



# Home Decor Using AR

Mr.Sreejith P S<sup>1</sup>, Akhil V S<sup>2</sup>, Saju T R<sup>3</sup>, Sireen Ibnu Kabeer<sup>4</sup>

Assistant Professor, Department of Computer Science And Engineering, Universal Engineering College ,Vallivattom ,  
Thrissur, India.<sup>1</sup>

B.Tech Student, Department of Computer Science And Engineering, Universal Engineering College ,Vallivattom ,  
Thrissur, India.<sup>2,3,4</sup>

**Abstract:** In Large strides being created in digital technology that digital design hasn't wedged effectively. Our application could be a step in this direction, permitting users to look at a 3D rendered model - a virtual likeness of the physical furnishings with no interruption of the markers - which may be viewed and designed in period victimization of our AR application. This study proposes a replacement methodology for applying increased Reality technology to interior style work, wherever a user will read virtual {furniture|piece of furnishings|article of furniture|furnishings} and communicate with 3D virtual furniture information employing a dynamic and versatile computer program.

A. **Keywords:**AR, 3D Rendering, K-means Algorithm

## I. INTRODUCTION

With the fast advancement in technology, the younger generations square measure a lot of inclined to exploitation their gadgets in the majority the activities they are doing. whereas shopping for furnishings needs a lot of thought and is long, they incline to go looking for each piece of knowledge that they have on the web 1st, before taking additional action of progressing to the physical store or visiting a web store. Through field analysis and interviews, it is often verified that customers on average realize issues find specifically what's going to suit their home. Also, it's troublesome to seek out matching furnishings and decors. In the existing system, search house owners will show their product within the web site, and other people will visit the internet|the net} search with online browser exploitation the relevant web address. search guests will flick thru a spread of products in 3D and buy product on-line exploitation on-line payment strategies. Then the product is going to be delivered to the customer. this is often the quality state of affairs for on-line looking

## II. THEORY

B. AR

Augmented reality (AR) is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced by computer-generated perceptual information, sometimes across multiple sensory modalities, including visual, auditory, haptic, somatosensory and olfactory. AR can be defined as a system that fulfils three basic features: a combination of real and virtual worlds, real-time interaction, and accurate 3D registration of virtual and real objects. The overlaid sensory information can be constructive (i.e. additive to the natural environment), or destructive (i.e. masking of the natural environment). This experience is seamlessly interwoven with the physical world such that it is perceived as an immersive aspect of the real environment.<sup>1</sup> In this way, augmented reality alters one's ongoing perception of a real-world environment, whereas virtual reality completely replaces the user's real-world environment with a simulated one. Augmented reality is related to two largely synonymous terms: mixed reality and computer-mediated reality. Augmented reality is used to enhance natural environments or situations and offer perceptually enriched experiences. With the help of advanced AR technologies (e.g. adding computer vision, incorporating AR cameras into smartphone applications and object recognition) the information about the surrounding real world of the user becomes interactive and digitally manipulated. Information about the environment and its objects is overlaid on the real world

C. K-means Algorithm

K-means is one of the simplest unsupervised learning algorithms that solve the well known clustering problem. The procedure follows a simple and easy way to classify a given data set through a certain number of clusters (assume k clusters) fixed apriori. The main idea is to define k centers, one for each cluster. These centers should be placed in a cunning way because of different location causes different result. So, the better choice is to place them as much as



possible far away from each other. The next step is to take each point belonging to a given data set and associate it to the nearest center. When no point is pending, the first step is completed and an early group age is done. At this point we need to re-calculate  $k$  new centroids as barycenter of the clusters resulting from the previous step. After we have these  $k$  new centroids, a new binding has to be done between the same data set points and the nearest new center. A loop has been generated. As a result of this loop we may notice that the  $k$  centers change their location step by step until no more changes are done or in other words centers do not move any more.

#### D. 3D Modelling

3D modeling is a technique in computer graphics for producing a 3D digital representation of any object or surface. An artist uses special software to manipulate points in virtual space (called vertices) to form a mesh: a collection of vertices that form an object. These 3D objects can be generated automatically or created manually by deforming the mesh, or otherwise manipulating vertices. 3D models are used for a variety of mediums including video games, movies, architecture, illustration, engineering, and commercial advertising. The 3D modeling process produces a digital object capable of being fully animated, making it an essential process for character animation and special effects. The core of a model is the mesh which is best described as a collection of points in space. These points are mapped into a 3D grid and joined together as polygonal shapes, usually triangles or quads. Each point or vertex has its own position on the grid and by combining these points into shapes, the surface of an object is created. Models are often exported to other software for use in games or movies. But some 3D modeling programs allow the creation of a 2D images using a process called 3D rendering. This technique is fantastic for creating hyper-realistic scenes using sophisticated lighting algorithms.

