Journal of Content Validation

article

ISSN Number: ST00-ST00, www.cvsgm.org

Comprehensive Insights: Identification and Detection of Learning Disabilities

Hakimi Bin Ismail[1*], Watie Binti Salleh[2]

[1 2] *Faculty of Education, Universiti Malaya, Kuala Lumpur, Malaysia*

**Corresponding author; Email: hakimi54iml@gmail.com*

Received: 11 January 2025 **Accepted:** 10 March 2025

Revision: 15 February 2025 **Published:** 20 March 2025. **Vol**-1, **Issue**-1

Cite as: Ismail, H., Salleh, W. (2025). Comprehensive Insights: Identification and Detection of Learning Disabilities. *Journal of Content Validation, 1*(1), 115-120.

ABSTRACT*:* Modern world, technology has revolutionized many fields. But in case of diagnosis of learning disabilities, we still relay on the traditional methods of diagnosis which involves tedious assessments and requires medical assistance. IDOL focusses on reducing this manual assessment and replaces it with a more reliable and accurate digital assessment. Dyslexia, Dyscalculia and Dysgraphia are prominent learning disabilities. They affect the way a person learns new things throughout their life. Dyslexia is very common in India. There are more than 10 million cases per year in India. Dyslexia is a learning disorder characterized by difficulty in reading. The condition is chronic and self-diagnosable. But a lot of people struggle to find the correct resources to diagnose the disability and some don't know how to proceed. IDOL is a solution to such issues. The application mainly focuses on dyslexia different modules which concentrates on two major learning disabilities: Dyslexia and dysgraphia. A simple assessment that consists of questions on literacy based on the age group of the user. The user can be a student, a teacher or a parent. Any individual can take the test. The test takes less than 5 minutes to complete but is efficient in testing the user. This can be a potential and time-saving way to diagnose dyslexia rather than the conventional method of diagnosing dyslexia by scans and medical procedures.

Keywords: Total Assessment, IDOL, Medical Procedures, Learning Disabilities

Introduction

Life itself is a learning process. But about 10% of the population have some type of learning disability. Learning disabilities affect the psychological processes involved in learning. They can impair the way a person learns how to read, write, do math or any other learning process. The most common learning disorder is dyslexia, affecting approximately 80 to 90 percent of all learning disorders. Dyslexia is categorized by slow learning or trouble to recognizing words. Because not all parents and teachers know to recognize dyslexia, some children are never diagnosed. These children struggle with reading problems throughout the school and may be considered lazy which they are actually not. Dyslexia is due to differences in the brain and hence no blood tests or screenings can detect it. Instead the Careful evaluation of the signs and symptoms can identify that someone has problems with reading. Testing for dyslexia must focus on certain criteria such as the follows.

When dyslexia remain undiagnosed, the child may struggle with many issues and also gets blamed for it which is actually is not his/her mistake in the first place. Identifying dyslexia by second grade gives the child time and more opportunity to find different learning approaches for himself/herself. So, the application gives an opportunity to get diagnosed for dyslexia by conducting an assessment for the user based on the age category. The questions are based on basic English vocabulary and spelling recognition. The assessment has 3 criteria when the user is a child the application is redirected to a set of questions on vocabulary and spell checks. If the user is a parent or teacher, the application gives guidelines on what can be done and suggests a solution based on the answer given by them to the questionnaire.

