Paper Title:

VSCODE- Code With Voice Using Natural Language Processing(NLP)

Paper Link:

https://ieeexplore.ieee.org/document/10072106

1 Summary

1.1 Motivation

The motivation of this paper is to provide code with the help of voice input for the people with physical disabilities. The paper highlights the challenges and issues that the physically challenged people face during code execution even if they are educated. The paper also discusses how those people can input their code and execute it without using a keyboard. The goal of this paper is to provide an overview of how the voice of the user is converted to text using Natural Language Processing technique and help to create an extension of Visual Studio Code (VSCODE) in which the code snippets will be generated via API.

1.2 Contribution

The contribution of this paper is to present a concise overview on how various Natural Language Processing techniques are used to extract the keywords for code from the converted text. For converting the user's voice to text the paper discusses the automatic speech recognition (ASR) tool. To generate keywords from the converted text, the paper explains the NLP preprocessing techniques to transform and process text data; the techniques are stemming, lemmatization and tokenization. Moreover, to produce high quality waveforms for text to speech conversion, the paper discusses the WaveNet architecture that will be able to produce high quality speech into text conversion. The language that is used in this project is Python; so the selected framework for using libraries and tools is FLASK as it is a lightweight and flexible framework where the

developers can easily meet their NLP requirements. Furthermore, the contribution of the paper is to analyze some other models for speech to text conversion namely HMM (a statistical model), ANN (a neural network model) and MFCC (a feature extraction technique).

1.3 Methodology

The methodology of this paper involves a system where users can generate code snippets from their speech through API in an extended version of Visual Studio Code. Therefore the proposed system is an all-encompassing system that combines speech recognition, Natural Language Processing (NLP), and a customized API to optimize the coding workflow in Visual Studio Code. The system suggests to use Speech Recognition (ASR) tool for real time conversion of voice to text. The converted text is sent to a custom API, initiating the interaction with the proposed system. The API comprises an NLP model and a Code Snippet Generator. The NLP model utilizes techniques namely stemming, lemmatization, and tokenization to analyze the text and produce code keywords. The keywords are sent to Code Snippet Generator which generates codes of Python language (as the system prefers FLASK). The code samples that are produced are transmitted in reply to an extension of Visual Studio Code and finally using the extension the code snippets are written in VSCODE text editor. The APIs mentioned in the paper for the proposed system are Public, Partner, REST, SOAP, Private).

1.4 Conclusion

In conclusion, the VSCode extension that has been proposed exhibits considerable potential in greatly benefiting individuals with physical impairments by providing them with an unparalleled level of accessibility to investigate and showcase their coding abilities. In addition to its immediate effects on skill enhancement, this instrument facilitates the exploration of novel employment prospects, encompassing freelance work, teaching positions, and affiliations with diverse organizations. The accessibility of the

proposed system is ensured by its user-friendly characteristics, which also include cross-platform functionality and the expansion of language support; because the results of the mentioned system are expected as befitting.

1 Limitations

2.1 First Limitation

The first limitation of the paper is that the paper doesn't go into enough detail about how well the system works with different accents and languages, which could make it less useful in situations where people speak more than one language. The paper also doesn't go into enough detail about real-time processing and possible latency problems, which hurts the overall user experience.

2.2 Second Limitation

Another limitation is that it's not clear from the paper what the specifics of the training datasets are, which might affect how well the language learning and code generation work. It means if the training data isn't complete and includes all kinds of people, the model might not be able to correctly understand and read the different speech patterns and language nuances of people who are physically challenged.

3 Synthesis

The synthesis of the thesis paper "VSCODE- Code With Voice Using Natural Language Processing (NLP)" involves the integration of innovative technologies to address the challenges faced by physically challenged individuals interested in coding. The paper proposes a solution that allows users to code entirely by voice, eliminating the need for a keyboard. The synthesis incorporates Speech Recognition and Natural Language Processing (NLP) to convert spoken words into text, which is then processed by a custom code generator API. This API, linked to Visual Studio Code (VSCode) through a dedicated extension, generates code snippets based on the extracted keywords and syntax, facilitating live coding through voice commands. The synthesis not only emphasizes the

technical aspects of the solution but also highlights the broader societal impact by enabling physically challenged individuals to showcase their programming skills, potentially opening doors to employment and other opportunities in the IT industry.