

VOICE BASED CALCULATOR

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ABSTRACT

'A Voice Based Calculator' is an electronic device which perform lengthy calculations Manual key input for calculations in traditional calculators can be tedious and time-consuming.. Present invention developed a new way of calculation. It provides two modes of calculation, first mode is text mode and second mode is voice mode. Text mode performs mathematical calculation by typing numbers and symbols which is same as normal calculator. Voice mode takes voice input from user in the form of speech and performs mathematical calculation. Voice mode gives output in the form of voice only. This mode of calculation is easier than the regular text mode. Voice based calculation is useful for physically challenged people.

The internal processes for operations in both voice and text modes are identical in function and computation. Proposed device is useful for the physically handicapped person as well as illiterate people. Using advanced computational techniques, it efficiently reduces the time consumed by lengthy calculations, which are typically time-consuming with regular calculators.. User doesn't have to press any type of keys in the voice based calculator. Voice based calculator is affordable to common people and easy to use

Keywords: Voice Based Calculator, Text Mode, Voice Mode, Traditional Calculator.

I. INTRODUCTION

The concept of voice based controlled calculators has been around for centuries. In the 19th century, Charles Babbage proposed the mechanical calculator which was capable of performing basic arithmetic operations. However, it wasn't until the 1980s that the first voice based controlled calculator was developed. This was the Casio VX-10, which was capable of performing basic calculations using voice commands. The technology has advanced significantly since then and now there are a range of voice based controlled calculators available on the market. These calculators can understand and interpret more complex commands and can even be used to perform advanced mathematical operations.

A voice-based calculator is a modern application that allows users to perform mathematical calculations using voice commands. Instead of manually inputting numbers and operations, users can simply speak their calculations, and the system processes the spoken input to provide accurate results. This technology leverages speech recognition and natural language processing to interpret and execute mathematical expressions. Voice-based calculators have gained popularity due to their convenience and accessibility. They are often integrated into smartphones, smart speakers, and other devices, making it easy for users to perform calculations without the need for a physical calculator or keyboard input.

A recent survey directed among individuals performing calculations regularly shows that they lean toward utilizing a separate calculator rather than a calculator present in their work station PCs to spare time and accomplish performing various tasks. They recommended that utilizing the PC based calculator is tedious as they need to change screens and this prompts composing mistakes. Given a choice, they would prefer to favor a voice initiated adding machine running out of sight on their PCs, to which data sources can be given as spoken digits and tasks, and would show the outcome on the screen. This voice enacted number calculator can be executed on a fundamental PC framework with no extra equipment.

Number calculator is a computer or program capable of performing rapid calculations with large amounts of data. Another name for number cruncher is calculator. An electronic calculator is a small, portable electronic device which is used to perform calculations, such as basic arithmetic, complex mathematics, complex calculations etc. Many small scale as well as medium scale shops currently using calculator to perform calculation and to perform this calculation it takes more time because of key input as well as input limitation. In

the various places various people using calculator day by day to perform basic as well as complex mathematical operations. These operations are done by those people who know which key used for which purpose. But there are some limitations to this calculator. Like these calculators cannot be used by the people who are unable to see, also these calculator having number limitations etc.

In recent years, advancements in machine learning and artificial intelligence have improved the accuracy and responsiveness of voice-based calculators, making them a reliable tool for various educational, professional, and everyday scenarios. Overall, voice-based calculators have revolutionized the way people interact with mathematical calculations, providing a user-friendly and efficient means of solving math problems through natural speech.

II. LITERATURE REVIEW

1. Reese Robert, Combination wristwatch and calculator (Patent no: US 3928960 A) Reese [1] designed a blend of wristwatch and calculator using a typical electro-optical digital display. A period and schedule circuit is joined with an adding machine circuit, both framed by large scale reconciliation, and used to incite basic presentation stations of a light emitting diode digital display. Time is always kept however the calculator circuit is just endless supply of an "calculate mode" change to preserve battery energy. Additionally uncovered is a solar cell for energizing the battery and a repress clock for naturally dousing the display when the gadget is in the calculate mode however not being used.

2. Hiroaki Sakoe, Speech recognition system (Patent no: US 4239936 A) Hiroaki [2] disclosed a speech recognition system adaptable to noisy environments. The system includes a recognition unit for recognizing input speech signals and a noise measuring unit for measuring the intensity of ambient noises. Similarly, the system incorporates a rejection component, guided by a noise intensity-based standard, for dismissing the rejected outcomes obtained during the recognition process.

