

Learning Aid for Autistic Students using Machine Learning

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Abstract. – Autism Spectrum Disorder (ASD) is a kind of Neurodevelopment disorder found among children of any class of society. It has a wide diversity of symptoms that makes each child different from other and almost a unique behavior. Therefore, there are no definite ways of identification of autism. Learning ability of an Autistic child is low and varies from case to case. A different approach has been experimented for the development of Autilearn software which Aids the ASD detected child to learn and communicate efficiently. Use of basic colors eloquently has an impact on the brain that creates interest in them to learn, like normal children do. Each child is having different ability to learn and this software helps to explore various abilities of learning.

Keywords: Autism, Impact of Colors, Learning module, Test Modules, Result

INTRODUCTION

Autism Spectrum Disorder (ASD) is a topic for worldwide research. The root cause of it is yet to be found out. The approx. probability of autistic child one in 60-70 children, but still the exact reason behind it is unknown to our world.

Brain response of ASD kids is not like the normal kids' brain. Mind is available in every human being that gives intuitions to every one for all basic needs to survive.

In case of autistic kids, brain is not able to perform multiple instruction. Intuitions and some emotions are present but they cannot express because of low brain response. As per human machine interaction every human being understands emotions, languages etc. Colour plays an important role in this to understand emotions as well as helps in learning. Warm colour to calm colour we can express our feelings, a few things can impact on our mind due to colour combination. [1]

India culture is different so we cannot use the existing aid for each autistic kids of very country. If we can apply things which uses day to day life can helps learning fast atleast it reduces learning time. The exist some learning aid system of like TEACHH and virtual tutor are good but the things they used as per their country cutlers and practices so it helps to learn but does not have a great impact on autistic kids of different countries.[3]. we have tried the aid which is developed for Indian autistic kids using the things they use day to day life it helps to reduced their learning time and helps to remember and recall the things.

Autistic kids have learning problem. They are slow learner because of lack of contraction and unable to understand instructions [2]. Using different learning aids, we can try to improve their learning ability. Since each autistic kid is different and has different learning ability, use of any particular learning aid may be effective in varying degrees. In most cases autistic kid is not able to deal with more than 2 colours. Basic colours can be best used to teach at very basic level. And kid can focus on particular object which is designed using one basic colour. If the object is small and kid is playing with it then it would be difficult to save all the things in the brain. Same thing if we project on the screen kid can try to relate that things with touched That he/she has played with the same colour object. Brain of human being is liked to store the things which he loves or liked.

Similarly autistic kid brain also can store single instruction. In autistic kid's brain can understand only one instruction in most cases and focuses on that only.

2. Proposed System

Autilearn has a main motto to make specially abled students learn faster, the main focus and design is done keeping in mind this motto. This architecture specially design for Indian autistic children and all the images or objects used that children uses day to day life The following architecture iexplains how the entire working of the application is done, right from the first working page to the last along with the procedure. It explains how each exercise works and helps students to grasp concepts faster. There are various exercises inside the application. We have also provided a dashboard to maintain the user's data, as each student will be different and will grasp concepts differently. We have a facility to keep how many attempts each student made, how many levels did he pass/fail. There are various levels that the student goes through in the application. Each level is designed keeping in mind the aptitude of especially abled students. We aim to teach them basic numbers and alphabets along with some social skills. We have levels in each of the given modules (match the column, identifying alphabets, counting numbers are our modules) also.

