Child Education Using AR

[1]Kunal Jadhav, [2]Abhishek Patil, [3]Mitali Haldankar, [4]Kalpana Pandey, [5]Nilambari Narkar

[1]Student, [2]Student, [3]Student, [4]Student, [5]Professor
[1]Department Of Computer Engineering,
[1]Xavier Institute of Engineering, Mahim, Maharashtra, India

Abstract : Education has not only become a means to gain knowledge but also a necessity in today's world. Parents aim to find the talents of their children and nurture them from a very young age. This led to a packed schedule for the children, covering their entire day. In such rigorous preparation for life, children often are drained and their creativity levels depleted, leaving the child uninspired towards their daily education. To attract a child's attention in such a distracting world towards academics is relatively difficult. Today's young generation is used to the technologically advancing world and has adopted digital modes of education as a part of their curriculum. Augmented reality is one such technology that can be used for children's education. In this paper, we introduce an Android application created to provide a preliminary level of education to children from a young age up to age ten.
Augmented reality can be used to create engaging and interactive educational experiences for the children. The application offers an unparalleled and engaging method of education that captures the interest of children and transforms the learning process into an enjoyable experience using augmented reality. It offers a range of educational modules, including alphabet, number recognition and animal identification. The app is interactive, engaging, and easy to use, making it ideal for young children. In summary, the Android application introduced in this paper is an innovative tool for children's education that harnesses the power of augmented reality technology. By providing a fun and interactive learning experience, it helps children stay engaged and inspired in their daily education.

I. INTRODUCTION

1.1 Problem Statement

The rate at which a youngster picks up concepts, their environment, their level of focus, and their level of concentration can all have an impact on how each child learns. Children aren't exposed to the outside world for a variety of reasons, therefore they aren't familiar with the many components of the ecosystem. Children are accustomed to using digital devices from an early age, making smartphones an ideal platform for education. Keeping this in mind, we have included augmented reality technology into our project for the goal of educating children.

1.2 Aims and Objectives

Using augmented reality technology, we developed a smartphone application to enhance the learning experience of users. This mobile app will use Augmented Reality (AR) technology to make studying more enjoyable by displaying three-dimensional items that mimic their original shapes. The learning media in this project are geared toward post Gen Z or early childhood so that they can view, recite, shape to change the size of items, and interact with them.

II. RELATED WORK

A study By G. J. Carlo H (June 22) has shown that impact and use of augmented reality is on education is increasing these days and Augmented Reality make education interesting and gives visual experience to the user. Current generation of children are technology friendly and can easily adapt this new technology.

There are prominently two models which work similar to our app but first one does not provide the option for testing purpose and so we can not measure the child's understanding of particular subject or topic. In second app there is test module but there you need continuous uninterrupted internet service and it is not possible for some remote area students to have good internet services. And mainly both the app were not specially dedicated to children's education whereas our app only works for children's education

III. RESEARCH METHODOLOGY

Our Approach

The authors begin by providing an overview of the importance of education and the challenges faced by traditional methods of teaching. They argue that AR technology can help address these challenges by creating a more immersive and engaging learning experience for children.

The authors then describe the methodology used in their study, which involved the development and implementation of an AR-based educational application for children. The first step in the methodology was to conduct a needs analysis to determine the specific educational needs and goals of the target audience. This involved reviewing existing literature on child education and consulting with experts in the field.

Based on the needs analysis, the authors identified several key learning objectives that the AR-based application should aim to achieve. These included improving children's understanding of basic concepts in subjects such as math and science, promoting critical thinking and problem-solving skills, and enhancing children's motivation and engagement in the learning process.

The next step in the methodology was the development of the AR-based application itself. This involved creating a detailed design document that outlined the functionality and user interface of the application. The authors also used software development tools such as Unity3D and Vuforia to create the 3D models and animations that would be used in the application.

Once the application was developed, the authors conducted a pilot study to test its effectiveness in achieving the identified learning objectives. The pilot study involved recruiting a small group of children and having them use the AR-based application over a period of several weeks. The authors collected data on the children's learning outcomes and their overall satisfaction with the application.

Based on the results of the pilot study, the authors made several revisions to the AR-based application to improve its effectiveness and usability. They then conducted a larger-scale study involving a larger group of children to further evaluate the application's effectiveness.

