling operating costs.
- Speech based tools are designed to help leaders manage staffing and resource issues. It digs deep into the processes by offering insights that can help in cutting down on human resources and logistics.
- Indirectly, tools such as Voice Biometrics and Speech Analytics avoid/detect acts that are either malicious or fraudulent in nature, thereby impacting legal and compliance costs.
- For larger issues, it helps in Root-Cause Analysis, Workforce Management, KPIs and other key metrics where a company can save money ■

Case Study

The following study will help in understanding how Speech Technology aims to offer multiple benefits along with optimal ROI for the enterprise.

1. Speech Analytics Deployment

- **Description:** After years of operations, the phone-based Customer Service organization of a telecom giant decides to reimage itself to sync with the latest trends in customer service.

It also wishes to recapture its past reputation as one of the best customer service in the country.

- **The Challenge:** In its quest to turn around prospects, the management is primarily looking at increasing sales opportunities over the phone and optimizing resources to balance all the sub-processes.

The Contact Center consists of over 1,500 agents and supervisors, making it a mammoth task for the business analysts to drive this project.

- **The Solution:** Driven by Speech Analytics deployment with the help of a leading Speech-tech company, customer interactions were mined to arrive at meaningful insights. In just under 3 months, the company successfully meet the objectives.

In the next 6 months, it derived an optimal ROI with the increase in revenue and profitability. With improved customer service by way of Workforce Management, it reclaimed its market position as the number 1 after-sales service provider ■

Speech Based Products for Enterprises

There are multiple channels through which a company can leverage the benefits offered. This technology is available in nearly all major languages spoken around the world. Let's explore some of the most prominent products available for enterprise use.

1) Speech Analytics



A highly customizable solution which offers intelligent insights from customer interactions. This software aided product is designed to help contact centers and other customer-facing functions in understanding the customer's intent, detects emotions etc. For the management, the algorithm-

driven tool helps in enhancing customer experience, increase revenues, optimize costs & improve regulatory compliance.

auMina - Speech Analytics Solution from Uniphore

The latest version 2.4 helps enterprises in getting deeper insights into customer interactions and offers benefits across various areas of business operations. Its multi-pronged approach helps in

- Solving business problems by harnessing customer interactions
- Improving product lifecycle and carrying out product enhancements
- Automation and optimizing productivity
- Improving performance of client-facing staff
- Identifying up-selling and cross-selling opportunities

The current version of auMina comes in various packs as per the requirement of specific industries.

In the world of Speech Technology, Speech Analytics is the flagship offering. Let's look at how Analytics in Speech helps various industries in understanding the customer's voice ■

1) Sales Analysis: Analysis of sales through gauging Intent to Buy, Sales Pitch Effectiveness, Conversion and Non-Conversions (Cross Sell/Up Sell).

2) Sales Promotion: Analysis of sales promotion effectiveness like media promotion, outbound calling, SMS campaigns.

3) Collection & Risk: Analyze Collector effectiveness, intent to pay and overall collection risk.

4) Legal Compliance: Analysis of adherence to script and compliance with regulatory guidelines.

5) Churn Propensity: Analysis of repeat callers, customer sentiment and correlation of customer CRM data to gauge Customer's propensity to churn.

6) NPS & CES: Analysis of NPS & CES to measure customer advocacy levels and brand loyalty.

7) Complaint Analysis: Analysis of complaints like network, billing, deductions etc. and providing RCA.

8) Supply Chain: Analysis of calls reporting supply chain issue and providing root cause analysis of overall supply chain management.

9) Repeat Call Analysis/FCR: Identifying issues that drive repeat calls and eliminate those for First Call Resolution.

10) Call Categorization: Automated & detailed call categorization beyond disposed outcome by executives ■

1) BFSI

- Sales Analysis
- Collections and Risk Analysis
- Legal Compliance
- NPS & CES
- Legal Compliance

2) Telecom

- Sales Analysis
- Complaint Analysis
- Churn Propensity
- NPS & CES

3) Travel & Airlines

- Complaint Analysis
- Sales Analysis
- Sales Promotion
- Churn Propensity
- NPS & CES

4) E-Commerce & FMCG

- Supply Chain
- Sales Analysis
- Complaint Analysis
- Sales Promotion
- NPS & CES

2) Voice Biometrics



In the wake of a multi-fold increase in online fraud, hackers are easily able to gain access to systems making conventional channels of “logging-in” a risky affair. Psychologically, it can be quite a tedious task to remember multiple user ids and passwords. Under such circumstances, Voice

Biometrics can be a fool proof replacement where the unique voice print can act as a strong authentication medium.

For enterprises, deploying Voice Biometrics not only helps in minimizing losses, but also contributes to the brand building exercise ■

amVoice – Uniphore's Voice Biometrics Offering

This patented solution from Uniphore helps enterprises in many ways such as eliminating fraud in consumer transactions, contributes to information security, prevents fraud originating internally and much more. Here are some of the perks of amVoice.

- Replaces conventional methods of authentication by using voice prints
- Independent of the device or the language
- Records the unique characteristics of an individual's voice
- The voice-print can be easily matched with the database for authentication

3) Virtual Assistant



In today's fast-paced world, consumers expect top-notch service from brands in the shortest time possible. The “Digital Consumer” seems to be getting accustomed to the self-service or DIY concept.

Akin to voice assistants such as Siri or Cortana on computer devices, a Virtual Assistant service for enterprises is changing the way it interacts with customers. This enterprise product helps organizations integrate existing support systems to offer an intuitive service to its customer base.

akeira – Patented Virtual Assistant Product from Uniphore

Offered in over 25 global languages backed by 150 dialects, **akeira** responds to unstructured customer queries on the IVR with accurate answers. It uses NLP (Natural Language Processing) to offer solutions without human intervention. Here are some of the benefits of integrating Akeira with your existing telephone system.

- Voice-based transactions find a faster resolution. It works on multiple devices
- Enhances “Customer Experience” by ensuring first call resolution, thereby minimizing escalations
- Offers intriguing ways for Cost optimization and Resource Utilization
- Can be easily deployed across various mediums of interaction such as websites, mobile apps, Telephone Systems & Kiosks ■

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Uniphore Software Systems is headquartered in IIT Madras Research Park, Chennai. Uniphore was incubated in IIT Chennai, India in 2008 and currently has offices in India, Philippines, and U.A.E with about 100 employees spread across all locations. Uniphore's investors include Kris Gopalakrishnan, IDG Ventures India, India Angel Network, Yournest Fund, Stata Ventures. Uniphore has worked with over 70 enterprise customers and served over 4 million end users. Uniphore was recognized by Deloitte as a Technology Fast 500 company in Asia Pacific in 2014 and was also ranked as the 10th fastest growing technology company in India by Deloitte Fast 50 in 2015. Uniphore's Co-Founder & CEO, Umesh Sachdev was recognized by the TIME Magazine list of 2016 amongst "10 Millennials Changing The World", and with India's edition of MIT Technology Review's 'Innovators Under 35' for the year 2016.