



# RESEARCH ON AR-POWERED EDUCATION: THE NEXT GENERATION OF LEARNING TOOLS

<sup>1</sup>Savi A. Ingle, <sup>2</sup>Samiksha G. Dhone, <sup>3</sup>Warad A. Jaiswal, <sup>4</sup>Mayuri R. Chapte

Department of Computer Science and Engineering, Jawaharlal Darda Institute of Engineering and Technology, Yavatmal, Maharashtra, India

**Abstract:** Augmented Reality is changing education in a very amazing way and it brings a new technical dimension to teaching and learning practices through amazing visualization of the real world in an interactive environment made out of technology. We know that Visualization is very much needed in present times of education but many students are lacking it. So to improve visualization, augmented reality (AR) is used. AR is helping us to change the present way of learning in the classroom in more fun yet technical way with a great boost to imagination and visualization. In this project, we are proposing a new project in unity in which we have to import the vuforia unity interfacing package into the unity setup. On importing this we get assets from vuforia to unity which contain the AR components which are used to develop AR applications. Compared to 2D applications we will have a better experience using AR applications which will include 3D modules and, in this application, all the teaching topics can observe in the 3D graphical images. Augmented reality is not limited there is still more to this, we can combine AR with other realities and even artificial intelligence to make it more reliable and efficient. The future of technology is going to specially emphasize AR and its other dimensions, it's going to be all about technology sooner or later so it's our general approach to make education more fun and effective for our present and future generations.

**Keywords-** *Augmented Reality, 3D visualization, Android Application.*

## I. INTRODUCTION

Augmented reality does not create artificial environment, but it can play with the existing environment and also overlays feature on it. Likewise, VR, AR also found applications in various fields. AR design and development of a three-dimensional physical model has typically been viewed as a critical part of the design process. Augmented Reality software for design, we'd already been discussing internally how the advanced visualization technologies of Virtual Reality and Augmented Reality would be implemented across our design ecosystem. The Augmented reality is additive, overlaying digital content on to the real world. The user is aware of and can still interact with his environment.

Designers of AR software and apps will find many of the traditional tools still very useful: e.g. paper and video prototyping, understanding existing mental models, etc. It is an AR model of the featured components that can be viewed through IOS devices.

Augmented reality (AR) is a field of computer research that deals with the combination of real-world and computer-generated data. Augmented reality is a technology that allows virtual objects to be placed in the real world. In real-time, Enhancing our information about the world around us. Another aim of augmented reality is to blend all parts seamlessly together so that the user is made to believe that the whole environment is real. In other words, there shouldn't be any conflicts and discrepancies between the augmented environment and the rules by which the user normally senses the real world. An augmented reality App is a software application that merges digital visual content into the user's real-world environment. We have made an android application that will help to engineer students better understand various concepts regarding their subjects.

## PROBLEM STATEMENT

Augmented reality when combined with offline EDUCATION DOMAIN can turn an ordinary class into an engaging experience. AR technology provides virtual examples and adds realistic elements to support materials like reference books FROM TRADITIONAL EDUCATION DOMAIN which are difficult to understand and certainly are not enough interesting to engage one's focus as a result, classes IN EDUCATION DOMAIN CAN become more interactive when technology meets them. Now a days students do not use reference books to study and do not get through concept thoroughly. Young Generation do not find the reference books interesting due to theoretical culture. One more major problem with the reference books is that the language is not easy to absorb. Another concern is that the reference books are heavy to carry which makes it difficult for students to carry and use it consistently. Whatever we read in the references does not provide us a clear understanding of the topic as we are unable to imagine the concept. Last but not the least people don't use references as readymade books with appropriate solutions are present in the market.

## AIM OF PROJECT

To make an android application to provide technical and virtual extension to traditional education domain, to enhance the learning and absorbing ability of minds pursuing it and make them capable to use the technology so that they can bring great output in all means.

## SCOPE OF PROJECT

Augmented reality in education can serve a number of purposes. With the help of this technology students easily acquire, process and remember the information. Additionally, AR makes learning itself more engaging and fun.

