

VIRTUAL REALITY AND AUGMENTED REALITY APPLICATIONS: A LITERATURE REVIEW

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Abstract

The latest look of low-priced virtual reality (VR) applied sciences – like the Oculus Rift, the HTC Vive, and the Sony PlayStation VR – and Mixed Reality Interfaces (MRITF) – like the HoloLens – is attracting the interest of customers and researchers suggesting it may additionally be the subsequent greatest stepping stone in technological innovation. However, the records of VR science are longer than they can also seem: the idea of VR was once formulated in the Nineteen Sixties, and the first business VR equipment was regarded in the late 1980s. For this reason, at some stage in the closing 20 years, 100s of researchers explored the processes, effects, and purposes of this science producing hundreds and hundreds of scientific papers. What is the consequence of this substantial lookup work? This paper desires to grant a reply to this query by way of exploring, the usage of superior scient metric techniques, and the present lookup corpus in the field. We amassed all the existent articles about VR in the Web of Science Core Collection scientific database, and the resultant dataset contained 21,667 files for VR and 9,944 for augmented actuality (AR). The bibliographic file contained a range of fields, such as author, title, abstract, country, and all the references.

Keywords: augmented reality, virtual reality, systematic literature review, applications, Technology

1.INTRODUCTION

In this day and age, we are encompassed through mixes of advances. We have won large components of these developments into our everyday day by day existences. Progressively, these extraordinary developments are getting coordinated to furnish us with new capacities and administrations. It is a combo of developments that empower the steady mixing of PC-created content material with stay video shows. AR relies upon methods created in VR and interfaces with a digital world as properly as has a stage of relationship with this current reality. It lets in see the surrounding world in some different dimension and

2415

to ride matters that are now not approachable in actual lifestyles or no longer even created. Also, the world of 3-D pictures has neither constraints nor borders and can be manipulated and created by using us to beautify it by means of a four dimension: the dimension of our vision. This science turns into overwhelmingly elegant and popular in the cutting-edge decade.

1.1. AUGMENTED REALITY

Less immersive than digital truth, augmented truth entails including graphics, sounds, and different factors to the herbal global. These additions don't update the herbal factors the person sees; rather, AR additions beautify or adjust the actual global to extradite the person's experience. Some famous cellular games, along with Pokemon Go, have made the AR era appealing to a big wide variety of users.

1.2 VIRTUAL REALITY

In the assessment of AR, digital truth creates a simulated surrounding wherein the person is absolutely encompassed. The maximum, not unusual place VR era is a headset that totally covers the person's eyes. With this, the person can view and interact with a very simulated surrounding. Most VR structures reply to a person's motion and position, so he or she will go searching a 360-diploma simulated surroundings via way of means of turning his or her head, similar to in actual life. Some structures additionally consist of controllers or gloves that permit the person to interact with digital factors and items.

2. LITERATURE REVIEW

Interrante, (2018) Virtual and augmented actuality applied sciences have entered a new near-commodity era, accompanied via huge industrial investments, however, nevertheless are challenged with several open lookup questions. This distinctive difficulty of IEEE Computer Graphics and Applications ambitions at vast views to seize the country of the art, necessary achievements, and have an effect on a number of areas in these dynamic disciplines. It carries three unique articles that think about vital factors of VR/AR applied sciences and define future lookup opportunities.

Kolivand (2021) Augmented Reality (AR) and Virtual Reality (VR) primarily based remedy has validated that it is convenient to use, additionally motivating and extra attractive, and fun as most of the research proved. Furthermore, the price of human sources and the gear with well-known rehabilitation remedies is excessive to some extent. Whereas, the AR and VR structures are low price and effortless to popularize, beside the incredible range of the saved time. This paper offers a complete evaluation of Augmented Reality Technology.

M. E. de Oliveira (2020) Virtual Reality (VR) and Augmented Reality (AR) based totally applied sciences can be utilized in countless areas, such as science, services, education, remedy, and the military. On the different hand, agriculture is a place that has benefited from laptop systems, with technological advances that have culminated in fields of learning about such as Agriculture 4.0, Digital Agriculture, and Precision Agriculture, imparting an enlarge in meal manufacturing in a sustainable way. Thus, the agricultural region can be a goal for authorities and researchers in VR and AR. In this article, a literature assessment is introduced with the goal of displaying why VR and AR applied sciences are recommended to the agricultural sector. The searches had been carried out on Google Scholar, ACM Digital Library, Elsevier, IEEE Xplore, MDPI, and Springer. After looking out and selecting, twenty articles had been analyzed. The assessment describes the fundamental enter and output gadgets used, the major crops, the targets of the applications, the users, the international locations the place the research has been conducted. The effects exhibit that digital agriculture is capable to assist customers to extend productiveness in a sustainable way. The evaluate recognized trends, challenges, and possibilities for enhancing these applied sciences utilized in agriculture.