### III. RELATED WORK

Here we introduce each papers based on the technologies used in the AR and this are arranged in technologies bases

The aim of this paper <sup>[1]</sup> is to, we have a tendency to conferred a time period increased reality system with occlusion handling supported RGBD pictures, a system for on-line dense reconstruction of indoor scene victimization data from a hand-held RGBD camera to enhance the accuracy and hardiness of camera following, we have a tendency to combined dense reconstruction with SLAM, and designed a time period rendering system to supply AR content. We have a tendency to represent all the key elements and implementation details here, including time period frame-to-model following, surface model integration and fusion.

The aim of the paper <sup>[2]</sup> is this paper studies suggest that of substitution the classic informational boards with additional engaging and content-rich ways of business data to a smart phone user. A simple camera-enabled Smartphone will be wont to step into a virtual world. for instance, in a very repository, a straightforward map will be overlaid with Associate in Nursing animation depiction troop movements and posters with pictures will be overlaid with short movies. we decide QR codes because the start line of our marker based following system, as they already enjoy variety of implementations for varied mobile platforms. We tend to develop Associate in Nursing application to review the stages through which data has to pass so as to be showed the user. We tend to establish the bottlenecks of the system, with the purpose of maximising its performance and that we propose a mechanism of skipping frames at every stage so as to provide a quick on-screen response. We tend to conclude by menstruation the output frame rate, with relation to the hardware specification of the devices.

This paper <sup>[3]</sup> we tend to propose associate degree approach for dynamic occlusion handling for AR applications, investment the data provided by a RGB-D device. The key of our system is a position snapping algorithmic rule that aligns object boundary within the raw depth knowledge towards the target within the corresponding colour image and so enhances the depth map consequently. the improved depth maps square measure then used for depth testing with the virtual objects for dynamic occlusion handling. Experimental results demonstrate the enhancements on the depth maps provided by our technique. We tend to more demonstrate our final dynamic occlusion effects on 2 AR use cases. Despite some limitations in our current algorithmic rule, we tend to believe our algorithmic rule is a promising start line for study in dynamic occlusion handling for AR applications and hope to inspire a lot of future analysis during this necessary space. In this work <sup>[4]</sup> a tracking method that can recognize the vertices of any convex polygon in augmented reality system since most of the markers is squares. The transformation matrix of the camera can be estimated at the aid of coordinates of the four vertices. Stable, accurate and real-time properties are obtained as the algorithm can withstand a large range of motion and fast motion speed of camera.

In this work <sup>[5]</sup> we present RKSLAM, a robust key frame-based monocular SLAM system that may faithfully handle quick motion with strong rotation and guarantee smart AR experiences. we tend to contribute two key technical contributions: a unique multi-homography primarily based feature chase methodology that is incredibly robust and economical, and a sliding-window primarily based camera create an improvement theme that imposes the motion



previous constraints between consecutive frames through simulated or real IMU data supported RKSLAM, we tend to develop associate degree AR App on a mobile device.

The main aim of this paper<sup>[6]</sup> color is one among the visual components that psychologically have an effect on people's feeling. Though there are a unit slight variations supported culture, many studies in color science have found that the majority single colours usually have that means or feeling. Therefore, most skilled designers use colours in their works to precise feeling. During this paper, we tend to gift a completely unique technique that recommends style pictures employing a color combination supported the relation between color and feeling. to attain this, we tend to estimate feeling supported the colour image scale, that could be a illustrious color theory within the field of style and recommends style pictures per the feeling. during this paper, we tend to planned a completely unique technique that recommends pictures supported the feeling calculable from the image. For this, we tend to established Associate in Nursing feeling prediction model by victimisation the colour image scale, a widely known theory in style fields, and calculable the feeling of the image victimisation the highest 3 colours and therefore the model. Then we tend to counselled pictures of that calculable feeling was nearer to input feeling on color image scale. Additionally, we tend to conduct a crowd sourced user study to judge our results. Our experiment principally relied on Kobayashi's analysis. Moreover, we tend to obtained the 3-color combination from pictures by extracting the highest three colours often used; thus, there's no guarantee that the extracted three-color combination with success represents the image. Also, it's legendary that human emotions plagued by color are altered supported era and culture. Consequently, a a lot of sturdy approach for estimating human feeling is needed in our future work. During this paper, we tend to contemplate the sole color. However, the issue that affects the feeling of pictures isn't the sole color. In our future work, we'll study different factors that may have an effect on the feeling of pictures, like composition and texture, and improve our feeling estimation by using these factors.

