Voice-Driven Insights for Smart Monitoring

Rahul Lilhare[1], Janvi Petkar[2], Vaibhavi Kalode[3]

Assistant Professor, MCA, KDK College of Engineering, Nagpur, India[1]

PG Scholar, MCA, KDK College of Engineering, Nagpur, India [2]

PG Scholar, MCA, KDK College of Engineering, Nagpur, India [3]

rahul.lilhare@kdkce.edu.in[1] , janvipetkar.mca24f@kdkce.edu.in[2], vaibhavikalode.mca24f@kdkce.edu.in[3]

Abstract: *Traditional data monitoring dashboards typically demand that users engage by typing, navigating through complicated menus, and possessing some technical background, which can make them difficult for non-technical individuals and people with physical disabilities to use effectively. To tackle these challenges, this paper introduces a Voice-Driven Intelligent Data Visualization System for Smart Monitoring, which offers an easy-to-use approach for generating data visualizations through natural speech commands. The system proposed here records the user's spoken words, transforms them into written text using speech recognition methods [2], and determines the user's intention by analysing the query with keyword-based parsing. Based on the query, the frontend creates suitable visual representations like bar charts, line graphs, and pie charts automatically. To improve decision-making, a machine learning model is used to predict the best chart type, which increases the accuracy and intelligence in selecting visualizations [9]. The system is built with Python and uses tools like Speech Recognition, pandas [4], Plotly[6], Flask for handling the backend tasks [8], and Streamlit to create an interactive web dashboard [7]. The dashboard lets users upload datasets, create data visuals on the fly, adjust chart settings like grouping and target attributes by hand, and save the visuals for use in reports. The system works well with low use of computer power and allows basic features to work without extra load on system, which helps keep things private and saves money. The test results show that the system is very good at understanding questions and creating visual displays, and it usually takes between 2 to 3 seconds to respond. Adding machine learning and interactive dashboards makes the system easier to use, more adaptable, and enhances the overall experience for users. The suggested method makes it easier to access data monitoring tools and provides a starting point for developing smarter, voice-activated dashboards in the future.*

Keywords: Voice-Controlled Dashboard, Speech Recognition, Data Visualization, Machine Learning, Interactive Dashboard, Smart Monitoring, Web-Based Visualization