Conditions of Learning Disability

Learning Disability is a condition that has a direct effect on the brain and there is no cure or any identified medical treatments. Most of these cases remain undiagnosed due to the lack of awareness from their parents and teachers in underdeveloped countries like Sri Lanka. Deep Learning with Machine Learning techniques is used in the screening process to provide a better solution. [3]. In the field of Artificial Intelligence, an Expert System is a PC framework that has capacity and ability of decision taking just like an intelligent human. Expert Systems are designed to handle difficult problems by going through collections of information, which is represented as if-else rules rather than the procedures. In this report we propose structuring an expert system for diagnosing dysgraphia. PROLOG is the expert system used to diagnose dysgraphia [4]. Trained convolutional neural networks are used to detect the spoken letter/word, detect the written letter/word and detect the written number on the mobile application. Outputs from the convolutional neural network are fed into the models used for screening learning disabilities. The machine learning algorithms used in building the models include k-nearest neighbors, random forest and support vector machine. Screening results from the models built in this research provided an accuracy of 89%, 90%, 92%, 92% for dyslexia, letter dysgraphia, dyscalculia and numeric dysgraphia respectively. This is the first game-based screening and intervention tool for dyslexia, letter dysgraphia, dyscalculia and numeric dysgraphia [5]. System testing was carried out using 50 differently abled children and 50 typical children. With the initial dataset 88%, 58%, 99% screening accuracies are achieved in neural networks for letter dysgraphia, dyslexia and numeric dysgraphia screening while dysgraphia, whereas 90% accuracy was achieved for dyscalculia.

Methodology

The project basically focuses on the children with learning disabilities. The project contains two modules which helps in identifying the major learning disabilities such as dyslexia and dysgraphia at a young age. The scope of the project is that it can be utilized by parents and teachers. The teachers of second grade can assess the whole class and screen them for learning disabilities. Hence it mainly concentrates young lads who are to begin their learning process.

The project has a very bright perspective of helping young people and guiding them in case of a disability. This would be a beginning to discover and regularize the path they are yet to take. So, this project is more of a service to every individual which is very enlightening about the condition they might have.

Architecture Module 1

The user enters the application by entering his/her basic details such as his name and age. The questions are displayed on the screen based on their age criteria. If the user is a child the questions are displayed. When the user is a parent then the questions about their children's performance is asked and when the user is teacher the Ward's performance is inquired. Then the results are generated based on the answers stated. The figure 4.1 illustrates the flow of events based

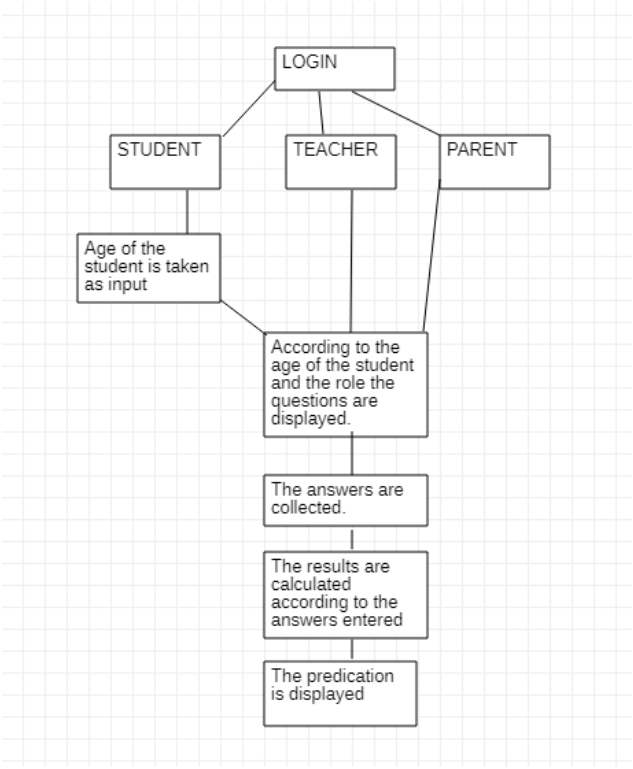

Figure. 1

Results and Discussion

This is the home page of our website, designed to help people struggling from dyslexia and we have several modules to go through from this page. You can take quiz to verify that you are struggling from dyslexia. We have categorized questions based on the age of the candidates, which is available in dropdown menu.