The larger-scale study involved dividing the children into two groups: one group used the AR-based application, while the other group used traditional teaching methods. The authors collected data on the children's learning outcomes and compared the results between the two groups.

The authors found that the group using the AR-based application showed significantly greater improvement in their understanding of the subject matter and their problem solving skills compared to the group using traditional teaching methods. They also found that the AR-based application was more engaging and motivating for the children.

In addition to the main study, the authors also conducted a follow-up study to evaluate the long-term effects of using the AR-based application. This study involved contacting the children who had used the application several months after the initial study and assessing their retention of the subject matter.

The authors found that the children who had used the AR-based application showed greater retention of the subject matter compared to the children who had used traditional teaching methods. They also found that the children who had used the AR-based application reported a higher level of interest and enthusiasm for learning compared to the children who had used traditional teaching methods.

Based on their findings, the authors concluded that AR technology has the potential to significantly improve the effectiveness of education for children. They also noted that further research is needed to explore the optimal ways to use AR technology in education and to evaluate its effectiveness across different subject areas and age groups.

Overall, the methodology used in this study provides a comprehensive framework for the development and evaluation of AR-based educational applications. It emphasizes the importance of conducting a needs analysis to identify specific learning objectives and the use of pilot studies to test and refine the application's effectiveness. The study also highlights the potential benefits of using AR technology in education, including improved understanding, retention, and engagement among children.

IV. RESULTS AND DISCUSSION

begin with, I would like to provide a brief overview of how our Android application operates. Starting with our android application, in Fig.1 here it displays the home page screen after starting the application. Furthermore, we can see in Fig.1 that it displays the necessary information about our application for user's to take a note and understand about what our application actually does, while displaying the information afterwards it also has a close button after reading the whole information. The user can then click the close button and continue on ahead with the exploration of our android app.

fig 1

after understanding what our android application is about through our app information screen it then goes to the main screen means the main menu given in Fig.2.
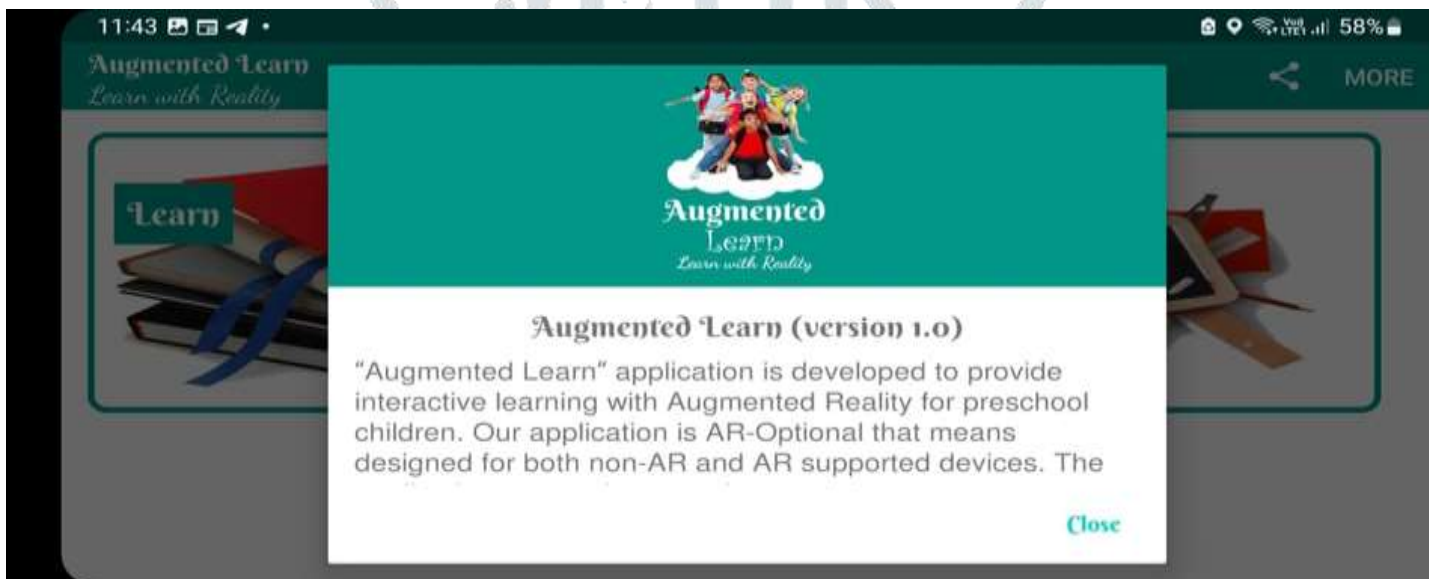

fig 2

Here in Fig.3, the modules which are being displayed are the learning and the testing modules. We can choose either of them but it is recommended to choose first the learning module as the child would learn and then give the quiz from understanding the module.