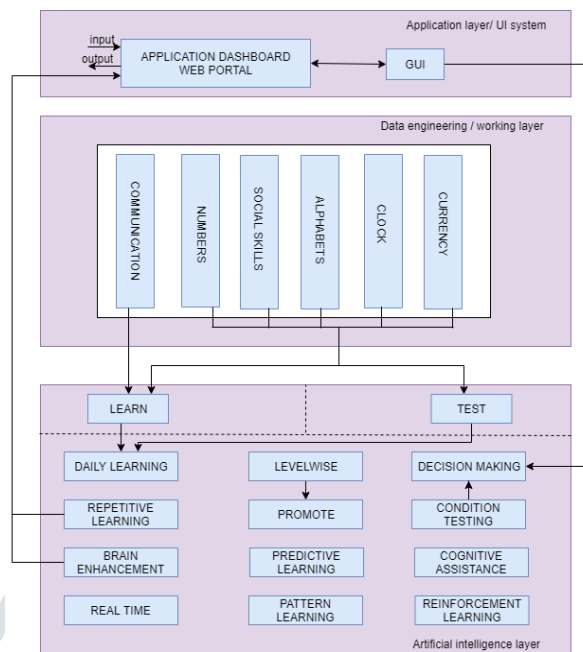


Fig 1. Architecture of Autilearn

➤ **Learning Module**

It firstly get divided into two parts, where the child can learn or if he/she is confident then he can directly go appear for the test shown in the fig.1. The modules to learn are the same that of the test, so the child is confident before he/she appears for it. The modules are match the column, counting numbers and learning alphabets. All this can only be accessed. All the learning module design using basic colour, which grab the concentration of the kids easily. The objects relate with the alphabets are those which students are using day to day life. This helps students to the feel or touch they have in their mind they can recognized it. In this module the basic colour used with the faint background. Here colour plays an important role, object we are showing same object on the big screen same which reduces stress on the eyes and students can focused for long time. Once the students learn basic then we tried the more than two colours smooth warm colour attracts the students. For validation purpose to keep track a login is provide for the user. We insist user use aid on big screen.

➤ **Test Module**

In test module we can check how much student is learnt and now is able to perform the task or not. Based on the performance we can promote the students on next higher level. Which saves the each student time because each students learning ability is different those who are good in learning can promote next level soon, and those who are slow can repeat the things a few more time and here we can identify the problem and their behavior pattern can apply other method to improve learning skill. Each students attempt is recorded, we have a rule that if the student scores more than 60% in his test then only he will be followed to move to the next level or else he will have to repeat the same level until he scores more than 60% overall. Each student will be given a total of 5 attempts to cross a particular level with a minimum of 60%. Here system will generate report of the kids and suggest progress of the students. Using machine learning system predict the performance of the students This is how the entire application structure functions and this is how each student learns and then appears for the test. We have to keep in record the number of attempts each student goes through and the percentage he scores in each level of a particular module. We then finally display the result either pass or fail along with the attempts. The machine learns how to student performs and then moves him to the next level accordingly. Autilearn serves the purpose to make things interactive for students and make them learn better in this following format.

Table 1: Result Chart of various students before using

Student Name	Test	Score	Attempt
Rahul Pandit	Alphabet	60%	4
Shweta Pawar	Maths	77%	3
Snehal Mukherjee	Alphabet	65%	5
Naman Mehta	Alphabet	60%	5

Abhishek Acharya	Social Skills	75%	3
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In the table 1, showing that learning time of the students is more objects was small and it was difficult to focused on the object or recalling of the object

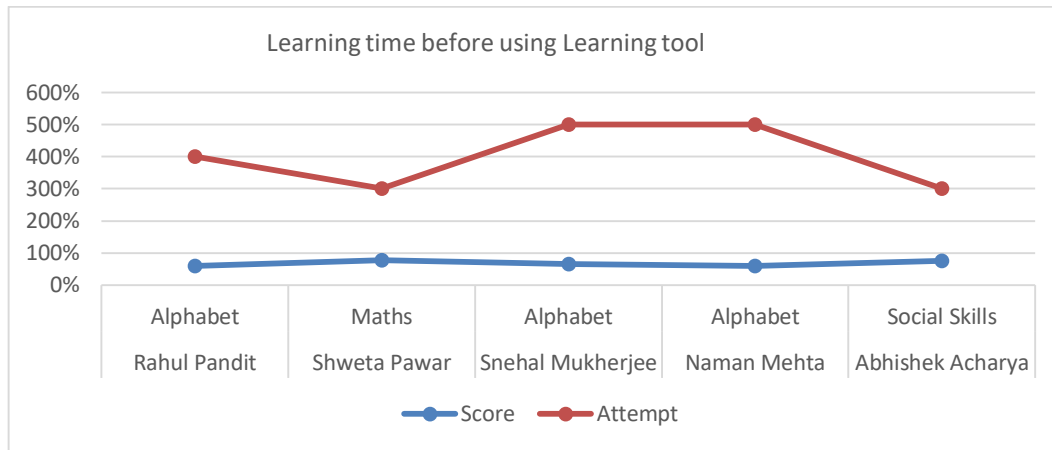
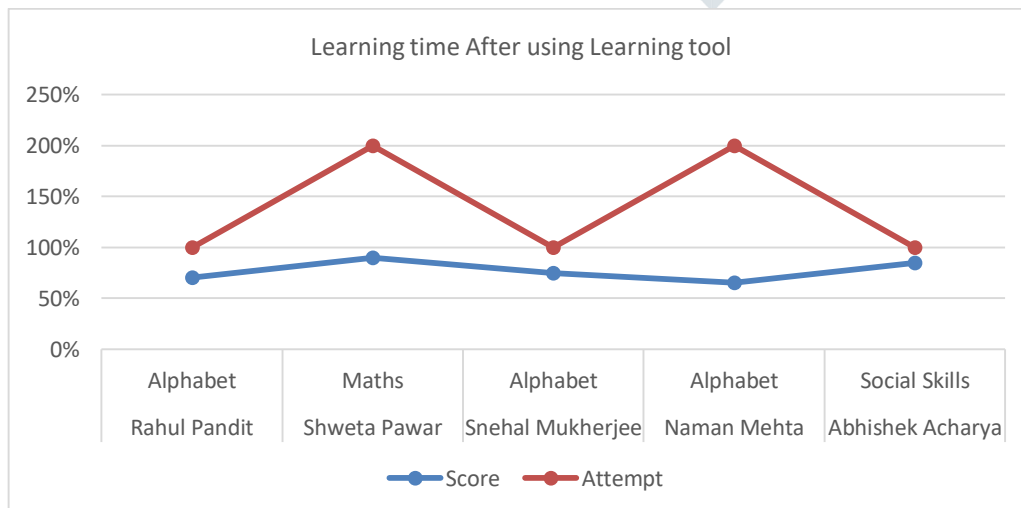