The paper<sup>[7]</sup> we tend to describe a model extracting colour themes with rating from image mistreatment colour network. We tend to show that in terms of variety, span and accuracy, our model is able to do higher results than that in alternative ways. For a picture, our model will extract most themes the image has and rank these themes. Once setting variety of colour themes, ranking themes is selected out. There AR stills some potential space for improvement in our model. To start with, in our model, we tend to pre-process pictures mistreatment strikingness detection and super pixels segmentation that have important influence on our final results. Therefore, we are able to improve our de- taction and segmentation ways to get a lot of vivid and rep- preventative themes. Moreover, within the method of constructing the colour network, solely 2 main issues, strikingness and colour distance, AR thought-about. If other connected factors are incorporated, the colour network could generate a lot of representative colour themes that has vital influence on final extracted colour themes. Moreover, within the comparison section, we tend to use themes extracted by human as ground-truth. However, there AR several factors which will influence human preferences. a lot of credible themes rating is obtained if we tend to conduct some psychophysical experiments and establish connected rules consequently within the method of gathering themes with visual comparison. Finally, during this article, we tend to solely use thirty train pictures as architect et al. did. a lot of coaching pictures will facilitate eliminate biases in our model. In alternative perspective, selection of colours could vary from one individual to a different, gazing learning different people's perception habit will get totally different people's preferences in extracting colour themes. In future work, we'll in company human personal preferences into our model. This paper<sup>[8]</sup> we tend to describe some observations on the sensible implementation of the median cut color division rule fittingly changed for correct colour rendering. The RGB colour area is in turn divided in such some way that colours with visual significance, notwithstanding comparatively tiny in population, area unit given representatives within the colour map. Suitably changed, median cut division is sort of nearly as good as our greatest octree division. Like octree division, error-diffusion video digitizing is beneficial for reducing posterization in giant regions with a slow variation in colour. We tend to propose Associate in Nursing improved Median-cut Image division rule that has been testified by tests to be able to effectively improve the colour division speed and quality. This improved rule could be a sensible technique to touch upon the colour pictures that contains profusion of data. In this work<sup>[9]</sup> we have a tendency to describe ways for playacting colour division on full colour RGB pictures, exploitation associate octree organisation. The advantage of the octree is that it's straightforward to come up with each a decent partitioning of the colour area and a quick inverse colour table to search out the colour index for every component within the image. With solely 256 colours, it's usually necessary to error-diffusion dither the colour for look, even supposing this will increase the RMS component error. we have a tendency to dither exploitation integers for potency while not loss of colour accuracy.

This paper<sup>[10]</sup> we have a tendency to contemplate colour palettes extracted from creation collections, that we have a tendency to believe to be Associate in nursing plentiful supply of rhetorical and distinctive colour themes. We have a tendency to aim to capture colour designs embedded in these collections by suggests that of applied math models and to make sensible applications upon these models. As artists typically use their personal colour themes in their paintings, creating these palettes seem oft within the dataset, we have a tendency to used density estimation to capture the characteristics of palette knowledge. Via density estimation, we have a tendency to administered varied predictions and interpolations on palettes that LED to promising applications like photo-style exploration, period of time colour suggestion, and enriched pic recolorization. It was, however, difficult to use density estimation to palette knowledge as



palettes typically come back as unordered sets of colours that build it troublesome to use typical metrics on them. To the current finish, we have a tendency to develop a divide-and-conquer algorithmic program to set up the colours within the palettes in an exceedingly coherent order that permits purposeful interpolation between colour palettes. To verify the performance of our model, we have a tendency to additionally conducted quantitative experiments on datasets of digitized paintings collected from the web and received favourable results. We have introduced a unique methodology for interpolating and summarizing palette knowledge. Palette data sets AR typically out there as unordered sets of colours, creating it troublesome to directly apply ancient ways to investigate the information. We have a tendency to design a good palette ordering methodology (Binary Palette Sort) that creates use of kernel-based spatial property reduction to reorder colours in palettes in an exceedingly purposeful method, permitting North American country to use progressive interpolation techniques on palette knowledge. The palette density provided a mean to develop varied fascinating applications like period of time accommodative palette, photo-style exploration, and enriched pic recolorization. We've conducted each quantitative and qualitative experiment to assess the performance of our methodology, and favourable results were obtained within the future, we'd prefer to study comprehensive however the user interacts with Smart Palette and Photo-style adventurer, presumably through crowd-sourcing and on-line survey. The system<sup>[11]</sup> The projected system uses Marker-less increased Reality as a basis for enhancing user expertise and for a stronger perception of things Marker less pursuit may be a technique of point pursuit – the determination of position And orientation of an object within its surroundings. this is often a awfully necessary feature in computer game (VR) and increased reality (AR), making