J. He et al., (2017)With the fast improvement of pc 3D processing ability and the emergence of less costly sensors, the science of augmented truth (AR) and digital fact (VR) has superior rapidly in current years, mainly in aggregate with real-world technologies. Firstly, the ideas are summarized, and the distinction and connection are analyzed between AR and VR. Then, a standard AR machine with software program and hardware structure used to be introduced primarily based on the contemporary lookup achievements. Three key strategies and associated lookup are added in detail. Finally, the utility of AR in a range of areas is introduced, especially in the area of army systems, gear assist, ance, and coaching simulation.

A. Taghian, et al (2021)This paper evaluation numerous 3D visualization applied sciences such as digital fact (VR), augmented truth (AR), and combined fact (MR). It was once caused by using current lookup and breakthroughs in AR technological know-how and its biomedical embedded purposes in the wearable electronics area, particularly in the area of head-up shows (HUD). Wearable AR applied sciences are being used to assist aged generations and human beings with dementia, visible impairment, and listening to impairment in accordance to a developing physique of research. Moreover, the surgical neighborhood and biomedical schooling have benefited from these technologies. In addition to discussing the improvement of novel wearable devices and systems, the paper important points medical makes use of wearable science that is presently being evaluated.

S. Su et al., (2020)For decades, digital truth (VR) and augmented truth (AR) applied sciences have remained absent from science and engineering workflows due to the custom-built nature of the hardware and software program and routinely pretty task-specific design. In addition to excessive cost, these traits create an essential entry barrier for most customers to make investments in VR and AR applications. Recent trends in each VR and AR applied sciences in the business region have resulted in the availability of lower-priced consumer-grade and dependable VR and AR hardware and software program tools. However, extensive lookup is wished to adopt VR and AR science use for data-intensive scientific and engineering functions such as community modeling research, human sciences research, and visualization of complicated simulated environments. Our VR and AR purposes supply examples of how scientists and engineers can use superior visualization applied sciences to function facts evaluation and assessment, for this reason, reworking scientific discovery.

Delgado, J. et al (2020)This paper provides a find out about the utilization panorama of augmented truth (AR) and digital fact (VR) in the architecture, engineering, and building sectors, and proposes a lookup agenda to tackle the current gaps in required capabilities. A sequence of exploratory workshops and questionnaires have been performed with the participation of fifty-four professionals from 36 companies' enterprises and academia. Based on the facts gathered from the workshops, six AR and VR use-cases had been defined: stakeholder engagement, plan support, graph review, building support, operations, and administrative support, and training.

Noah, N., and Das, S. (2021)Research is increasingly more being carried out to become aware of the advantages furnished via the ultra-modern trends in the AR/VR domain, which has considered a make bigger in activity as a end result of the stay-at-home phenomena in 2020. Of unique pastime is the utility of AR/VR to education, a self-discipline that has viewed a fast shift to on line modules in 2020. To higher apprehend the developments in AR/VR enabled education, we performed a systematic literature overview consisting of N=61 papers posted in the yr 2020 that centered on AR/VR in the schooling sector. We specifically centered on papers the place research has evaluated consumer perceptions in distinct

countries, tutorial fields, and at different instructional levels. We observed that whilst most papers carried out person research and evaluated the technical functions of AR/VR, consumer perceptions, impact, and attention had been now not explored in detail. Our findings spotlight tendencies that can pressure seriously wanted improvements via AR/VR specifically to assist a globalized digital evolution in the schooling sector.

Jishtu, P., and Yadav, M. A. (2022)Speed has grown to be a way of life. We are asymptotically piling data. Speed can be done with new sketch processes, techniques, and Technology. Innovations AR and VR are simply some of the many types of applied sciences that will play a key function in shaping the Architecture and Planning of tomorrow, making it future-ready and ushering in a new age of innovation. AR and VR in Architecture & Planning have been delivered as supporting equipment and has helped generate more than one graph options, elevated probabilities of visualization, and supplied us with extra enhanced, detailed, and unique journey in real-time; enabling us to see the resultsof work on hand nicely earlier than the graduation of the project. This equipmentis similarly developed for town improvement decisions, supporting residents have interaction with neighborhood authorities, get admission to public services, and sketch their commute. After reviewing a couple of lookup papers, it had been located that everyone is transferring ahead with the modifications delivered by using it, besides completely grasp its role. This paper affords a precis of the appliance of AR & VR in structure and planning.

