

Nave Bayes Classifier Method Expert System for Diagnosis of Attention Disorders and Hyperactivity in Children

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ABSTRACT

ADHD, also known as Attention Deficit Disorder and Hyperactivity in Indonesian, is a psychiatric condition that makes sufferers less able to focus and more prone to excessive activity or being unable to sit still than average persons. Many people are still unaware that if a youngster exhibits excessive behavior and has poor concentration, the child may have ADHD. Even if these symptoms have manifested, many parents choose to ignore them due to the high expense and distance required to see a doctor; therefore, a professional system is required to identify the sickness. The system's creation aims to make it simpler to diagnose diseases so that they can be stopped before they start and their symptoms can be treated. The technique makes use of the MySQL database, PHP programming language, and NBC (Naive Bayes Classifier). Black box testing of a system. By showing the percentage of symptoms, Nave Bayes values, and disease solutions, the results provide an expert system for diagnosing ADHD in kids using the Naive Bayes approach.

Keyword: Expert System; Naive Bayes Method; Attention Deficit Hyperactivity Disorder.

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1. INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is a psychiatric disorder that causes sufferers to have difficulty concentrating and have excessive activity or can't stay still compared to normal people (Yazar, A et al., 2019; Ohnishi, T et al., 2019; Mizuno Y et al., 2019). Many people do not realize that if a child's behavior is excessive and has a low level of concentration (Clayton, S., 2020), the child may suffer from ADHD (Dobrakowski, P., & Łebecka, G, 2020). It is also usual for someone who exhibits a number of symptoms to seek advice from those in his immediate vicinity or online resources regarding the illness he is dealing with (Király, O, 2020). When a person suspects that they may have ADHD (Mitchell, J. T et al., 2021), they must get medical confirmation of the condition. In order for someone to visit a doctor in order to confirm the illness they are suffering from (Puig-Domingo, M et al., 2020). High prices and remote locations are issues that arise (Abdellatif et al., 2019). As a result, we require a method that can assist someone who exhibits certain signs of attention deficit hyperactivity disorder in confirming the condition and obtaining a treatment option (Morrison-Smith, S., & Ruiz, J., 2020; Maddikunta et al., 2021).

Computers are known to improve human performance every day in all sectors in the modern day (Shneiderman, B., 2020). As a result, the researcher suggests a technique that can assist a person in determining whether they have Attention Deficit Hyperactivity Disorder. An expert system is the available system (Salman, F. M., & Abu-Naser, S. S., 2019). Because this system was created in the middle of the 1960s, the expert system is a subset of artificial intelligence (AI) that is quite old (Jaakkola, H et al., 2019). The General Purpose Problem Solver (PPS) by Newel and Simon was the first expert system to be used. A system known as an expert system aims to use the expertise of experts in solving issues involving computer systems. Expert systems are systems that leverage human knowledge entered into

computers to tackle issues that are typically solved by experts, according to Turban and Aronson. However, to use an expert system, an appropriate method is needed to get the right results (Ahmad, S et al., 2022).

According to Ahyarudin and Topiq's research (2021), an expert system application that can diagnose lung disease in children has been created. This is based on their research on the Expert System for Diagnosing Lung Disease in Children Using the Web-Based Naive Bayes Method. An expert system application that can diagnosis during pregnancy has been created as a result of research by Handoko and Neneng (2018) on the Expert System for Diagnosing Diseases During Pregnancy Using the Web-Based Nave Bayes Method. Based on research conducted by Setiyani and Prasetyaningrum (2021) regarding the Application of the Naïve Bayes Classifier Method in the Gastric Disease Diagnosis Expert System, Setiyani and Prasetyaningrum's research has succeeded in making an expert system application that can diagnose gastric disease.

The researchers employed the Nave Bayes method to obtain the results of the diagnosis of Attention Deficit Hyperactivity Disorder after learning from multiple prior studies that used it to successfully address a variety of issues with disease diagnosis. The Naive Bayes classification approach assumes that each X variable is independent or independent and does not depend on any other variables (Alizadeh, S. H et al., 2021). It is based on probability and the Bayesian Theorem. The training stage and the classification stage are the two steps that the NBC technique uses in the text categorization process (Kusumawati, R et al., 2019). The probability of an event occurring ranges from 0 to 1. At the training stage, a sample of data-which may be a document representation-is subjected to an analytical process. Equation 1 allows for comparison calculations between the words in the testing data and each existing class (Mesaros et al., 2021).

A person who exhibits many signs of attention deficit hyperactivity disorder can confirm that they have the condition and receive treatment with the help of an expert system that applies the Naive Bayes method. With this background, the title of this research is Nave Bayes Classifier Method Expert System for Diagnosis of Attention Disorders and Hyperactivity in Children.

