Brain Stimulation Game application for children

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Abstract -   Most of the new generation children nowadays are using their parent's electronic devices as a habit. Addict on to new technologies lead the children away from educational activities. This is affect to the child's future and main problem is this that the early childhood does not develop on correct way. Considering about this problem the research implemented an educational gaming application based on how to use technologies toward to better future by navigate children to educational activities and reducing time wasting for useless things through the new technologies. Smart Kids is an Unity based gaming application for children of 6 to 10 age category. Prototype methodology used for implement the application. The developed gaming application based on Mathematics and includes many features. The application developed to improve child's cognitive skills in mathematics and memory development areas. Different game categories used to develop child's different kind of skills and each category included different levels. The variation of gaming categories will be motivating child to do different sides. When considering about parents, within the busy life style some parents have not time to check child's skills improvements. As a solution, developed application calculates child's performance.

Keywords - kids, educational gaming application, cognitive skills.

I. INTRODUCTION

Smart Kids was developed as a mobile based android game for students who are going to sit for the grade five scholarship examinations in Sri Lanka. This mobile game consist with set of small games under three main category. Memory development, Logical thinking and mathematical skills are the main categories of this game "Smart kids". All the 4 games are "Not Matching, Mirror Image, Calculus Game, Choose Letter". With the development of the modern technology, mobile phones have become a great device a tool among each and every age limit.

Through this age limits, small children are more likely to play with mobile phones. Some children have addicted to play games with phones and spend a most of time with these devices. Almost all the mobile games are developed only targeting the entertainment but not the knowledge or the wisdom which can be easily given through these kind of game to the ones who are playing. As a result of this most of the education of the children has been destroyed. To address this problems an application with a set of games has been built to enhance children's memory development. "Smart Kids" is beneficial for the kids who are going to face scholarship examination. Kids will be able to improve their logical thinking capability, mathematical skills and can improve memory capability. It will be good solutions for kids who addicted to the mobile games and

also kids can be avoided from stress and mental disorders. In the developed system, application interfaces are created using Unity. Once the application is launched welcome screen is appearing, then register window will be displayed. After registering the logging interface is appeared. When logged into the system the child can play the game. The parent can check the brain improvements of the child as a whole or category wise. The level completed or level uncompleted windows are appearing after each time when the child played a level. Considering about child's development, application will provide different levels base on each child. Parents can check their child's improvement by this application. Application is going to measure child's brain development rate by keep tracking of child's activities. The parents can identify the child's skills and weaknesses. Then they can give more attention to improve those weak areas. Proposed application will provide multiple user accounts to each user.

II. LITERATURE REVIEW

Sinhala is a very difficult language compared to English to speak and write. So using   technology is the best way and effective way to teach language to children. . There are little number of new solutions for technologies enhancing the learning experience of Sinhala Language. An android Application with became a reality to Enhance Sinhala Learning Experience for Children, was a solution is focused to teach Sinhala

alphabetical letters to children and improve their language fundamental knowledge using augmented reality. The mobile application is implemented by using prototype methodology and application provides AR 3D Sinhala letters with animations, pronunciation. The problem of this research is there is no such away to predict child's improvement [1].

There are lot of numbers of mobile applications that are available that made educational purposes, instead of improving child's cognitive skills. When we consider about this Onto Cog which developed for develop English knowledge and improve Cognitive skills of preschool children. Mainly this research includes classification and relatedness in addition with memory skills related activities. Children have to categorize the pictures according to understand the relationship with the random question which they give. The main disadvantage is child will not feel a variety, because all games are same type of games [2].

New Information technology educational applications are developing day by day for many different subjects. Yang et.al has implemented this Map-Puzzle Application for the Evaluation of Children's Knowledge of spatial. Which this mobile application is mainly focused on geographical education. previous jigsaw-puzzle games, which predicts result by calculating total time which got finish the task by the child. But the mentioned application calculates result considering about total time that taken to finish tasks and no of total movements that made. This gives more accurate result than the previous [3].

This is a game-based platform which designed for teaching English to preschool children in many nations. This app mainly designed for tablets and iPad and pcs. It can two provides platforms for children to learning and playing as a game to practice the learning. This Application contains more than 100 interactive lessons and teacher tools. This focus on listening, speaking, writing and reading English. Game gives rewards to motivate the child to complete new tasks [4].

Lots of today mobile application in the market, there are few availability of educational games particularly for kids and preschoolers . This have implemented mobile application that would cater the kids and preschoolers in terms of reading, spelling and mathematics. The user chooses the category what user wants to play and there are 5 categories of the game specifically alphabets, body parts, colors, shapes and numbers. Each game has relevant limits and the score that dependent to the strategy and deepness of each game. If the player loses the game the application will give and show the score and error. The problem of this

research method is costlier than using the manual and computer process [5].

In the modern world, children are practiced to use smart devices with the development of the technology. Most of the children are using their parent's electronic devices like smart phones, tablets as a habit. This paper provides solution for this problem this educational base gamming application is developed based on Sinhala language. Application will provide a game that preferable for age 6 to 8 children. It includes different educational areas to improve children's mathematical skills, reading skills, decision making skills, memorization skills. To make easier to play this game project team developed it using leap motion technology. This technology will attract children to this game application [6].

New technologies like leap motion and sensor technologies are latest new ways for the effective learning. The children are more like towards new technologies and it made this problem in 2016 Game Based Learning with the leap motion controller system was developed. The research was done out with a small number of kids covered the area of using innovative input devices in school education. A very small 3D infrared camera is tracking the user's hand and finger movements in allow the user to play the game [7].