It is also not limited to a single age group or level of education and can be used equally well in all levels from pre-school education up to college, or even at work. We have used this technology because traditional methods of education as we know they are becoming a thing of past. It enhances learning of abilities like problem solving, collaboration and creation to better prepare students for the future. Researchers have reported on the positive impact that Augmented Reality experiences have on learner's as compared to non-AR once. There are various benefits of Augmented Reality in education such as Accessible learning material anytime anywhere, no special equipment is required, faster and more effective learning process. Universally applicable to any level of education and training. AR isn't limited to only one-use case or field of application. Augmented Reality is still new and unsettled. Though possibilities of AR in teaching /studying are great, providing new ways of learning. Students gets new tools to visualize their subjects and complex concepts as well as obtained practical skills. Moreover, even parents can benefit by engaging their children to study with playful apps.

## II. LITERATURE REVIEW

- 1] Zhu et al. address the use of augmented reality for healthcare teaching. The augmented reality approaches developed did not have an explicit pedagogical framework.
- 2] Diegmann et al. describe as the results of their review that the specific directions of augmented reality approaches are more likely to lead to certain benefits, such as increased motivation.
- 3] Akçayir and Akçayir emphasize the results obtained with the literature analysis, that augmented reality approaches promote a better learning performance, in which the problem most identified in the analyzed researches is centered in the difficulty of students to use this type of application in a better form to promote learning.

4] O’Shea and Elliott conducted an exploratory analysis of available mobile augmented reality approaches for educational purposes, with the intention of evaluating them for their potential and affordances to transform the way education can occur with the use of augmented reality and not just how content can be presented to students that interact with these types of technologies. The rationale presented by the authors consists in the fact that AR has achieved great advances in the robustness of technology, aspect that also converged with the wide dissemination in the use of mobile devices, but emphasize that the practical improvements to the use of these resources in education are still being defined and redefined. So, it is necessary to deepen the affordances that AR has to offer, seeking to highlight the added value that these applications can offer and how best to take advantage of its distinct characteristics to improve learning.

5] Saidin et al. describe a review of augmented reality in education, focusing on demonstrating the advantages and resources with potential to transform educational environments. Considering that in the perspective of AR technology, since its conception, seeks to promote a more active, effective and meaningful learning process, unlike other technologies that have emerged for educational purposes, but have created a passive learning process that does not use its resources to promote critical thinking and creation of meaning or metacognition.

6] Becker et al. highlight technologies and practices likely to come into use in their sectors over the next five years (2017-2021). An emphasis is the intensification of the development of augmented reality technologies in 2016, accompanied by the use of mobile learning in the educational contexts for the year 2017, an issue already noted in the 2012 report.

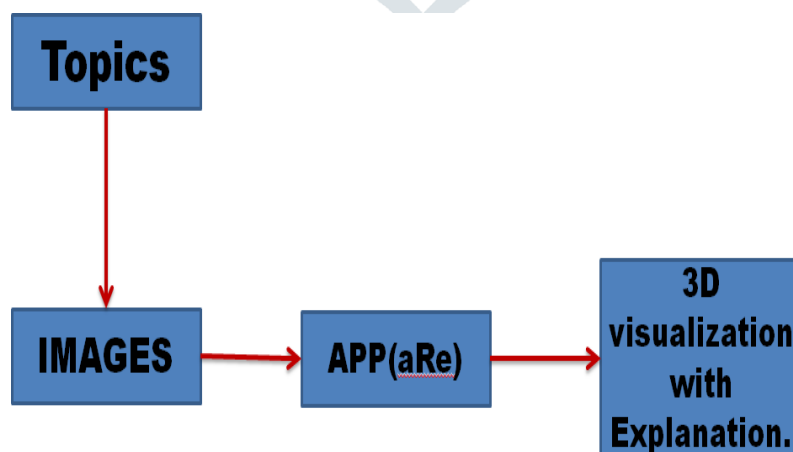
7] Chatzopoulos et al., A variant of augmented reality technology is the Mobile Augmented Reality (MAR) technology It has been making inroads in the training and learning domain, as learning approaches can be virtually accessed using the ubiquitous mobile devices, in which, learners can access learning materials and contents anywhere, anytime on their mobile devices .