2. RESEARCH METHOD

The waterfall diagram can be used to model the steps of this study. The following are the several phases used in this research:

A. Requirements Analysis

It is also usual for someone who exhibits a number of symptoms to seek advice from those in his immediate vicinity or online resources regarding the illness he is dealing with. When someone has a suspicion that someone has ADHD, that person should get medical confirmation of the condition. In order for someone to visit a doctor in order to confirm the illness they are suffering from. High prices and remote locations are issues that arise. As a result, we require a method that can assist someone who exhibits certain signs of ADHD in confirming the condition and receiving the Rule Base healing. This study's goal is to develop a system that will enable a person to identify and confirm that they have attention deficit hyperactivity disorder. Researchers can use an expert system and the Naive Bayes approach to determine whether someone has attention deficit hyperactivity disorder. Someone who exhibits some signs of ADHD can confirm that someone has the condition and receive the appropriate treatment with the help of an expert system that applies the Nave Bayes approach.

The classification of the severity of the ADHD disorder, which is described in the form of a decision tree, yields the results shown below.

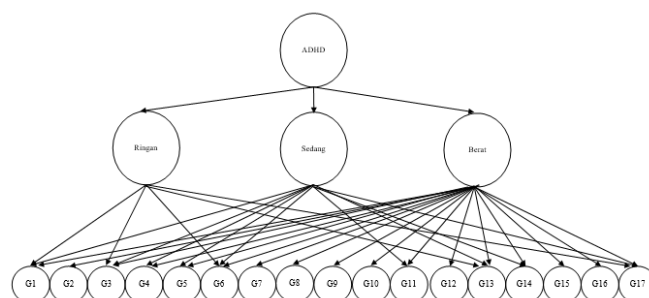


Fig 1. Decision Tree ADHD

B. Design System

Drawing, planning, and sketching a potential application are all examples of design. Unified Modeling Language (UML) is the system design employed.

1. Use Case Diagram

Figure 2 below displays use case diagrams for diagnosing ADHD.

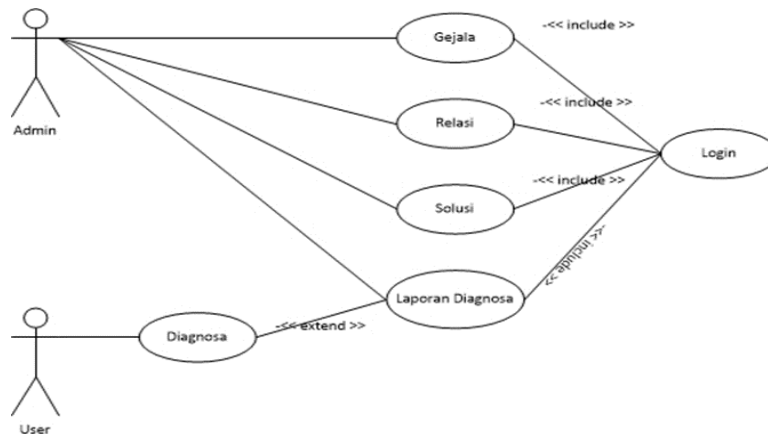


Fig 2. Use Case Diagrams System

Figure 2 illustrates it as follows:

- An actor who manages all data is known as an administrator.
- Users are actors who execute diagnostics in the role of program users.
- The login procedure must be completed before the admin has access to manage symptom data, solution data relations, and diagnostic reports.

2. Activity Diagrams System

The following Activity Diagram illustrates the diagnosis of ADHD disease.

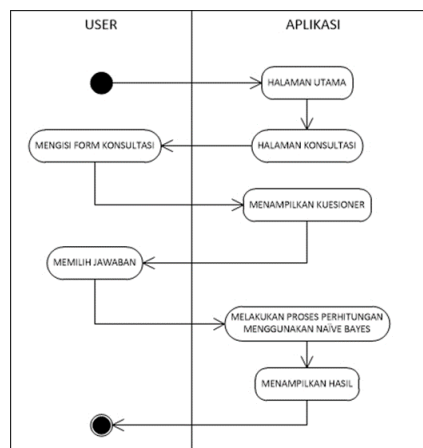


Fig 3. Activity Diagram User Diagnosis

The user's actions during the diagnosis are depicted in Figure 3. The user enters their name, age, and address on the consultation form. The user will then respond to many surveys regarding the symptoms they have experienced. Based on the responses to the questionnaire given earlier, the system will then execute the computation process. The system's last phase will show the results of the diagnostic tests.

