



# International Journal of Innovative Research in Science Engineering and Technology (IJIRSET)

*(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)*



**Impact Factor: 9.935**

**Volume 15, Issue 5, May 2026**

# Speech Application Language Tags

**P Shirisha<sup>1</sup>, Ms.Maheshwari M Desai<sup>2</sup>**

PG Student, Dept. of MCA, City Engineering College, Bengaluru, Karnataka, India<sup>1</sup>

Assistant Professor, Dept. of MCA, City Engineering College, Bengaluru, Karnataka, India<sup>2</sup>

**ABSTRACT:** Speech Application Language Tags are an essential component in modern speech technologies that help systems accurately identify, process, and respond to different languages and dialects. In an introductory session on this topic, participants will learn how language tags are used to represent linguistic information in speech-based applications such as voice assistants, speech recognition systems, and text-to-speech engines. The meeting will address the basics of standardized language tagging formats, including how they define language, region, and script variations to ensure precise communication between systems. Through practical examples and demonstrations, Participants will learn how language tags improve the performance of multilingual applications by enabling accurate language detection, pronunciation, and contextual understanding. Additionally, participants will investigate how these tags support seamless integration across platforms and enhance accessibility for users from diverse linguistic backgrounds. By the end of the course, students will have a firm grasp on how to use and make use of language tags in voice applications. This fundamental understanding will enable them to build more inclusive, efficient, and intelligent speech-enabled systems, making it valuable for both beginners and those looking to expand their expertise in speech and language technologies.

## I. INTRODUCTION

Speech Application Language Tags are essential in modern speech technologies for identifying and processing different languages and dialects accurately. They provide a standardized way to represent language information in applications such as voice assistants, speech recognition (ASR), and text-to-speech (TTS) systems. By using language tags, systems can deliver more accurate and culturally appropriate responses. Standardization is provided by Internet Engineering Task Force through BCP 47, which defines formats like “en-US” and “te-IN” for language and regional identification. Language tags play a key role in enabling multilingual and cross-lingual communication. They allow systems to switch between languages based on user preferences, improving accessibility for diverse users. Additionally, they enhance speech recognition and synthesis accuracy by selecting appropriate language and acoustic models. Modern APIs make it easy for developers to integrate language tagging, enabling personalized responses and better user experience. Standardized formats also ensure interoperability, reduce errors, and improve data consistency. Overall, language tags support efficient, accurate, and user-friendly speech-based applications.

## II. SYSTEM MODEL AND ASSUMPTIONS

The system model for Speech Application Language Tags (SALT) is designed to enable accurate language identification and processing in speech-based applications. The system begins with user input in the form of speech or text, which is first analyzed to detect the appropriate language tag based on standards defined by the Internet Engineering Task Force using BCP 47. These tags specify language, region, and script, helping the system understand the linguistic context of the input. Once the language tag is identified, the system routes the input to the appropriate modules such as Automatic Speech Recognition (ASR) for converting speech to text and Text-to-Speech (TTS) for generating spoken output. The system selects suitable acoustic and language models based on the detected tag, ensuring accurate pronunciation and interpretation. It also supports multilingual switching, allowing users to interact in multiple languages seamlessly. The processed output is then generated in the desired language, maintaining clarity, correctness, and cultural relevance. The system assumes that the input speech is clear and belongs to supported languages defined in the tagging standard. It also assumes that the underlying models are properly trained for each language and can generalize well to different accents and dialects. Another assumption is that users select or allow automatic detection of language preferences correctly. From a technical perspective, the system assumes availability of sufficient computational resources and stable connectivity for real-time processing. Additionally, the system assumes secure handling of user data, ensuring privacy and protection during communication and storage. It is also assumed that developers correctly implement language tags in applications to avoid misinterpretation. Overall, the SALT system

relies on standardized tagging, trained models, and efficient processing to deliver accurate and user-friendly multilingual speech interactions.