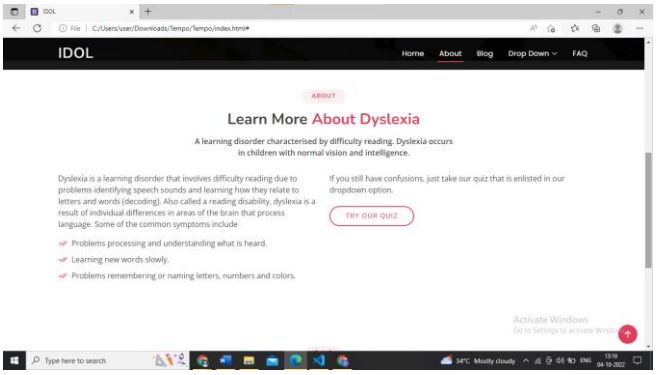

Figure 2

The figure 3 gives detail on the about module. About module contains the general description of what dyslexia is and various symptoms that are common in dyslexic patients.

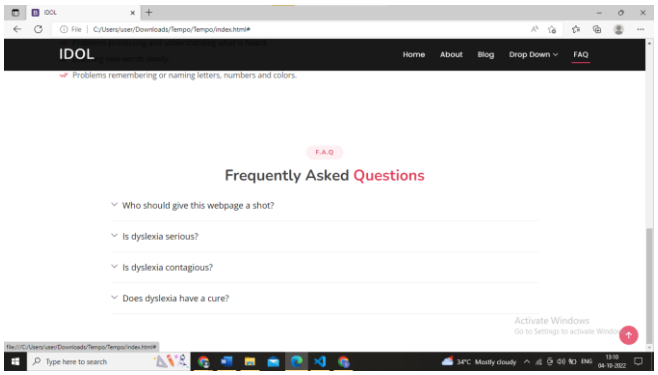

Figure 3

The figure 4 displays the frequently asked questions with answers and gives info about our webpage.

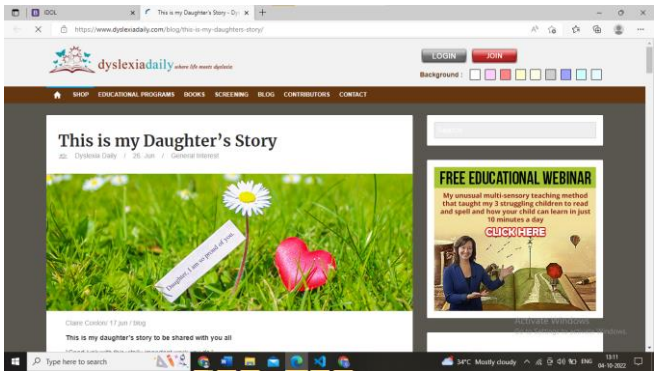

Figure 4

The figure 5 shows the class 9-12 module. Once you click on the class 9-12 option from the drop down, it will directly display you to this page. This page is specially designed for students studying between 9-12 to identify whether they have a probability of having dyslexia. Based on the input from the user we evaluate and display the results.

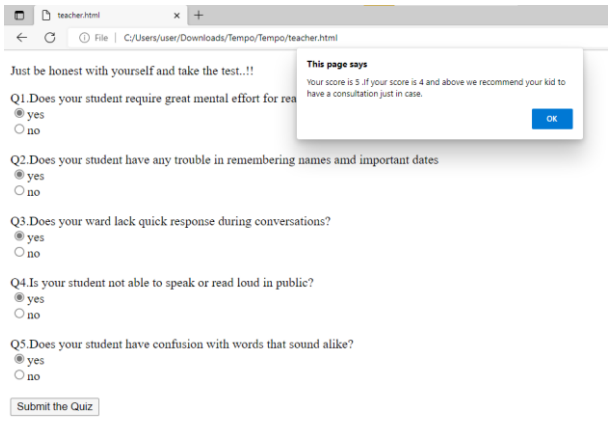

Figure 5

The figure 6shows the teacher module. As we displayed earlier in the dropdown module, this is the page displayed inside the teacher's module. This page consists of some basic questions related to dyslexia and based on the input from the teacher and we can evaluate and display whether their student has the probability of having dyslexia.