3. Class Diagrams System

Figure 4 displays a class diagram for the diagnosis of ADHD disease.

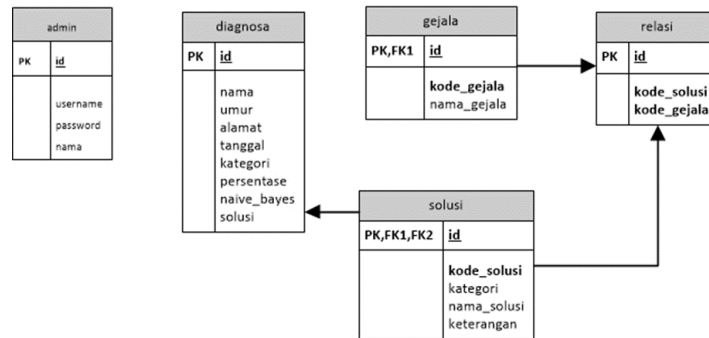


Fig 4. Class Diagrams System

Several related tables can be shown in Figure 4. The symptom table that is linked to the relation table using the symptom code column, the solution table that is linked to the diagnostic table using the solution name field, and the solution table that is linked to the relation table using the solution code field. Although the admin table is used to retrieve data during login, it is not related to any other tables.

3. RESULTS AND DISCUSSION

In order for the results of its application to be seen in accordance with the results of the program that has been made, this chapter will explain the display of the results of the application that has been made. It is used to clarify the displays in the Diagnosis of Attention Deficit Hyperactivity Disorder Using the Nave Bayes Method.

A. Results

Here is the main page view.

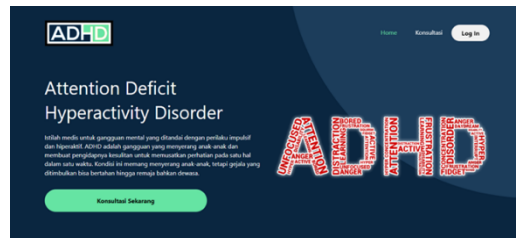


Fig 5. Main Page View

Figure 5 shows the layout of the home page, which includes an explanation of ADHD and a number of choices at the top.

The following step is the presentation of the diagnostic results page based on the prior responses.



Fig 6. Results Page View

Figure 6 shows the results page's layout, which includes a number of options at the top and a summary of the diagnostics' findings based on the responses to the chosen questionnaire.

The system then displays the dashboard page.

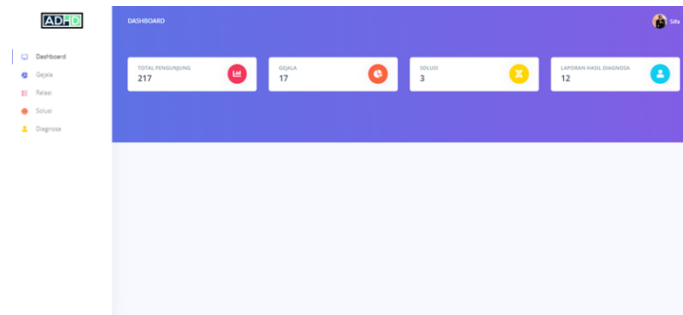


Fig 7. Dashboard Page View

Figure 7 shows the dashboard page's many options on the left or sidebar and a number of objects that describe the volume of data in the table.

B. Discussion

The author makes use of the PHP programming language and MySQL as the database to establish an ADHD diagnosis using the Naive Bayes approach. Because the admin or patient only needs to click on the buttons that are already available and simply input the data entered, the commands in the author's application are also pretty simple to understand.

The aforementioned justifications can be utilized to boost productivity and make the most of the resources used in the Naive Bayes Method for Diagnosing Attention Deficit Hyperactivity Disorder.

Number the equations in sequence with the equation number in parentheses with the right margin,

4. CONCLUSION

It can be determined based on the findings of the conversation and the tests that have been conducted:

1. According to the symptoms entered into the system, the results of testing this expert system can determine how likely the patient is to be afflicted by Attention Deficit Hyperactivity Disorder.
2. Because they employed a technique in line with the demands of the system that employs the density value of the symptoms, the results of the Naive Bayes calculation that has been applied have been good.
3. Results from the consultation include user information that has already been entered by the user, all questions and answers provided by the user, and the level of ADHD in the form of mild, moderate, and severe. The percentage is determined by the user's symptom experience; for instance, if the user reports 10 symptoms out of 17 symptoms, then 58.80% of users report having ADHD. the system's computed empirical Bayes value, the ADHD treatment option depending on the category of symptoms experienced, and an explanation of the option.

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