Fig 3

Given in Fig.4 and Fig.5, We have successfully deployed 2 Languages Module, those are English and Marathi. In that we have deployed Alphabets, Animals and Numbers Module. You can also add many such categories like Fruits, Vegetables, etc. Also we can deploy in many other different languages.

Fig 4

Fig 5

As we can see here in Fig.6, the app is detecting a smooth plane to display the 3D Model of an Animal, Alphabet or a Number. Now in Fig.7 it is referring to the 3D model of an elephant being displayed by our android application.
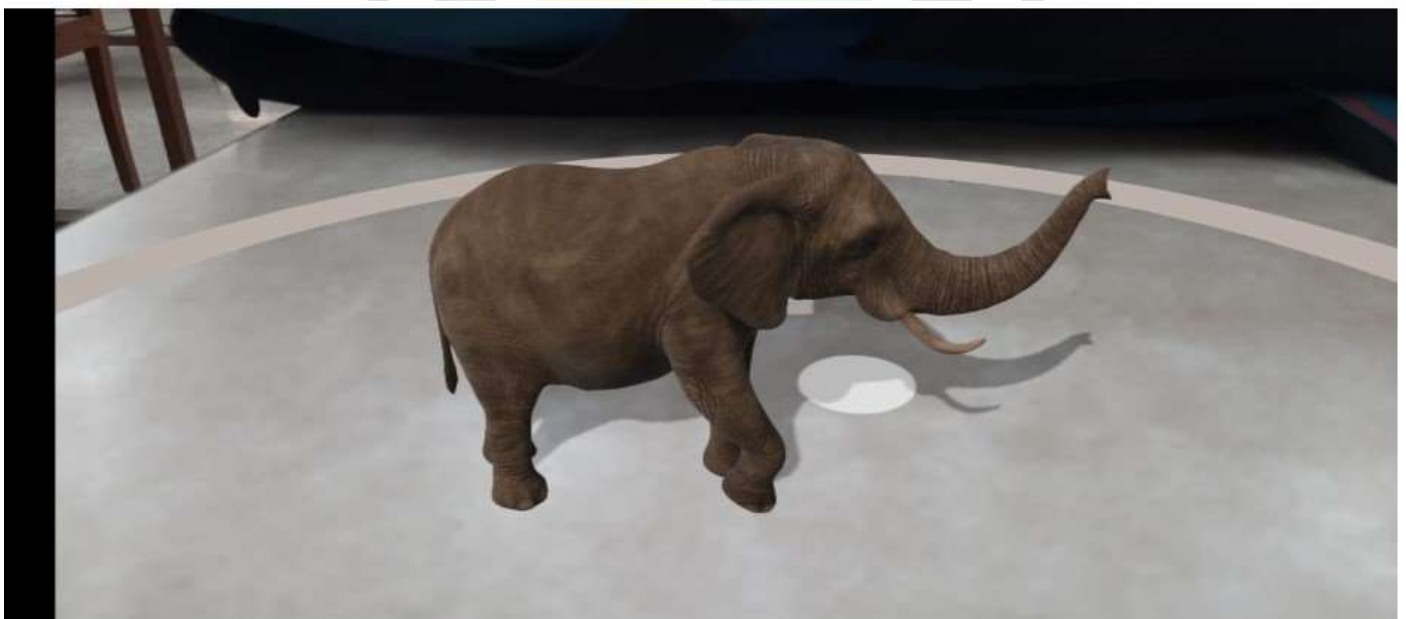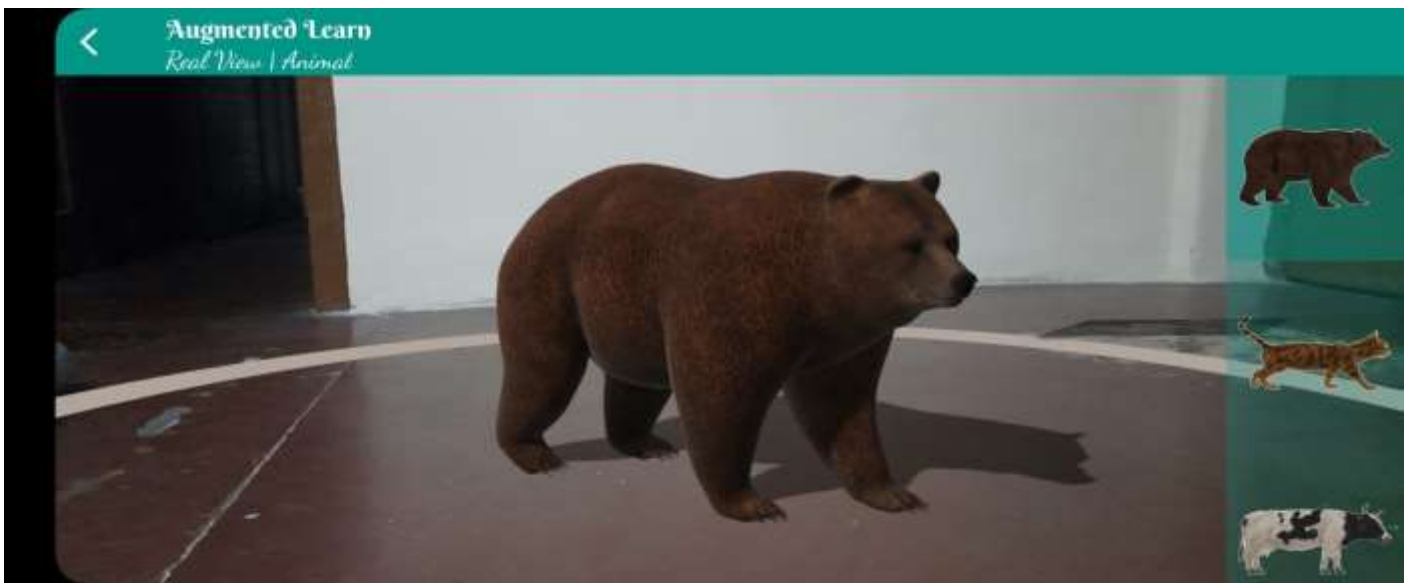

