Online Application Of Descriptive Statistics For Data Concentration Analysis

I Gusti Agung Sadnyana Putra[1], I Ketut Suja[2], I Gusti Agung Uttami Vishnu Putri[3]

[1,2]Tourism Department
[3]Information System Department
Politeknik Negeri Bali
Badung, Indonesia
agungsadnyana@pnb.ac.id

Abstract. Statistics is a branch of science that studies ways of collecting, processing, presenting, analyzing, interpreting and drawing conclusions from data. Descriptive Statistics Is a part of statistics that carries out the tasks of collecting data, classifying, processing and presenting quantitative data. This descriptive statistics only describes the characteristics or traits possessed by a group of data, without generalizing, namely drawing general conclusions based on sample data applied to the population. The forms of processing carried out on data samples consist of : data concentration, distribution and other processing. With advances in information technology, several statistical applications have been developed, but these applications directly present the final results of data processing without displaying the processing steps to obtain the final results. This is inadequate in terms of user understanding, because users do not get a clear explanation of the steps for solving problems based on statistics. This research intends to produce software that will provide detailed theories, formulas and data processing steps to obtain the planned final results. This research uses the method Waterfall [8] [9] or linear sequential, namely a sequential and systematic software development method consisting of: Analysis, Design, Coding and Testing. The results of making this application are data concentration processing, data dispersion processing and other processing. In this article, the results of data concentration processing will be presented which will show in detail the theory, formulas and problem solving steps to get the final results. These results will make it easier for users to understand and the presentation will be interesting.

Keywords: online application, descriptive statistics, data concentration

1. Introduction

Statistics is a branch of science that studies ways of collecting, processing, presenting, analyzing, interpreting and drawing conclusions from data. Then statistics can be interpreted as a collection of methods and rules regarding collecting, processing,

© The Author(s) 2023
A. Azizah et al. (eds.), *Proceedings of the International Conference on Applied Science and Technology on Social Science 2023 (iCAST-SS 2023)*, Advances in Social Science, Education and Humanities Research 817,
https://doi.org/10.2991/978-2-38476-202-6_28

interpreting and drawing conclusions from data in the form of numbers [1]. Descriptive Statistics is a part of statistics that carries out the tasks of collecting data, classifying, processing and presenting quantitative data [2]. In other words, descriptive statistics only describe the characteristics or traits possessed by a group of data, without generalizing, namely drawing general conclusions based on sample data applied to the population. Meanwhile, Analytical Statistics is a part of statistics that has the same task as descriptive statistics plus analysis, interpretation and drawing conclusions that apply generally. In the world of economics, statistics has a function as a tool in data analysis, forecasting and decision making, especially for economic actors and decision makers [1]. Looking at the function of statistics, it can be seen that statistics has a very important and necessary role in various areas of life [3]. A common problem found in understanding statistics is the complexity of processing that must be carried out on the data held [4].

With advances in information technology, several applications have been developed [5,6], including statistical applications, but these applications directly present the results without displaying the steps to solve the problem (Fig 1). This is inadequate in terms of understanding, because users do not get a clear explanation of the steps to solve problems based on their knowledge of statistics.

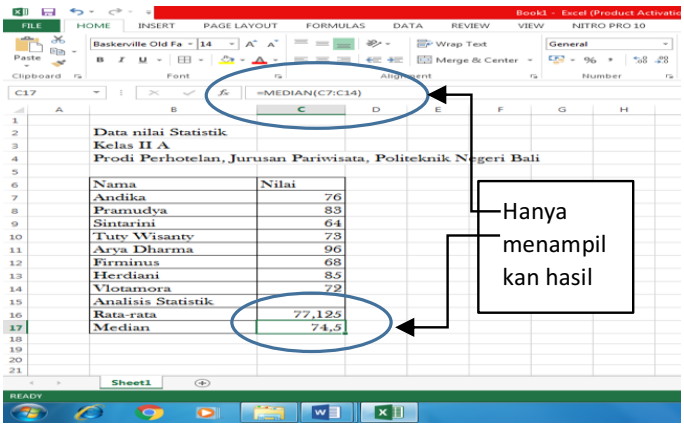

Fig 1. Statistical Applications in Excel

Based on this, we created an online application for descriptive statistics. In making this application, the steps for solving problems according to theory will be shown in detail (Fig 2). This will make it easier for users to understand and it is hoped that this application will be more attractive in presentation.