it potential to grasp the field-of-view and perspective of the user - allowing the virtual surroundings to react accordingly or the location of increased reality content in accordance with real While marker-based strategies of motion pursuit use specific optical markers, marker-less point pursuit does not need them, creating it a a lot of versatile technique. It also avoids the necessity for ready surroundings in. This work is<sup>[12]</sup> proposes a system for interior design prototyping supported portable-type projection-based AR (Augmented Reality). The DIY (do it yourself) interior planning process takes a lot of time, financial resources, and labour. To overcome such difficulties, several analysis studies have been undertaken within the field of AR. Among those studies, projection-based AR technology provides users virtual information that's terribly real by protrusive new digital information onto things and areas. Most of these studies employing projection-based AR technology are disbursed in predefined areas. During this paper, a projection-based AR system that can be wont to style interiors of non-predefined areas was proposed. This styled AR system will effectively design interiors, even within the areas not predefined by a 3D map of the house. Also, by connecting with mobile devices, the system raises the user's degree of freedom thanks to the interface usability, mobility, and overall convenience. To judge the effectiveness of the proposed system, we have a tendency to created a situation for interior style prototyping. A usability analysis was conducted by questionnaire once users performed tasks supported a predetermined scenario.

The main intent of this paper<sup>[13]</sup> was to achieve information concerning the effective use of the user's ability to move (opposition between static and dynamic conditions) and concerning the acceptable accuracy of the surroundings illustration. Composing furnishings during a area in line with the user desires. Thus, associate interface shouldn't solely enable this arrangement however any let the user pre-visualize the result, with the various Room bots units performing arts the desired moves during a simulated illustration of the area. To improve this pre-visualization facet, increased Reality (AR), in which virtual objects area unit superimposed to a true read of the the surroundings will be used. As a primary step towards this goal, a preliminary version of such associate interface was developed and evaluated during a user study our study has shown that participant took advantage of having the ability to maneuver inside the surroundings and performed considerably higher in terms of preciseness throughout the task. We are able to conclude that mobile devices area unit a lot of fitted to arrangement tasks and preferred to fastened devices like desktop PCs. even so the data that we have a tendency to collected failed to lend any support to our 1st hypothesis relating to the amount of details within the room representation: no variations were determined between a pure virtual illustration of the area and therefore the use of associate augmented reality surroundings. This last statement can be due to the simplicity of the task, we have a tendency to think of for this study, mainly relating to the combination of dynamic objects within the scene. We have a tendency to yet determine that permitting the user to move within the surroundings whereas mistreatment increased reality to integrate virtual parts increased the user expertise and mitigated the interaction between users and virtual artefacts.

In this paper<sup>[14]</sup> propose a marker less application for interior decoration functions, within which any novice user can simply adorn his/her home. We have a tendency to embody our observations and remember on potential future improvements. This paper conjointly discusses mobile application of Augmented Reality (AR) on the automaton platform. We discuss existing SDKs for developing AR applications on mobile platforms and elaborate their functionalities and limitations. conjointly offer a quick introduction to handheld increased Reality, mentioned the assorted free SDKs accessible for developing AR applications and printed their deserves and limitations. We also discussed the hurdles in achieving quick and economical tracking on mobile devices. The purpose of this work<sup>[15]</sup> is to propose a marker less application for interior decoration functions, within which any novice user can simply adorn his/her home. We have a tendency to embody our observations and remember on potential future improvements. This



paper conjointly discusses mobile application of Augmented Reality (AR) on the automaton platform. We discuss existing SDKs for developing AR applications on mobile platforms and elaborate their functionalities and limitations. conjointly offer a quick introduction to handheld increased Reality, mentioned the assorted free SDKs accessible for developing AR applications and printed their deserves and limitations. We also discussed the research presents an application that helps the user by suggesting placements of furniture based on interior design guidelines. This article discusses the issues that are regarding the future of interior design education. These issues may be concepts foundation, integration of technology, etc. This study discusses how the construction of distributed AR applications can facilitate interior design applications. This research observes virtual furniture and its alteration to create a new strategy for interior design education by using Augmented Reality technology. This paper addresses the complications encountered by users while tracking a virtual object on the tabletop. This survey discusses the needs of 21st-century interior designers and also their perceptions as well as limitations that their attitude and discernment exhibit. This application will also act as an opportunity for beginners to learn new skills from qualified veterans. As it will help the interior designer to learn some important things from architects that are often learned by trial and error. While previously, the applications were only focused on providing a brand of home furnishing with the retail business by promoting their products. There has been no other application that has introduced the two distinguished types of augmented reality on one common ground.