fig 6

fig 7

fig 8

Here in Fig.8 and Fig.9 we are displaying the 3D models of Animal module. The Bear 3D model can be seen in Fig.4.8 and also we are showing different types of animals which can be displayed by our android application.
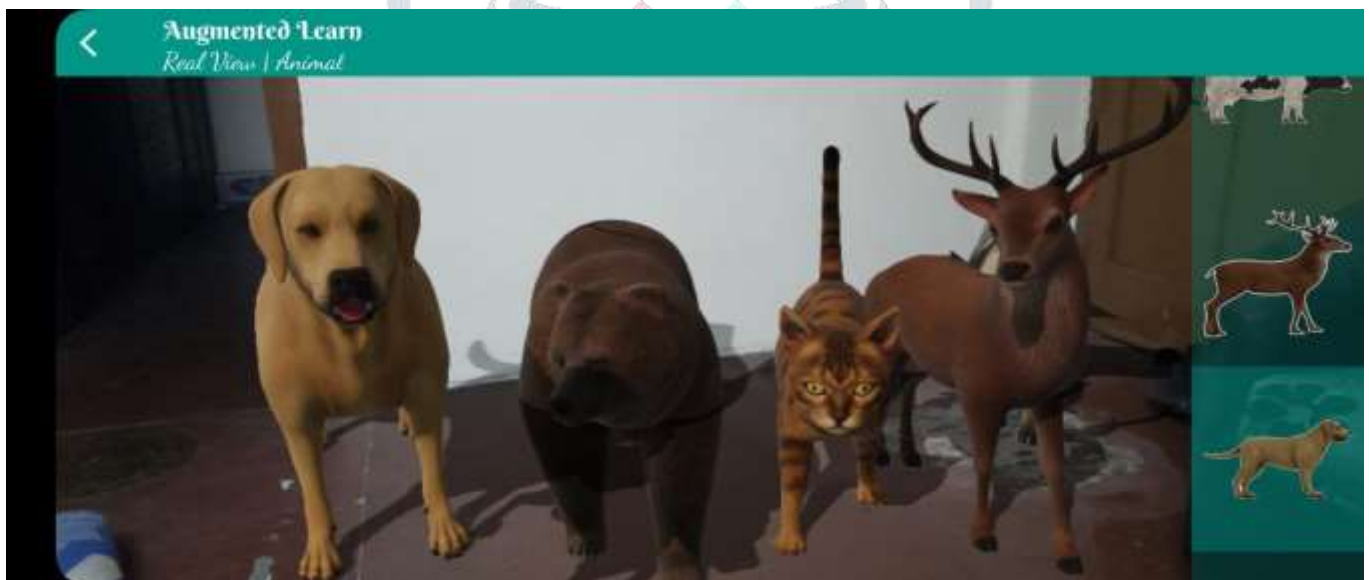