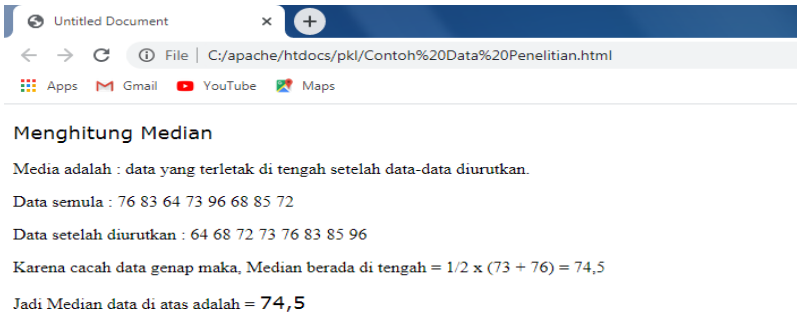

Fig 2. Examples of Research Results

2. Research Methods

The research carried out is in the form of designing a system that produces certain software. This research uses the method Waterfall [8,9] or linear sequential, namely a sequential and systematic software development method consisting of:

1. Analysis: The process of gathering software requirements, such as information domain, performance and interface required. This stage will produce software requirements specifications [10].
2. Design: a multi-step process consisting of data design, architectural design, interface design and procedural details/algorithms that will be applied in the next step, namely creating program codes [11].
3. Coding: The process of translating a design into program codes that can be read and executed by a computer machine. In this case, coding will be used using the PHP Triad program which consists of the PHP programming language, MySQL database and Apache server [12,13, 14,15,16].
4. Testing: When the code is created, testing begins, which consists of internal logic testing and external functional testing to eliminate errors and ensure the results are as required. Apart from that, this stage is also intended so that the resulting system can be used easily by future users [8].

3. Results And Discussion

3.1. Initial Implementation

The beginning of implementation is a display of the identity of this system and the system can begin to be used by providing pathways for 3 (three) types of facilities provided, namely: Data Concentration Measures, Data Dispersion Measures and Other Analysis as shown in Fig 3.

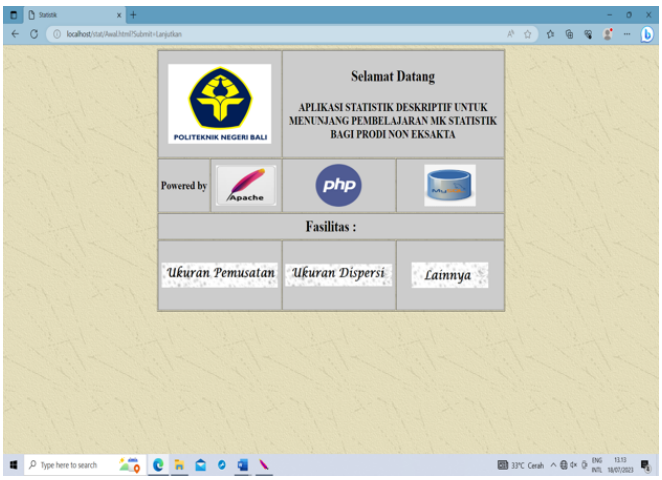

Fig 3. Application initial display

3.2. Application Usage Cycle for Data Concentration Analysis

The Descriptive Statistics Application can be operated by users by utilizing the facilities available in each main form according to the category at the start of the application (fig 3). The Data Concentration Analysis [17] facility can be used via the main data concentration form as shown in Fig 4 which will be explained in the following stages.

Fig 4. Main Form Data Concentration Size

3.3. Input New Statistical Data

The new statistical data input facility is used to enter new data that will be analyzed for data concentration measures. This is done by clicking the "Input Data" facility on the main menu. The form and data entered can be seen in Fig 5.

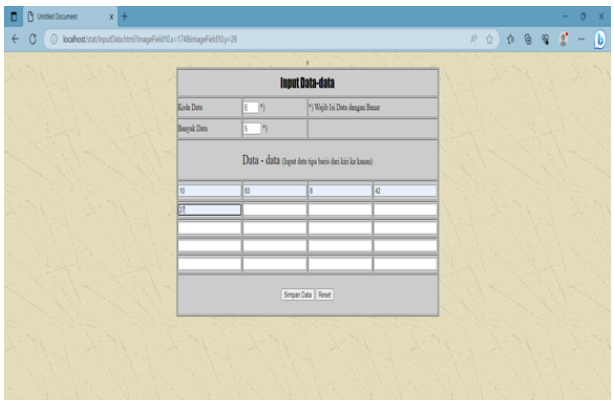

Fig 5. Input New Statistical Data

3.4. View Statistical Data

The statistical data viewing facility is a facility provided for users to see that previously inputted data has been included in the data list, it is also provided for users who wish to obtain information about existing/registered data. A display of the use of the "View Data" facility can be seen in Fig 6.