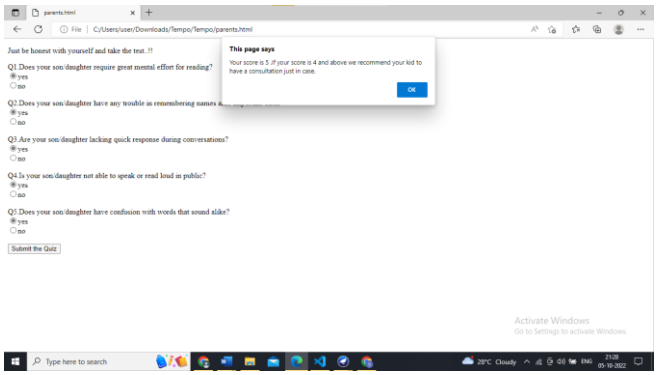

Figure 6

As we displayed earlier in the dropdown module, this is the page displayed inside the parent's module. This page consists of some basic questions related to dyslexia about their ward. And based on the input from the parents, we evaluate and display whether their ward has the possibility of having dyslexia.

Conclusion and future Enhancements

This application can be used during the evaluation of students to screen them for learning disabilities. It can also be used by parents who wish to check upon their wards. The school management and NGOs can also spread awareness and make use of this application to diagnose the learning disabilities in the children and detect them at an earlier age to give them the attention the need. This module can be integrated to a fully functional application that detects every learning disability and suggests the guidelines and tips for the user who is accessing the application. This application can be used in the counselling session to screen the candidates and the children who find it difficult to do learning related stuffs.

Funding: The research did not receive financial assistance from any funding entity.

Conflicts of Interest: The author has no conflicts of interest to disclose concerning this study.

Declarations: The manuscript has not been submitted/presented for consideration to any other journal or conference.

Data Availability: The author holds all the data employed in this study and is open to sharing it upon reasonable request.

References

Budlender, D. (2002). 'Gender Budgets: What's in it for NGOs?', Gender and Development, vol. 10, no. 3, pp. 82-87.

D. A. Kurniawan, S. W. Sihwi and Gunarhadi, "An expert system for diagnosing dysgraphia," 2017 2nd International conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE), 2017, pp. 468-472, doi: 10.1109/ICITISEE.2017.8285552.

R. Kariyawasam, M. Nadeeshani, T. Hamid, I. Subasinghe, P. Samarasinghe and P. Ratnayake, "Pubudu: Deep Learning Based Screening And Intervention of Dyslexia, Dysgraphia And Dyscalculia," 2019 14th Conference on Industrial and Information Systems (ICIIS), 2019, pp. 476-481, doi: 10.1109/ICIIS47346.2019.9063301.

S. Rosenblum and G. Dror, "Identifying Developmental Dysgraphia Characteristics Utilizing Handwriting Classification Methods," in IEEE Transactions on Human-Machine Systems, vol. 47, no. 2, pp. 293-298, April 2017, doi: 10.1109/THMS.2016.2628799.

S. S, U. R and V. R, "Dyslexia Biomarker Detection Using Machine Learning," 2022 International Conference on Communication, Computing and Internet of Things (IC3IoT), 2022, pp. 1-4, doi: 10.1109/IC3IOT53935.2022.9767973.

Zhang Xuepinga, Gao Erweia, C. Richard Liu, "Optimization of process parameter of residual stresses for hard turned surfaces; Journal of Materials Processing Technology," 4286–4291, 209, 2009.

Chorng-Jyh Tzeng, Yu-Hsin Lin, Yung-Kuang Yanga, Ming-Chang Jeng, "Optimization of turning. operations with multiple performance characteristics using the Taguchi method and Grey relational analysis.

Tadros, M. (2011). 'Women Engaging Politically: Beyond Magic Bullets and Motorways', Pathways Policy Paper, Pathways of Women's Empowerment RPC, Brighton.