fig 9

in Fig.10 if the child wants to see the alphabet in augmented reality then he/she can just click the mobile like button above the letter 'Apple' and can enjoy their augmented reality experience.

fig 10

Fig 11

Alphabets are getting displayed in the augmented reality environment when the child is learning. In Fig.11 and Fig.12 like that we can experience many such alphabets in augmented reality

Fig 12

Fig 13

We can also experience the MCQ-style quiz conducted in the Testing Module. As shown in Fig.13we can see that there are options given and there is the voice button of the correct answer and also its spelling for children to learn better with time and this all is being displayed over the screen of the user.

Fig 14

We can see in Fig.14 when the user select an option the app will then give a tick mark if the answer is right or else it will give a cross mark on the option chosen by the user. If the option chosen by the user is correct it will then proceed to the next question or else it will stay on the same question until the user get the correct option.

V. CONCLUSION

An Android application using AR technology for children can revolutionize the way children learn and experience the world around them. By using AR technology, children can interact with the virtual world, which can enhance their understanding and engagement with educational content. The application can be designed to include different modules such as alphabets, numbers and animals.. With the application, children can explore the world through an immersive experience, providing a deeper understanding of unknown concepts.

Furthermore, this application can have significant benefits for society by increasing access to education, particularly for children living in rural areas. Often, these children do not have access to the latest technologies or educational resources. However, by providing an android application that works offline, children in rural areas can also benefit from the advantages of augmented reality technology. This application can also help bridge the gap between rural and urban education systems.Overall, child education using augmented reality technology can have numerous benefits, from enhancing learning experiences to increasing access to education. By providing children with a fun and interactive way to learn, this technology can help improve educational outcomes and, in turn, contribute to the development of society.

At the end we have successfully developed an Android application that aims to provide preliminary education to children using Android Studio and Blender to implement the following three-dimensional models: 1] Alphabets, 2] Animals and 3] Numbers.

In addition to the basic display of a three-dimensional model, the child will be provided with a test module that will help the child evaluate the speed and grasp of knowledge he or she will acquire by asking questions on the screen with the three-dimensional model in question. Goal of this project aims at using Augmented Reality to create a model for learning that can be used as a basic concept in the children's educational journey.

REFERENCES

[1] Surabhi-Nanda and Shailendra-Kumar-Jha, "Augmented reality - an application for kid's education," *International Journal of Engineering Research and Technology(IJERT)*, 2017.

[2] Feryanto-Viola, Levi, Sunanda, and Michael-Vincent, "Augmented reality mobile application as learning media in science subject for the post gen z generation," 2021.

[3] G. J. Carlo H, "Augmented reality for education: A review," Jun. 2020.

[4] Paul-Milgram and Fumio-Kishino, *Taxonomy of mixed reality visual displays*, (Accessed on 05/10/2022), Dec. 1994.

[5] Paul-Milgram, Haruo-Takemura, Akira-Utsumi, and Fumio-Kishino, *Augmented reality: A class of displays on the reality - virtuality continuum*, (Accessed on 07/10/2022), Oct. 1994.

[6] T. H. Hollerer and S. K. Feiner, *Mobile augmented reality*, 2004.

[7] Cecilia-Avila, Garzon, and Jorge-Bacca-Acosta, "Augmented reality in education: An overview of twenty-five years of research," Apr. 2021.

[8] Piyush-Dhamdhere and Navin-Singh, "Augmented reality for abnormal kids," Nov. 2019.

[9] Masyarah-Zulhaida-Masmuzidin and Nor-Azah-Abdul-Aziz, *The current trends of augmented reality in early childhood education*, Dec. 2018.

[10] P.Kaliraj and T.Devi, *Innovating with Augmented Reality*. 2022.