3. Heihachiro Ebihara, Fukuo Sekiya, Takashi Yamada, Portable electronic device equipped with calculation and timekeeping functions (Patent no US 4266278 A) Heihachiro et al [3] developed a versatile electronic gadget with calculation and timekeeping capacities, furnished with a console for computation and time setting purposes, implies for delivering scanning signals when a key is incited, these signals being applied to exchanging components associated with rows of keyboard contacts. At the point when a key is depressed, the resultant elevated level sign potential applied to the relating contact push causes the line position to be recognized and put away in a first memory circuit, which delivers a sign making the comparing contact section be identified and put away in a subsequent memory circuit. Activation of an external control part makes a sign be put away by a reset sign in a first stage memory circuit which creates a output signal to be Likewise, stored within a secondary memory circuit synchronized with a timing signal, according to the same principle.. The low frequency and low duty cycle of the scanning sign and reset signal guarantee limited power utilization and concealment of switch bounce impacts.

4. 4 Der Lely Cornelis Van A compact electronic calculator (Patent no EP 0212759 A1) This invention relates to a compact electronic calculator to be worn as a pocket or wrist calculator or as a necklace. It is provided with a screen and at least one operating device to be actuated by human voice. The calculator operates by voice recognition.[4]

5. Marc Robeljo, Conrad Robeljo Loan calculator (Patent no US 20050086157 A1) A device and method for calculating loan factors based on answers to questions generated and displayed on a user input device.[5]

III. METHODOLOGY

Our Developing a voice-based calculator involves various technical aspects, including speech recognition, natural language processing, and user interface design. Below is a general methodology that you might follow when creating a voice-based calculator:

1. Define Objectives and Requirements:

Clearly define the objectives of the voice-based calculator. What functions should it perform? What are the target platforms or devices? Identify specific requirements, such as the languages it should support, the level of accuracy needed, and any accessibility considerations.

2. Speech Recognition Integration:

Choose a suitable speech recognition engine or library. Popular choices include Google's Speech-to-Text API, Microsoft Azure Speech, or open-source libraries like CMU Sphinx or Mozilla's Deep Speech. Integrate the selected speech recognition technology into your application.

3. Natural Language Processing (NLP):

Implement natural language processing to understand the user's intent. This involves parsing and interpreting the user's spoken commands. Design algorithms or use existing NLP libraries to convert spoken language into actionable commands for the calculator.

4. User Interface Design:

Develop a user-friendly interface that accommodates voice-based interactions. Consider both the auditory feedback (spoken responses) and visual feedback (on-screen display).

Create a system for the user to initiate voice commands and receive feedback on calculations.

5. Calculation Engine:

Implement the core calculation engine that performs mathematical operations based on the interpreted user commands. Ensure accuracy in mathematical calculations and handle various types of arithmetic operations.

6. Error Handling and Validation:

Implement robust error handling mechanisms. Consider scenarios where the speech recognition may misinterpret the command or when the user provides invalid input. Provide clear feedback to the user in case of errors and guide them on how to rectify issues.

7. Testing and Evaluation:

Conduct extensive testing to ensure the accuracy and reliability of the voice-based calculator. Test the system with a diverse set of users to identify potential issues related to accents, languages, and user preferences. Evaluate the performance of the speech recognition and NLP components under different conditions.

8. Accessibility Considerations:

Ensure that the voice-based calculator is accessible to users with disabilities. Implement features such as voice feedback, text-to-speech capabilities, and compatibility with screen readers.

9. Security and Privacy:

Address security and privacy concerns, especially if the calculator is integrated with cloud-based speech recognition services. Implement encryption and secure communication protocols.

10. Optimization and Scalability:

Optimize the performance of your voice-based calculator, considering factors such as response time and resource utilization. If applicable, design the system to be scalable for handling increased usage or additional features in the future.

11. User Training and Documentation:

Provide user training materials or documentation to guide users on how to interact with the voice-based calculator effectively. Consider incorporating a tutorial or onboarding process to familiarize users with the voice commands.