The paper <sup>[17]</sup> we present the SliceNet to perform slice-wise 3D reconstruction. The unremarkably used 3D deconvolution is replaced by reusable 2nd deconvolution, economical a lot of memory house. The LSTM is additionally introduced to capture international relations between slices. We have a tendency to additionally style a slice-aware attention module to produce dynamic info for every slice's generation. The model will turn out additional plausible results with higher resolution. Experiments on each synthesized knowledge and real knowledge verify the effectiveness of our planned methodology.1, if 3D the shape is symmetrical, the symmetry would maintain among all 2nd slices of this form. If a 3D form is plausible, then adjacent slices would be similar and therefore the varieties between them ought to be sleek. So, it's potential to model these 2nd slices with a shared-weight 2nd deconvolution block, avoiding the utilization of 3D deconvolution with far more parameters. Based on

this observation, we have a tendency to propose the SliceNet. With one input image, SliceNet predicts 2nd slices consecutive. Apart from individual patterns of slices, the relations between them square measure also necessary to form them consistent and final 3D form plausible. The paper <sup>[18]</sup> we discuss about an image-driven 3D modeling technique for rapid panel style. Our semi-automatic approach relies on guide technique and mesh volume deformation controlled by a special cage. We have a tendency to designed our modeling system to be interactive in 2nd, automating the method of form generation whereas looking forward to the user to produce image samples. Once a constant quantity model guide is given, victimization the contour extracted from pictures, the new control cage cherishes mesh models generated. Then the pure mathematics of the new panel is mechanically recovered from the deformable guide model. Our system conjointly permits the user to simply reconstruct alternative 3D objects in a very similar manner, like realistic-looking plant modeling from pictures. we have a tendency to show realistic reconstructions of a spread of panels, automobile shapes and demonstrate examples of plant written material.

This paper <sup>[19]</sup> outlines however AR applications will inspire users, and how psychological and activity inspiration are often driven by AR technology. to know inspiration as a granular method, we tend to hypothesized a combine of apparently self-contradictory mediators. The wow-effect centres on the thought that inspiration coincides with a requirement to interrupt down existing mental schemas to psychologically accommodate for data that changes however the individual perceives specific stimuli. If inspiration demands psychological accommodation, then the additional wowing or awing information the bigger the accommodation and theoretically the additional exalting the expertise. This work <sup>[20]</sup> surveys the progressive of technology, systems, and applications in increased Reality. It describes work performed by many various analysis teams, the aim behind every new increased Reality system, and therefore the difficulties and issues encountered once building some increased Reality applications. It surveys mobile increased reality systems challenges and necessities for winning mobile systems. This paper summarizes these applications of increased Reality and speculates on future applications and wherever current analysis can lead increased Reality's development. Section one offers associate introduction to what increased Reality is and therefore the motivations for developing this technology.

#### IV. CONCLUSION

This paper can create the awareness among the people about the furniture beforehand. People get to learn and understand more about the furniture they are interested in and they get to see how the specific furniture looks virtually before they actually claim it.

#### ACKNOWLEDGMENT

We utilize this opportunity to convey our gratitude towards all those who have helped us directly or indirectly for the completion of our work. We deeply and wholeheartedly thank **Mr. Sreeraj** -HOD, Computer Science and Engineering



for his extreme valuable advice and encouragement. We especially thankful to our guide and supervisor **Mr. Sreejith P S** -Assistant Professor ,Computer Science and Engineering for giving me valuable suggestions and critical inputs in the preparation of this paper. We would like to extend our sincere gratitude to all faculty of Computer Science and Engineering department for the support and suggestions that helped us in the development of our work to what it is now. We thank our parents and friends for the mental support provided during the course of our work at the times when our energies were the lowest.