### **III. EFFICIENT COMMUNICATION**

Efficient communication in Speech Application Language Tags (SALT) ensures smooth and accurate interaction between users and speech-based systems. The system uses standardized language tags defined by the Internet Engineering Task Force through BCP 47 to clearly identify the language and regional context of user input. This enables quick routing of data to the appropriate processing modules such as speech recognition and text-to-speech systems, reducing delays and improving response time. The use of language tags allows seamless communication across multilingual environments, where users can switch languages easily without affecting system performance. Efficient data handling, lightweight communication protocols, and optimized APIs help in transmitting speech and text data quickly between system components. This ensures real-time or near real-time responses, which is critical for interactive applications like voice assistants. Additionally, SALT enhances clarity and reduces ambiguity in communication by ensuring that the correct language models are used. This minimizes errors in interpretation and improves the quality of output. Overall, efficient communication in SALT improves system speed, reliability, and user experience by enabling fast, accurate, and context-aware speech interactions.

### **IV. SECURITY**

Security in Speech Application Language Tags (SALT) is essential to protect sensitive user data such as voice inputs and language preferences. The system ensures that only authorized users and applications can access speech data through proper authentication and access control mechanisms. Standardization by the Internet Engineering Task Force using BCP 47 helps maintain consistency and reduces the risk of misinterpretation or misuse of language information. To maintain data privacy, secure communication protocols and encryption techniques are used during data transmission and storage. This prevents unauthorized access and protects user information from potential threats. The system also includes validation mechanisms to ensure that language tags are correctly applied, avoiding errors and inconsistencies in processing. Additionally, secure data storage, backup, and recovery methods are implemented to prevent data loss. Regular updates and monitoring help identify vulnerabilities and improve system security. Overall, SALT ensures confidentiality, integrity, and reliability of communication, making speech-based applications safe and trustworthy for users.

### **V. RESULT AND DISCUSSION**

The implementation of Speech Application Language Tags (SALT) demonstrates significant improvement in multilingual speech processing and system performance. By using standardized tags defined by the Internet Engineering Task Force through BCP 47, the system accurately identifies language, region, and script information. This leads to better handling of diverse linguistic inputs and more precise responses in speech-based applications. The results show that integrating language tags enhances the accuracy of speech recognition (ASR) and text-to-speech (TTS) systems. Proper tagging enables the selection of appropriate acoustic and language models, resulting in improved pronunciation, reduced errors, and more natural output. The system also supports seamless multilingual switching, allowing users to interact in different languages without performance degradation. However, some challenges were observed during implementation. Performance may vary when dealing with mixed-language inputs or rare dialects with limited training data. Incorrect or missing language tags can also lead to misinterpretation of user input. Despite these limitations, SALT significantly improves communication efficiency, interoperability, and user experience, making it a valuable component in modern speech-enabled systems.

### **VI. CONCLUSION**

Speech Application Language Tags (SALT) play a crucial role in enhancing the performance and usability of modern speech-based systems. By using standardized formats defined by the Internet Engineering Task Force through BCP 47, the system ensures accurate identification and processing of different languages and dialects. This improves the effectiveness of speech recognition and text-to-speech applications. SALT enables seamless multilingual communication, allowing users to interact with systems in their preferred languages. It enhances accuracy, reduces errors, and provides culturally appropriate responses, improving overall user experience. The integration of language

tags also ensures interoperability between different platforms and systems. Although challenges such as handling rare dialects and mixed-language inputs exist, SALT remains a reliable and efficient solution. Overall, it supports the development of intelligent, user-friendly, and inclusive speech applications for a global audience.

#### REFERENCES

1. Internet Engineering Task Force – Official publications on language standards.
2. BCP 47 – Tags for Identifying Languages (RFC 5646).
3. World Wide Web Consortium – Language tagging in web technologies.
4. Google Speech-to-Text – Documentation and API guides.
5. Amazon Polly – AWS speech synthesis documentation.
6. Microsoft Azure Speech Service – Speech API and language support.
7. Speech and Language Processing – Academic reference for NLP and speech systems.
8. Mozilla DeepSpeech – Speech recognition framework.
9. Kaldi – Open-source ASR toolkit.
10. International Organization for Standardization – ISO language codes and standards.



INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  [ijirset@gmail.com](mailto:ijirset@gmail.com)



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details