May 2025:Top Read Articles in Multimedia & Its Applications

The International Journal of Multimedia& Its Applications (IJMA)

---ERA,WJCI Indexed---

ISSN:0975-5578(Online);0975-5934(Print)

https://airccse.org/journal/ijma.html

INFORMATIONHIDINGUSINGAUDIOSTEGANOGRAPHY–ASURVEY

JayaramP[1],RanganathaHR[2], AnupamaHS[3]

[1,2,3]Department of ComputerScience and Engineering,RVCollegeofEngineering,Bangalore,INDIA

ABSTRACT

Today's large demand of internet applications requires data to be transmitted in a secure manner. Data transmission in public communication system is not secure because of interception and improper manipulation by eavesdropper. So the attractive solution for this problem is Steganography, which is theartandscience of writing hidden messages insucha waythat noone, apart from the sender and intend recipient, suspects the existence of the message, a form of security through obscurity. Audio steganography is the scheme of hiding the existence of secret information by concealing it into another medium such as audio file. In this paper we mainly discuss different types of audio steganographic methods, advantages and disadvantages.

KEYWORD

Steganography,Cryptography,AudioSteganography,LSB.

FullText:**https://aircconline.com/ijma/V3N3/3311ijma08.pdf**

VolumeLink:**https://airccse.org/journal/ijma_current11.html**

REFERENCES

[1] W. Bender, W. Butera, D. Gruhl, R. Hwang, F. J. Paiz, S. Pogreb, “Techniques for data hiding”, IBM Systems Journal, Volume 39 , Issue 3-4, July 2000, pp. 547 – 568.

[2] Samir Kumar Bandyopadhyay, Debnath Bhattacharyya, Poulami Das, Debashis Ganguly and Swarnendu Mukherjee, “A tutorial review on Steganography”, International Conference on Contemporary Computing (IC3-2008), Noida, India, August 7-9, 2008, pp. 105-114.

[3] RobertKrenn,“Steganographyandsteganalysis”,AnArticle,January2004.

[4] Nedeljko Cvejic, Tapio Seppben “Increasing the capacity of LSB-based audio steganography ” FIN90014 University of Oulu, Finland ,2002.

[5] SajadShirali-ShahrezaM.T.Manzuri-Shalmani“Highcapacityerrorfreewaveletdomainspeech steganography”ICASSP2008

[6] Neil F.Johnson,Z.DuricandS.Jajodia.“InformationHidingSteganographyandWatermarking-Attacks and Countermeasures”,Kluwer Academic Publishers, 2001

[7] F.A.P.Petitcolas,R.J.Anderson,M.G.Kuhn:”InformationHiding-ASurvey”,ProcessofIEEE,vol.87, no.7, pp.1062-1078, July, 1999.

[8] MinWu,BedeLiu.“MultimediaDataHiding”,Springer-VerlagNewYork,2003.

[9] N.Taraghi-Delgarm,“SpeechWatermarking”,M.Sc.Thesis,ComptuerEngineeringDepartment,Sharif University of Technology, Tehran, IRAN, May 2006.

[10] M. Pooyan, A. Delforouzi, “LSB-based Audio Steganography Method Based on Lifting Wavelet Transform”, in Proc. 7th IEEE InternationalSymposium onSignal ProcessingandInformation Technology (ISSPIT'07), December 2007, Egypt.

[11] R.A. Santosa and P. Bao, “Audio-to-image wavelet transform based audio steganography,” Proc. of 47th Int. Symposium ELMAR, June 2005, pp. 209- 212.

[12] Xuping Huang, Ryota Kawashima, Norihisa Segawa, YoshihikoAbe. “The Real-Time Steganography Based on Audio-to-AudioData BitStream”,TechnicalreportofIEICE, ISEC, vol.106pp.15-22, September 2006.

[13] Aoki, Naofumi. ”A Band Widening Technique for VoIP Speech Using Steganography Technology”, Report of IEICE, SP,106(333), pp.31-36, 2006.

[14] Xuping Huang, Ryota Kawashima, Norihisa Segawa, Yoshihiko Abe International Conference on Intelligent “Information Hiding and Multimedia Signal Processing” © 2008 IEEE.