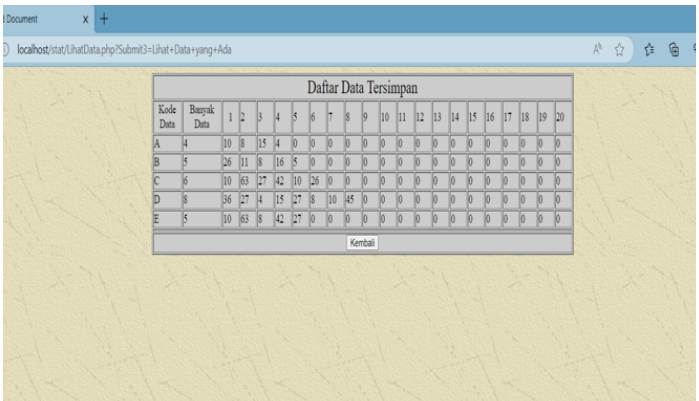

Fig 6. View Statistical Data

3.5. Using the Data Concentration Analysis Facility

In data concentration analysis, several facilities are available that can be used according to user needs, namely: arithmatic mean, weight mean, median, modus, Quartile1-2-3 and Decile. The following explains one by one the use of these facilities.

3.5.1. Start Using

a. Select/click the analysis menu available from the main menu for data concentration measures (figure 2).
b. Next, a list of existing data will be displayed that will be analyzed. Select the data to be analyzed by clicking "Select" on the available data (fig 7).

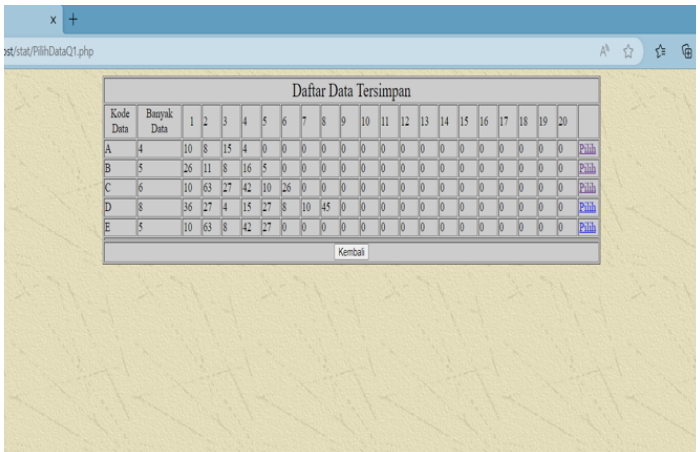

Fig 7. Selecting Data to Analyze

c. The results obtained will be explained in the next stages. In the results obtained, the following can be seen:

1) Theory: is a theory used as a basis for analysis.
2) Formula: is the implementation of theory in the form of equations and mathematical operations based on the theory.
3) Data and calculations: the data that is analyzed, the steps in the calculation operations that are carried out to obtain the final results of the required analysis.
4) “Back” button: to return to the main analysis form. For other data concentration analysis needs, the sequence of steps above can be reused.

3.5.2. Data Concentration Analysis Results

a. Arithmatic Mean

Arithmatic Mean is a number obtained from dividing the amount of data by the number of values. The results obtained are as shown in Fig 8.

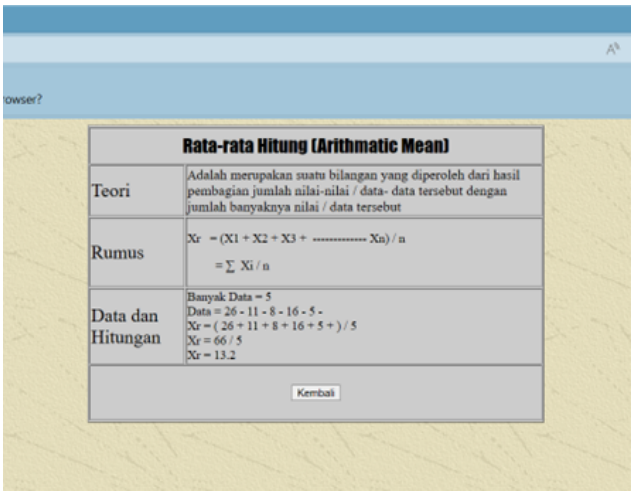

Fig 8. Results of Arithmatic Mean Analysis

b. Weight Mean

Weight Mean is a number obtained from the amount of data multiplied by its frequency divided by the number of values in question. The results obtained are as shown in Fig 9

.