Sinha, B. (2022)AR presents college students with the probability to exercise their information and capabilities by using seamlessly combining digital facts with the real-world environment. In addition to training real-world scenarios, AR can additionally supply interactive studying environments via interactive activities. AR has the practicable to retailer time and cash in the case of high-cost academic needs. AR systems, which can be used to make bigger collaborative studying experiences, allow the educating of training innovatively and interactively via providing facts in 3D format, thereby facilitating students' ability acquisition. Besides, AR structures positively have an effect on students' motivation and cognitive learning. They assist to increase their spatial and psychomotor-cognitive skills. AR can furnish pointers and comments visually, auditorily, or seasonally to enhance students' experiences. Through these features, AR structures can be built-in into teachers' lecture notes. Thus, the summary records to be taught can be conveyed to the college students in a concrete way.

Flavián, C. (2018)The arrival of Virtual-Reality, Augmented-Reality, and Mixed-Reality applied sciences is shaping new surroundings the place bodily and digital objects are built-in at one-of-a-kind levels. Due to the improvement of transportable and embodied devices, collectively with particularly interactive, physical-virtual connections, the consumer journey panorama is evolving into new kinds of hybrid experiences. However, the boundaries between these new realities, applied sciences and experiences have no longer but been genuinely hooked up with the aid of researchers and practitioners. This paper ambitions to provide a higher grasp of these standards and combine technological (embodiment), psychological (presence), and behavioral (interactivity) views to suggest a new taxonomy of technologies, particularly the "EPI Cube". The dice permits teachers and managers to classify all technologies, modern-day and potential, which would possibly assist or empower consumer experiences, however can additionally produce new experiences alongside the purchaser journey. The paper concludes with theoretical and managerial implications, as properly as a future lookup agenda.

Muñoz-Saavedra et al (2020)Augmented truth and digital fact applied sciences are growing in popularity. Augmented truth has thrived to date primarily on cell applications, with video games like Pokémon Go or the new Google Maps utility as some of its ambassadors. On the different hand, digital fact has been popularized by and large thanks to the videogame enterprise and more cost-effective

devices. However, what was once at the beginning a failure in the industrial discipline is resurfacing in current years thanks to the technological upgrades in gadgets and processing hardware. In this work, an in-depth find out about of the special fields in which augmented and digital actuality have been used has been carried out. This learn about focuses on conducting a thorough scoping evaluate targeted on these new technologies, the place the evolution of every of them at some stage in the ultimate years in the most necessary classes and in the international locations most concerned in these applied sciences will be analyzed. Finally, we will analyze the future vogue of these applied sciences and the areas in which it is crucial to look into two in addition combine these applied sciences into society.

Egliston, B., and Carter, M. (2021)Virtual Reality (VR) represents a rising classification of spatial computing science reliant upon the seize and processing of facts about the consumer (such as their physique and its interface with the hardware), or their surrounding environment. Much like digital media extra generally, there are developing worries of who stands to advantage from VR as a data-intensive shape of technology, and the place its viable data-borne harms might also lie. Drawing from vital statistics studies, we look at the case of Facebook’s Oculus VR—a market main VR technology, central to their metaverse ambitions. Through this case, we argue that VR as a data-intensive gadget is no longer one of unalloyed benefit, however one fraught with electricity inequity—one that has the achievable to exacerbate wealth inequity, institute algorithmic bias, and deliver about new types of digital exclusion. We contend that coverage to date has had confined engagement with VR, and that regulatory intervention will be wanted as VR will become extra broadly adopted in society.

Nayyar, A., et al (2018)Virtual Reality and Augmented Reality, these days, is supplying many beneficial functions that is attracting increased interest from tourism researchers and professionals. As, AR and VR applied sciences are evolving, the quantity of scientific purposes is additionally at increase. VR and AR are proving their well worth mainly when planning, marketing, education, vacationer game upkeep coming to light. The intention of this lookup paper is to spotlight pinnacle applied sciences for Tourism and Hospitality with regard to AR and VR.

3. APPLICATIONS FOR AR AND VR TECHNOLOGY

3.1 Policing

Equipped with AR structures that grant applicable important points on the environment, officers would be higher organized to enter unsafe situations. For example, when drawing near a residence after reviews of gunshots, officers may want to get admission to records like a 3D mannequin of the building, previous arrests at the address, and prior 311 reviews about hazardous conditions.