8] Azuma, R., Bailiot, Y., Behringer, R., Feiner, S., Julier, S., & Macintyre, B. Augmented reality is the integration of the virtual with the real world, in which computer-based graphic elements are displayed on the screens of the users’ technological devices, simultaneously with the elements of the actual environment, in which, the users are in addition, the term “augmented reality” is used in situations where the real scenery is “augmented” through virtual elements.

### III. METHODOLOGY

We are going to make an android application in which we will include various concepts of different subjects related to engineering for better understanding and visualizing the actual practical approach. The 3D model will be animated and will be superimposed on the specific page of the book where a specific topic is explained. The approach is to bring practical visualization using 3D models related to each concept to reduce the theoretical complexity. The intention is to solve the problem definitions with the above single approach.

#### BLOCK DIAGRAM



**Architectural Flow Diagram:**

Following diagram shows the Architecture flow of the ARE App.

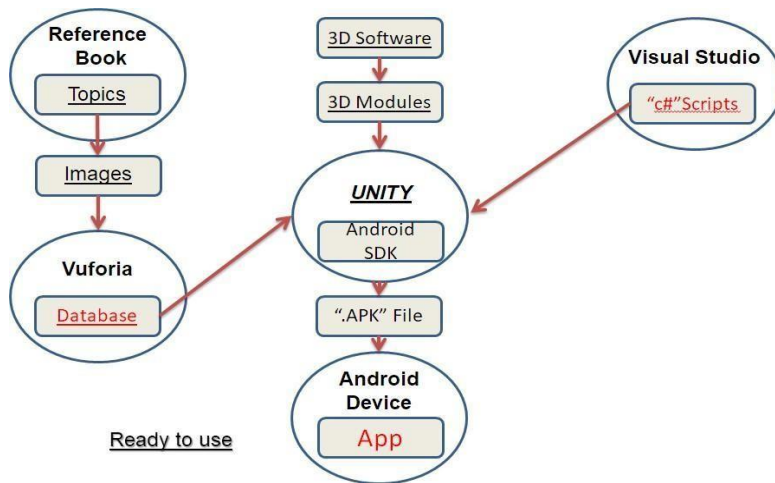


Fig 4.3. Architectural Flow Diagram

**Control Flow Diagram:**

Following diagram shows the Control flow Diagram of the ARE App.

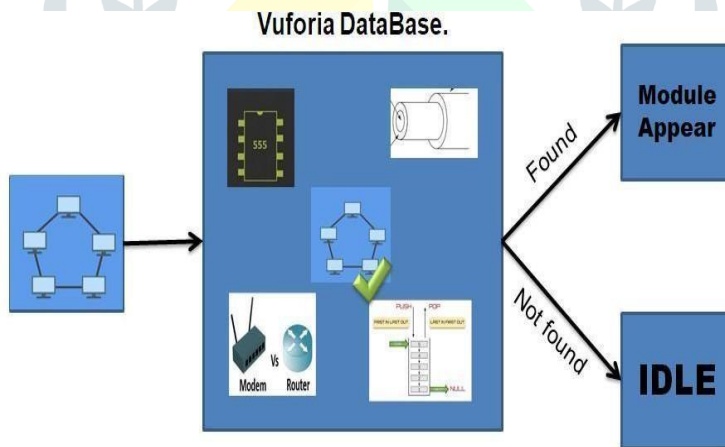


Fig 4.4. Control Flow Diagram

**IV. SYSTEM REQUIREMENT**

**TECHNOLOGY:**

- 1. AUGMENTED REALITY:** A technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view.

