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## THE 11TH INTERNATIONAL INNOVATION, INVENTION & DESIGN COMPETITION INDES 2022

# **EXTENDED ABSTRACTS BOOK**



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## SPEAK-UP ANALYTICS: A VOICE ACTIVATION SYSTEM FOR DATA ANALYTICS

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## ABSTRACT

Speak-up analytics was developed by using R programming under R-Studio. This project proposed a simple interactive web base system to help users to do better performance in data analysis. This system allows any users to do data analytics without any hand gestures, but they just speak up and tell the machine to do the analytics. Some basic functions were developed in this system, such as sorting, arrange, filtering, grouping, counting and basic plotting. With Speak-up Analytics, the users only need to give instructions to the machine, and the machine will execute it to perform the analysis. For example, for arranging year descending, the machine will pick up the word, and arrange the year by descending order. The goal of this project is to manipulate the data using voice-activated commands. The list of commands used to instruct this system to manipulate tables dan data is sort, table remove, group by, filter and arrange. For plotting, this project has also successfully applied voice activation command to plot several graphs such as histogram and scatter diagram. This system will benefit non-analytic person to screen and handle data without prior knowledge in programming and query language.

Keyword: Speak-Up; Data Analytics; RStudio; Shiny.

## **1. INTRODUCTION**

In conducting data analysis, a user must have sound knowledge using the data analysis software and its features. The lack of this knowledge would lead to the wrong interpretation of the data, thus leading to potential problems of data validity and reliability (Woolhouse, 2019). The lack of knowledge in conducting data analysis can also lead to misinterpretation thus impacting the trustworthiness in conducting research and writing scientific articles (Kwon et al., 2014). Furthermore, the lack of knowledge and understanding in the use of R programming and specific query languages has also prohibited users from performing proper data analysis. The lack of knowledge in these two areas also has impacted the enthusiasm level in conducting scientific research (Rusli et al.,2021)



Based on the paragraph above, this project proposes a simple interactive web base system to help users to better perform data analysis. This system aims to help users who lack appropriate data analysis knowledge in obtaining a more favorable result thus increasing the enthusiasm in conducting research and writing scientific articles.

## 2. METHODOLOGY

Methodology refers to the principles and procedures of logical thought processes applied to a scientific investigation. The research methodology for this project consists of two phases. The first phase involved building an interactive web base system, which is developed using: (i) R programming language, (ii) RStudio, and (iii) the use of an application called Shiny (RStudio Team, 2022). The second phase involved the inclusion of a voice detection feature that can detect English language, which is combined with an API (application language interface) adopted from Anyang University, Korea.

## **3. FINDINGS**

The major challenge highlighted in this project is the difficulty of understanding the R programming language which needs to be combined with the use of query language. Furthermore, the use of GUI statistical software also limits the user ability to analyze data as prior knowledge to each GUI interface or feature is required. This project provides a simple voice activated web base interactive system which can allow users to perform two major functions needed in data analysis, which are: (i) tabling and (ii) charting or plotting. The sample of the finding are represented in the following figures:

Your command is: count status					
Show 10 v entries		Search:			
	status	1		n	
1	hurricane			3613	
2	tropical depression			2898	
3	tropical storm			5348	

Figure 1 Example of Tabling Results in Data Manipulation.



Your clean command is: ggplot(aes\_(x = ~horsepower, y = ~Displacement) + geom\_point()) Group vars:

Figure 2 Example of Plotting a Scatter Diagram Using Speak Up Analytics

## 4. CONCLUSION

This project provides a simple voice activated interactive web-based data analysis system. The development of this system is based on the use R programming and RStudio combined with an API from the Anyang University, Korea. This system provides several advantages, mainly: (i) users are able to perform simple data analysis without prior knowledge of the query language, and (ii) users are able to use a voice activated command system which interprets natural language to specific query.

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