Fig 1.Learning time before using tool

Student Name	Test	Score	Attempt
Rahul Pandit	Alphabet	70%	1
Shweta Pawar	Maths	90%	2
Snehal Mukherjee	Alphabet	75%	1
Naman Mehta	Alphabet	65%	2
Abhishek Acharya	Social Skills	85%	1

Fig 2.Learning time after using tool



In the table 2 and fig 2 it is showing that how technology helps the students to remember the objects relate the objects. This helps reduced the learning time, gives description about various students who have appeared for a particular module, shows how well have they scored and are any improvements required. This information about the student is collected via the registration page created which keep the information atomic in the database. The various attributes are student name, the type of test that they have taken or opted for(i.e alphabet learning, number counting or match the following). The table also shows the number of attempts the child took to pass a particular level along with his score. Each child has to score above 60% to pass the test.

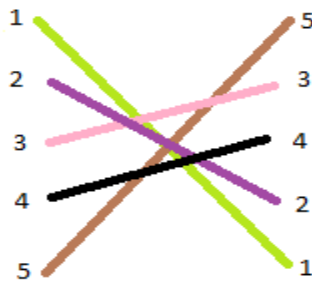


Fig. 2. Match the column module

This is a basic level of the match the column module shown in the fig 2. Shows a sample of how the module of match the column works. There are two types and they are of alphabet matching and basic number matching. Here each child has to connect the respective number to its answer, same is the case with alphabet. On receiving the correct answer the module moves to the next level.

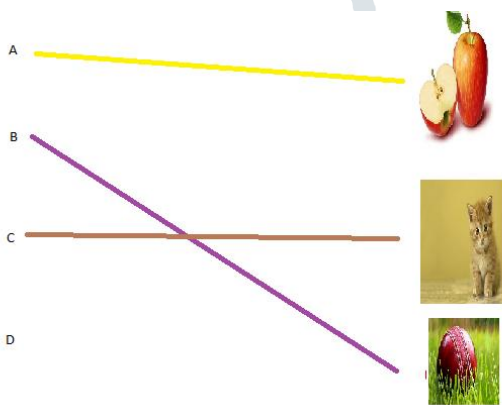


Fig. 3. Advanced match the column module

This is the next level of the match the column module. It's complicated as compared to the first one and not at straight forward shown in the fig 3. Here each number has to be matches with a particular object. Say for example number one should be matched with one pencil, two should be matched with two apples etc. This enhances the child's ability to identify daily routine objects well as well as learn numbers along with them.

LEARNING CURRENCIES



WHAT IS THE NUMBER?

NEXT BACK EXIT

Fig 4: Currency learning page

After passing various level of match the column the child is now clear with various objects and some colors also. We now expose him to many colors on one screen. We do that by making him identify the currency on screen .Each bill consists of various colors , this is how the child will be familiar with colors and learn various currency notes at the same time shown in the fig 4..Currency is used to with indian kids it helps to learn fast.

Table 3:Chart for marking scheme

TEST(result)	ATTEMPTS
>20% fail >40%bad >60%pass >70%good >80%very good >90%excellent	The students total number of attempts on a particular level is shown , along with the test result.

This is the test attempt chart , here we display the result and show the criteria of how each child score is evaluated and whether he/she is fit to move to the next level or not shown in the table 3.This is the grading scale for AUTILEARN. .Rewards and grades motivate the students to give their best hence , we gives such output for the student to understand where he stands and whether his grades are poor ,good or very good.

3. CONCLUSION

The aims of development of this learning aid is that the overall growth of Autistic students. We aim and hope to provide an efficient learning aid for autistic as well as other mentally disordered students. It will be achieved by implementing various interacting modules as well by understanding human psychology We have taken into consideration the color study and response of each student to different colors is recorded. We have successfully reduced the learning time (be it alphabets, numbers etc.) of a student by a certain percentage in each of our module.

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