3.2 Emergency Management

Much as the upward jab of facts visualization has improved situational recognition at some point in emergency situations, AR can enhance responders’ expertise in their environment in order to rescue residents in need. Residents may want to plot their places on an interactive map allotted to responders, which would then exhibit EMS employees the most secure rescue routes and discover mainly hazardous areas.

3.3 Asset Management and Public Works

Armed with shows highlighting the circumstance of metropolis belongings and the presence of any hazardous conditions, DPW people would be capable of whole repairs and building tasks extra successfully and safely. Knowledge about their environment — for instance, that a ceiling hasn’t been changed because 1980 and would possibly incorporate asbestos — is essential to workers’ safety.

3.5 Digital Services

Instead of forcing residents to fill out static digital types in order to get hold of services, AR and VR ought to furnish an interactive trip that walks customers thru the utility process. Deploying this sort of technological know-how would limit mistakes by using residents, make certain they get their offerings extra quickly and create extra nice government-citizen interactions.

3.6 Culture and Tourism

By offering extra imagery and historic or cultural details, AR has the capacity to radically change traveler experiences with metropolis landmarks. The French city of Cluny has established augmented fact monitors for the duration of its ancient abbey in order to illustrate what the neighborhood was regarded like in the Middle Ages, and different cities may want to pursue comparable applied sciences to spotlight their ancient pasts.

3.7 Mental Health Services

Recent lookup has indicated that AR and VR have tremendous viability for treating intellectual fitness troubles like anxiousness and PTSD, developing possibilities for customers to confront their fears in publicity therapies. And, VR simulations can additionally assist residents with PTSD exercise job interviews, and examine to control their signs in high-stress environments. By furnishing social people with these tools, cities can enhance their intellectual fitness treatment.

3.8 Education

Augmented and digital truth have the practicable to convey greater college students into the lecture room and create extra attractive and interesting school room experiences. Using VR, college students in fitness care services or underdeveloped rural areas ought to take part in the lecture room honestly in a whole lot extra full and prosperous way than in standard online classes. Using AR and VR, instructors should create an immersive gaining knowledge of the environment, permitting college students to discover the ocean flooring or unfamiliar components of the globe. By funding these kinds of applied sciences in public schools, cities can make faculties extra inclusive and engaging.

3.9 Urban Planning

By developing AR and VR fashions for new development projects, cities should get a higher feel of how new work will be healthy inside the present city panorama and doubtlessly expand activity from investors. By making these fashions on hand to residents and neighborhood businesses, cities can additionally attain remarks on their plans.

3.10 Training

With the potential to recreate real-world experiences in an excessive stage of detail, augmented and digital actuality ought to revolutionize education for metropolis personnel in any of the preceding areas. Particularly precious would be the capacity to simulate conditions that are too risky or tough to recreate in actual life. Imagine police officers who exercise digital drug raids, emergency responders that exercise rescues of aged or motionless residents, or DPW people that simulate responses to the place of work injuries. AR and VR coaching packages are capable to expose personnel to sensible and various situations, making ready them for any of the variables they may encounter.

4. CONCLUSION

In recent years, augmented fact generation has attracted massive interest from researchers. Driven via way of means of laptop imaginative and prescient and synthetic intelligence generation, augmented fact

generation has proven a sturdy momentum of improvement. Both the monitoring registration accuracy, show equipment overall performance, and the character of human-laptop interplay had been substantially improved. However, it may be visible that there are nevertheless many issues to be solved in augmented fact generation. In phrases of monitoring registration generation, the present-day monitoring registration approach cans handiest employ a small quantity of data withinside the scene, inclusive of function factor data, which results in incomplete expertise of the device to the environment. In phrases of show generation, the scale and rate of augmented fact glasses that could offer customers an excessive feel of submergence can't meet the call of the public.

In phrases of interplay mode, the extra herbal and multi-consumer augmented fact interplay generation stays to be studied. In the following few years, the utility of augmented fact generation, particularly withinside the utility of cell shrewd terminals, will emerge in a huge number. Although cell gadgets are less submersible than helmet-set-up displays, they may be quite popular. At the identical time, the release of ARK it and AR core improvement systems realizes the mixture of augmented fact and clever cell gadgets technically. In the destiny improvement, clever wearable gadgets, that may provide complete play to the blessings of augmented fact generation, will create an extra sensible integration global for human beings. People can engage with the device in an extra herbal manner of human-laptop interplay. In the destiny, augmented fact generation will extra de human lifestyles to a notable extent, that is an inevitable fashion of clinical and technological improvement.

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