

Voice-Based Accessibility for Disabled Users in Websites Using Data Mining and Regression Analysis

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Web accessibility remains a major challenge for users with physical and motor disabilities, as most websites rely on mouse- and keyboard-based interactions that are unsuitable for hands-free navigation. Existing voicebased solutions mainly depend on speech-to-text systems, which require large datasets, high computational resources, and language-specific transcription, limiting their effectiveness for lightweight, real-time accessibility support. This research proposes a prediction-based voice accessibility system that enables web navigation without full speech transcription. A dataset of approximately 3000 short audio samples was collected from 30 participants, covering ten common accessibility commands such as scrolling, zooming, and navigation control. MelFrequency Cepstral Coefficients (MFCCs) were extracted as compact audio features, and multiple machine learning classifiers were evaluated. Model performance was assessed using stratified train–test splits, cross-validation, precision, recall, F1-score, and confusion matrices. A tuned XGBoost classifier achieved an overall accuracy of approximately 72%, outperforming logistic regression, support vector machines, and random forests while maintaining low latency suitable for real-time use. The model was deployed as a browser extension, enabling language-independent, realtime voice-controlled web navigation and improving digital accessibility for disabled users.

Keywords: *Voice Recognition; Accessibility; Machine Learning; Regression Analysis; Web Navigation*