### REFERENCES

- [1]. Xiaozhi Guo; Chen Wang; Yue Qi, Real-Time Augmented Reality with Occlusion Handling Based on RGBD Images. Real-Time Augmented Reality with Occlusion Handling Based on RGBD Images
- [2]. Gherghina A, Olteanu A C, Tapus N. A marker-based augmented reality system for mobile devices[C] Roedunet International Conference. IEEE, 2013:1-6.12.
- [3]. Du C, Chen Y L, Ye M, et al. Edge Snapping-Based Depth Enhancement for Dynamic Occlusion Handling in Augmented Reality[C]// IEEE International Symposium on Mixed and Augmented Reality. IEEE, 2016:54-62.0
- [4]. Gao Y F, Wang H Y, Bian X N. Marker tracking for video-based augmented reality[C] International Conference on Machine Learning and Cybernetics. IEEE, 2017:928-932.
- [5]. Liu H, Zhang G, Bao H. Robust Keyframe-based Monocular SLAM for Augmented Reality[C]// IEEE International Symposium on Mixed and Augmented Reality IEEE, 2016:1-10.
- [6]. Z. Feng, W. Yuan, C. Fu , J. Lei, and M. Song , "Finding intrinsic color themes in images with human visual perception," Neurocomputing, vol. 273, pp. 395-402, 2018.
- [7]. D. Kang and K. Yoon, "Emotion-aware design image recommendation using color image scale," In Proc. MMEDIA 2018 : The Tenth International Conference on Advances in Multimedia, 2018, pp. 7-8.
- [8]. A.Kruger, "Median-CutColorQuantization". [Online] Available: <http://collaboration.cmc.ec.gc.ca/science/rpn/biblio/ddj/Website/articles/>
- [9]. D.S. Bloomberg, "Color quantization using modified median cut". <http://leptonica.org/papers/mediancut.pdf> [Accessed Oct. 31, 2018].
- [10]. H. Q. Phan, H. Fu, and A. B. Chan, "Color orchestra: ordering color palettes for interpolation and prediction," IEEE Transactions on Visualization and Computer Graphics, vol. 24, no. 6, Jun., pp. 1942- 1955, 2018.
- [11]. Santosh Sharma; Yash Kaikini; Parth Bhodia; Sonali Vaidya "Markerless Augmented Reality based Interior Designing System", IEEE 5-5 Jan. 2018.
- [12]. Yoon Jung Park ; Yoonsik Yang; Seungho Chae; Inhwan Kim; Tack-don Han "DesignAR : Portable Projection-based AR system specialized in interior design" 2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC).
- [13]. Stéphane Bonardi; Jérémy Blatter; Julia Fink; Rico Moeckel; Patrick Jermann; Pierre Dillenbourg; Auke Jan Ijspeert "Design and Evaluation of a Graphical iPad Application for Arranging Adaptive Furniture 2012 IEEE RO-MAN: The 21st IEEE International Symposium on Robot and Human Interactive Communication
- [14]. Prasad Renukda , Rohit Ghundiya , Harshavardhan Gadgil, Vishal Pathare Markerless Augmented Reality Android App For Interior Decoration International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181
- [15]. Jiang Hui. (18-19 Aug. 2015). Approach to The Interior Design using Augmented Reality Technology, 2015 Sixth International Conference on Intelligent Systems Design and Engineering Applications (ISDEA)
- [16]. Sidra Nasir; Mohammad Noman Zahid; Talha Ahmed Khan; Kushsairy Kadir; Sheroz Khan. (28-30 Nov. 2018). Augmented Reality Application for Architects and interior designers: Interno A cost effective solution)2018 IEEE 5th International Conference on Smart Instrumentation, Measurement and Application (ICSIMA)
- [17]. Yunjie Wu; Zhengxing Sun; Youcheng Song; Yunhan Sun; Jinlong Shi. Slicenet: Slice-Wise 3D Shapes Reconstruction from Single Image. ICASSP 2020 - 2020 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)
- [18]. Baojun Li , Xiuping Liu, Yanqi Liu, Ping Hu, Mingzeng Liu, Changsheng Wang. Image-Driven Panel Design via Feature-Preserving Mesh Deformation. Dalian University of Technology
- [19]. Chris Hinsch, "Reto Felix, Philipp A. Rauschnabel, IEEE, IEEE. Nostalgia beats the wow-effect: Inspiration, awe and meaningful associations in augmented reality marketing
- [20]. Augmented reality technologies, systems and applications Julie Carmigniani, Borke Furht, Marco Anisetti, Augmented Reality technologies, systems and applications, Multimed Tools Appl (2011) 51:341-377