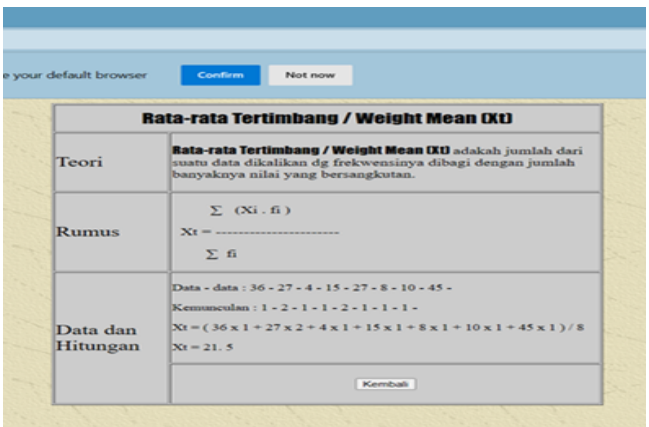

Fig 9. Weight Mean Analysis Results

c. Median

The median is the number that is in the middle of a series of numbers after being arranged in order of size. The results obtained are as shown in Fig 10.

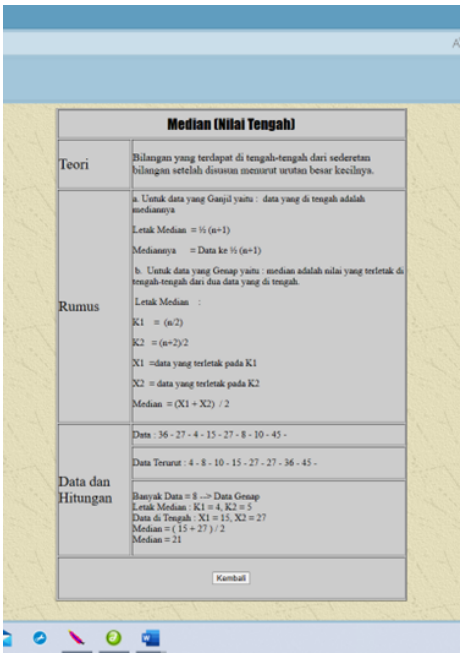

Fig 10. Median Analysis Results

d. Modus

Mode is the number or information that has the highest frequency, or the data that appears most often in a set of numbers or a series of information. The results obtained are as shown in Fig 11.

Fig 11. Mode Analysis Results

e. Quartile

Quartiles are numbers that divide a series of values into four (4) equal parts. Quartiles consist of 3 parts, namely quartiles 1, 2 and 3. For an example of the analysis the results obtained are quartile-3, as seen in Fig 12.

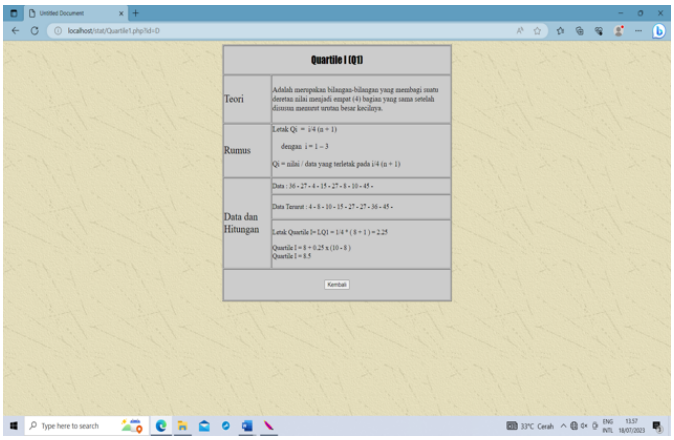

Fig 12. Quartile Analysis Results

f. Decile

Decile is an extension of median and quartile analysis, namely numbers that divide a series of values into ten (10) equal parts. Decile consists of 10 parts, namely decile 1 to 9. For example, the analysis results obtained are decile-7, as seen in Fig 13..

