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QuorumGen: Voice Assisted Source Code Generating tool for Students with Upper Limb Disability

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Abstract

Students with disabilities require specialized support and accessible technologies in order to participate and succeed in their academics without facing attitude obstacles. Quorum is a high-level, object-oriented programming language designed to be accessible to learn programming concepts for differently abled students. Upper limb disabled students have inaccessibility due to the unavailability of a tool to understand natural language voice commands to generate Quorum code blocks since they cannot code by the conventional method which relies on the dexterity of human hands.

Students with upper limb disabilities find it inspiring to be able to write code using their voice because it will give them more confidence to pursue their education in software development field. The chosen problem will be resolved by developing a tool that understands natural language voice instructions to generate Quorum language code blocks to provide accessibility for them to code by voice and easily learn the programming concepts using natural language processing and deep learning that aims to convert spoken commands or instructions into executable source code with custom dataset for this specific task of generating Quorum code snippets.

The core implementation of this project is the natural language command to Quorum source code generation with custom dataset. The model performance accuracy was 81.62% for code generation with the bounded scope of syntax and structure of Quorum language syntax trained, tested, and evaluated. Holdout validation was used in this research to evaluate the selected model

Keywords: Voice recognition, Natural Language Processing (NLP), Code generation, Upper limb disabled student, Accessibility, Deep learning, Programming education

Subject Descriptors:

- Computing methodologies $\longrightarrow$ Artificial Intelligence $\longrightarrow$ NLP $\longrightarrow$ Speech Recognition
- Computing methodologies $\longrightarrow$ Machine learning $\longrightarrow$ Machine learning approaches $\longrightarrow$ Neural networks

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