2. **3D MODELING SOFTWARE:** In 3D computer graphics, 3D modeling is the process of developing a mathematical representation of any surface of an object (either inanimate or living) in three dimensions via specialized software.
3. **VUFORIA BY GOOGLE:** Vuforia Engine is a software platform for creating Augmented Reality apps.
4. **ANDROID SDK:** The Android SDK (software development kit) is a set of development tools used to develop applications for Android platform.

**PLATFORM(SOFTWARES):** Unity Game engine v2018.3.14f. Vuforia engine. Blender v 2.79/ MAYA. Android Device.

#### ADVANTAGES:

1. Heightening the interest of students
2. Experiential learning and practice
3. Revolutionizing distance learning

#### DISADVANTAGES:

1. Barriers to entry
2. The potential for isolation
3. Addictive nature of virtual environments

#### V. RESULT

In this proposed system we develop an android application using Augmented Reality Technology (AR) for education.

#### VI. CONCLUSION

Augmented reality is an old idea that is right now on the verge of success. This is due to the fact that until lately there have not been advanced enough technologies to make feasible AR applications. They have been lacking either in computing power, user tracking accuracy or ease of use and comfortableness, which all are necessary to produce a satisfying AR experience. We can conclude that Augmented reality is one of the most emerging computer technologies and has become an exciting rage for the upcoming generations as a field of futuristic technology. Due to the ability of having several advantages which are involved in the making, designing, coding of the screen less, this needs plenty of knowledge and process for the development is still under improvement.

#### VII. REFERENCE

- [1] Zhu, E., Hadadgar, A., Masiello, I., & Zary, N. (2014). Augmented Reality in Healthcare Education: An Integrative Review. *PeerJ*, 2, e469. <https://doi.org/10.7717/peerj.469>
- [2] Diegmann, P., Schmidt-Kraepelin, M., Eynden, S., & Basten, D. (2015). Benefits of Augmented Reality in Educational Environments—A Systematic Literature Review. In O. Thomas, & F. Teuteberg (Eds.), *Proceedings der 12th Internationalen Tagung Wirtschaftsinformatik* (pp. 1542-1556). Osnabruck: AIS Electronic Library (AISEL).
- [3] Akcayir, M., & Akcayir, G. (2017). Advantages and Challenges Associated with Augmented Reality for Education: A Systematic Review of Literature. *Educational Research Review*, 20, 1-11. <https://doi.org/10.1016/j.edurev.2016.11.002>
- [4] O'Shea, P. M., & Elliott, J. B. (2016). Augmented Reality in Education: An Exploration and Analysis of Currently Available Educational Apps. In C. Allison, L. Morgado, J. Pirker, D. Beck, J. Richter, & C. Güetl (Eds.), *Communications in Computer and Information Science (Immersive Learning Research Network: Second International Conference (iLRN))* (2nd ed., pp. 147-159). Santa Barbara, CA: Springer International Publishing. [https://doi.org/10.1007/978-3-319-41769-1\\_12](https://doi.org/10.1007/978-3-319-41769-1_12)
- [5] Saidin, N. F., Halim, N. D. A., & Yahaya, N. (2015). A Review of Research on Augmented Reality in Education: Advantages and Applications. *International Education Studies*, 8, 1-8. <https://doi.org/10.5539/ies.v8n13p1>
- [6] Becker, S. A., Cummins, M., Davis, A., Freeman, A., Giesinger, C. H., & Ananthanarayanan, V. (2017). NMC Horizon Report:

2017 Higher Education Edition. Austin, TX: The New Media Consortium.

- [7] Chatzopoulos, D., Bermejo, C., Huang, Z., & Hui, P. (2017). Mobile Augmented Reality Survey: From Where We Are to Where We Go. *IEEE Access*, 5, 6917-6950. <https://doi.org/10.1109/ACCESS.2017.2698164>
- [8] Azuma, R., Baillot, Y., Behringer, R., Feiner, S., Julier, S., & Macintyre, B. (2001). Recent Advances in Augmented Reality. *IEEE Computer Graphics and Applications*, 21, 34-47. <https://doi.org/10.1109/38.963459>