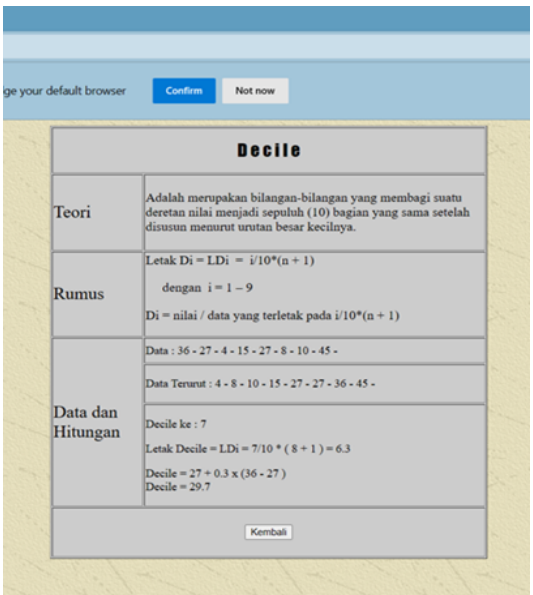

Fig 13. Decile Analysis Results

4. CONCLUSIONS

a. The online application of descriptive statistics for centralized data analysis provides several facilities that can be used according to user needs, namely : arithmatic mean, weight mean, median, modus, Quartile1-2-3 and Decile.

b. Each element of analysis is equipped with theory, formulas and data along with calculation steps to obtain final results, which are not available in other statistical applications. This is a specialty of this application because it will make it easier to understand and analyze the required statistics.

References

1. Wirawan, Nata, Easy Ways to Understand Statistics, 4th Edition, 2017, Keraras Emas, Denpasar
2. https://ejournal.uin-suka.ac.id/adab/FIHRIS/article/viewFile/1922/916 Descriptive Statistics as a Collection of Information, accessed 12 February 2023
3. https://www.globalstatistik.com Statistical Functions
4. https://jurnal.ar-raniry.ac.id/index.php/alkhawarizmi/article/view/6949 Analysis of Student Difficulties in Descriptive Statistics Courses
5. Kadir, Abdul, 2018,*Introduction to Information Systems*, Andi Offset, Yogyakarta
6. Steven B. Kim , Dong Sub Kim, Christina Magana-Ramirez, Applications of statistical experimental designs to improve statistical inference in weed management, 2021, PLOS ONE, |https://doi.org/10.1371/journal.
7. https://salamadian.com/pengertian-aplikasi/ accessed 20 February 2023
8. https://idcloudhost.com/pengertian-aplikasi-arti-fungsi-klasifikasi-dan-contoh-aplikasi/ accessed March 10, 2023
9. Pressman, 2015, S*oftware Engineering,* 7th Edition, McGraw-Hill International Inc.
10. Mc.Leod,R,Jr, 2015,*Management Information System*, 10th Edition, Prentice-Hall International Inc.
11. Aragon, G., Escalona, M.J., Lang, M., dan Hilera, J.R.. 2012. An Analysis of Model-Driven Web Engineering Methodologies. *International Journal of Innovative Computing, Information and Control* 8(12):1-10.
12. Wasowski A., Truscan D., Kuzniarz L.. 2010. 8th Nordic*Workshop on Model Driven Software Engineering* (NW-MODE 2010). Proceedings of the Fourth European
13. Korth, Silberschatz, 2015,*Database Sistem Concept*, 6th Edition, McGraw-Hill International Inc.
14. Lalang Erawan, Ajib Susanto, Agus Winarno*Techno.COM, Vol. 16, No. 2, Mei 2017: 132-143*
15. Sutarman, 2010,*Building Web Applications with PHP and MySQL,*Graha Ilmu, Yogyakarta
16. User Guide and Reference. Version 1.9. *Programming and Software Engineering* , Unit (PST), Institute for Informatics, Ludwig-MaximiliansUniversität. München, Germany.
17. Lei Bao, Edward F. Redish, 2019, Concentration Analysis: A Quantitative Assessment of Student States, https://www.researchgate.net/publication/22860573
18. William, Hugh E and David, Lane, 2012,*Web Database Application with PHP and MySQL,* O'Rilly and Associates Inc.Conference on Software Architecture: Companion Volume:243-244.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (http://creativecommons.org/licenses/by-nc/4.0/), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.