III. METHODOLOGY

The developed system is using the prototype methodology of Software Development Life Cycle (SDLC). The software prototyping is referring to building software application prototypes. The model technique prototype methodology is utilized to accomplish the objectives of the project. In model strategy, the three stages analysis, design and implementation are performed simultaneously and they repeat until the point that the entire framework gets completed. The principal model is the first part of the prototype with a minimal number of functions of the project.
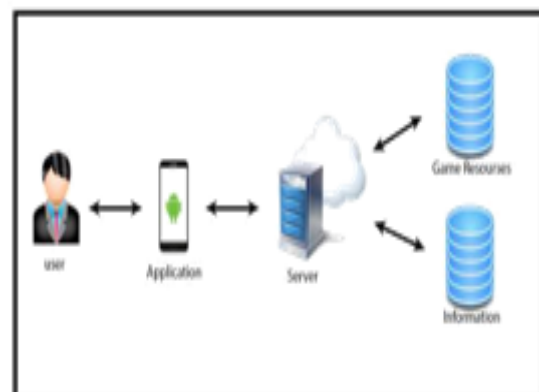

Fig.1. High Level Diagram.

According to the Figure 1, illustrate that user (kid) can play the "Smart Kids" through android mobile device. Database will be hosted and game resources like images, audio clips, and graphics will be stored there.

During the requirements gathering and analysis phase, the research team studied number of research papers and existing solutions from online journals and articles. First the current system was analyzed and the weaknesses and the strengths of the current system were identified. The kids within the age range of 6 to 10 were focused by the research group and the techniques which they use to improve their knowledge were identified. After analyzing the current system, the next step was to gather the requirements. First the research team were discussed about the ways to gather the requirements. As the primary data gathering, the research discussed to prepare questionnaires for the scholarship kids to gather data about them. And also interviewed parents and teachers to collected further information about behavioural and educational patterns of the kids.

In the designing phase, the project team focused more on development of the game interfaces and gaming application. The game is the main part of the research project and the application has different categories for the child to play. Application interfaces are created using Unity. Once the application is launched welcome screen is appearing, then register window will be displayed. After registering the logging interface is appeared. When logged into the system the child can play the game. The level completed or level uncompleted windows are appearing after each time when the child played a level.

IV. RESULTS

This section explains the results of the system. There are 3 games called "Choose Letter" and "Calculus" . In this games kids have to select the correct among the all four answers. Then the marks will be added. After the completion of all the games kids get the marks. Finally kids can compare their marks with the previous marks the had. It can be seen by a graph.
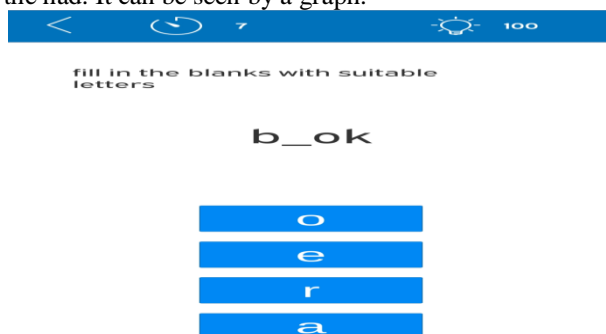

Fig.2. "Choose Letter" game Interface.

This is a mathematical game. Two values will be given with one operator randomly. User will be given 4 answers. User has to pick the correct answer.

Fig.3. "Calculus" game.

This is a logical game. In here it asks that the image is a mirror image or not. The user has to decide it and give the correct answer by pressing "YES" or "NO" buttons.

V. DISCUSSION

Smart Kids is an educational base gamming application which is based on skills improving. The research has been accomplished by developing the Unity Methodology. Since the research team has performed the unit testing and error handling well. The system is running without any major issues, but proper testing with test cases are yet to be done. Mentioned before were the main objectives of the research. During the developing period the team had to face some technical and logical challenges. Following are some of the major challenges faced by the research group.

1.Identifying which kind of games to be made

To avoid the listed problems, the team had to seek for support from other individuals who are working as Software Developers in the industry and to refer tutorials, books etc.

In order to complete the system, the team used the following techniques to solve the issues mentioned above.

1. Had a professional discussion with teachers and parents.
2. Details were gathered using internet and other sources.

The team used the following steps in order to ensure a high reliability in the system.

1. Powerful open sources tools were used as Unity.
2. A password is necessary to Login to the application in order to ensure maximum security.
3. User can view child's performance.

4. Password will be saved as encrypted to ensure the security of the password.
5. Application will be working properly when playing the game.
6. Scores will be updated properly.

When designing the System there were some assumptions observed. They are listed below.
1. Developing team assume all the parents have knowledge about android mobile phones.
2. Children have basic knowledge of using a mobile phone in order to use "Smart Kids" Gaming application.

The accuracy of the system is more than 80%.

The Reliability rate of the system is more than 70%.

VI. FUTURE WORKS AND CONCLUSION

"Smart Kids" the mobile game application that work as a children's skills development application. The possible functionalities that research developed in this game application measure the skills development and improve child's knowledge and cognitive skills. This project is covering several levels with different areas which increase the knowledge of the child step by step. Application measure the improvements of the child by keep tracking what are the marks that child has got.

I hope to develop this Unity application with full autonomous gaming levels because all the equations and answers are made the members for the game. It randomly chose a id and display in the screen. We hope to develop this application as how it will automatically generate the equations, answers by difficult from level to level. And we hope to develop this application also for IOS and windows mobile phones.

VII. ACKNOWLEDGEMENT

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