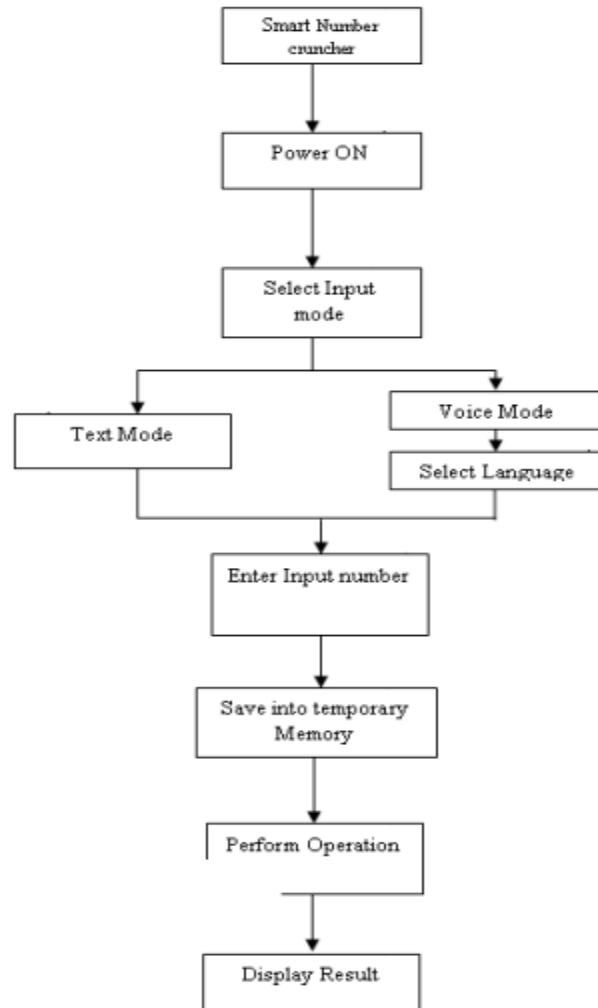
12. Deployment:

Deploy the voice-based calculator on the intended platforms or devices. Ensure compatibility and integration with the desired operating systems or environments.

13. Iterative Improvement:

Collect user feedback and continuously iterate on the application to improve accuracy, user experience, and address any emerging issues. Remember that the success of a voice-based calculator depends not only on the technical implementation but also on its usability and user acceptance. Regularly seeking user feedback and making iterative improvements is crucial in the development process.

IV. WORK FLOW



Workflow diagram of Voice Based Calculator. Once voice based calculator is get power on, then voice based calculator ask to select input mode. voice based calculator provides two options; one is text mode which works like normal calculator. Another option is voice mode. When user selects voice mode then voice based calculator ask to select language. User will enter the input numbers. For long calculations input number will store in temporary memory to perform operation and result will displays on screen.. As it defines how voice based calculator works step by step. Here when user wants to perform calculation of some numbers, user switched on the device. As user power on the device, its user choice which mode of operation he requires. Depend on user choice; he can select either text mode or voice mode. If user selects text mode, then user enter the number and mathematical operator to perform the calculation. All this kind of data stored in the temporary memory of the calculator. On completion of mathematical operation final result is displayed on the display unit that is LED display of the calculator. This mode of operation done same way as that of regular or traditional calculators. Along with this mode of calculation if user selects voice mode, then user have to select the language for instructing the device. As voice based calculator supports multiple language so user can select his own language for calculation purpose. On selection of language user speak out the number and operator with the help of microphone mounted inside the calculator. A user instructs the calculator, calculator converts speech in to binary code. It stores user defined data in the temporary storage of the device. On completion of calculation again binary data converted in to voice mode. This voice mode output is given to the user with the help of speaker to the user. This device can be mounted in any type of electronic device which having calculation facility. Text mode output and voice mode output is presented to the user with the help of display result module of the device.

V. CONCLUSION

Voice based calculator, is a type of calculator used in various electronic devices to perform mathematical calculations. Smart number cruncher performs complex mathematical calculations very easily. The reason behind this is it having two modes of calculation that is text mode and voice mode. Text mode takes input, by pressing text or number or symbol and performs mathematical operations on the numbers, result of the operation is displayed on the display board. In the smart number cruncher along with this traditional way one more way of calculation is added known as voice mode. In the voice mode user have to select language to give input in the selected language, as user selects language user gives input in the form of speech. As user gives input and operation, smear number cruncher performs calculation and gives output in the form of voice mode. The best part of the device or calculator is user gives input in the form of voice mode and gets output in the form of voice mode only. Smart number cruncher is helpful for physically handicapped and illiterate people. This calculator is easy to use and affordable to common people. It is time saving application and used for complex mathematical calculations.

Voice controlled calculators are becoming increasingly popular due to their convenience and easy to use. They use machine learning algorithms to understand and interpret spoken commands and can accurately interpret and execute mathematical calculations in a wide range of scenarios and with various types of input. They can be used in a variety of scenarios, from basic calculations to more complex mathematical operations. They can also be used in educational settings and for testing.

VI. REFERENCES

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