[15] A. Delforouz, Mohammad Pooyan, "Adaptive DigitalAudio SteganographyBased on Integer wavelet transform ", IEEE ThirdInternational Conference on Intelligent Information HidingandMultimedia Signal Processing, 2007, 26-28 Nov 2007, pp 283-286.

[16] R. A. Santosa, P. Bao," Audio-to-Image Wavelet Transform based Audio Steganography", 47th International Symposium ELMAR-2005 , 08-10 June 2005, Zadar, Croatia, pp 209-212.

[17] S. Shirali-Shahreza, M. T. Manzuri-Shalmani, "Adaptive Wavelet Domain Audio Steganographywith High Capacity and Low Error Rate", IEEE International Conference on Information and Emerging Technologies, 2007, 06-07 July 2007 pp 1-5.

[18] Yincheng Qi, Jianwen Fu, and Jinsha Yuan, “Wavelet domain audio steganalysis based on statistical moments of histogram”, Journal of System Simulation, Vol 20, No. 7, pp. 1912-1914, April 2008.

[19] Yin-cheng qi, liang ye, chong liu “Wavelet domain audio steganalysis for multiplicative embedding model” Proceedings of the 2009 International Conference on Wavelet Analysis and Pattern Recognition, Baoding, 12-15 July 2009.

[20] V.Vapnik,“StatisticalLearningTheory”,JohnWiley,2008.

[21] Mengyu Qiao, AndrewH. Sung, Qingzhong Liu“Feature Miningand Intelligent Computingfor MP3 Steganalysis” International Joint Conference on Bioinformatics, Systems Biology and IntelligentComputing 2009.

AUTHORS

Jayaram P is currently doing his Engineering degree in R V College of Engineering Bangalore.Hehaspublished manypapersin National Conferences. Hisareasofresearch are Networking, Operating Systems, Data Structures, Computer Graphics and Mobile Computing.

Ranganatha H R is currently doing his Engineering degree in R V College of Engineering Bangalore. He has published many papers in National Conferences. His areas of research are Algorithms, Distributed Systems, Network security and Business Intelligence.

Anupama H S is working as an Assistant Professor in R V College of Engg Bangalore. ShedidBEin S.I.T College ofEnggTumkurandM.Tech in J.N.N.C.E CollegeShimoga, Karnataka, India. Her research of interest are Security, Steganography, Brain Computer Interface and Virtual Keyboard.

THECURRENTTRENDSOFAUGMENTEDREALITYINEARLYCHILDHOOD EDUCATION

MasyarahZulhaidaMasmuzidinandNorAzahAbdulAziz

DepartmentofCreativeMultimedia,UniversitiPendidikanSultanIdris,TanjungMalim,Perak Darul Ridzuan, Malaysia.

ABSTRACT

Augmented Reality has been widely used in various level of education such as higher-level education, secondary education (lower/upper secondary level), primary education, and ininformallearning.However,theimplementationinearlychildhoodeducationisstilllimited. Byusinglibraryresearchmethodology,theobjectiveofthispaperistoinvestigatethe existingworkofaugmentedrealityinearlychildhoodeducationbetween2009-2018.Based on the results, it shows that the publication of augmented reality in early childhood education increased slowly withinthesepast ten years. It hasbeenfoundthat the mainadvantage of augmentedreality is to enhance motivation. Early literacy has been found to be the most used topicwithsamplinglessthan30children.Finally,'Marker-based'augmentedrealityhas beenwidelyusedwithmobiledevicesandintermofdatacollectionmethods,'Test'hasbeenusedthe most in this field of research.

KEYWORDS

AugmentedReality,ChildComputerInteraction,EarlyChildhoodEducation,Preschool

FullText:https://aircconline.com/ijma/V10N6/10618ijma05.pdf

VolumeLink:https://www.airccse.org/journal/ijma_current18.html

REFERENCES

[1] Azuma,R.T.(1997).Asurveyofaugmentedreality.Presence:Teleoperators&VirtualEnvironments,6(4), pp.355-385.

[2] Azuma,R.,Baillot,Y.,Behringer,R.,Feiner,S.,Julier,S.,&MacIntyre,B.(2001).Recentadvancesin augmented reality. IEEE Computer Graphics & Application, 21(6), pp. 34-47.

[3] Wu, H. K.,Lee, S.W. Y.,Chang, H.Y., &Liang, J.C.(2013).Currentstatus,opportunitiesandchallenges of augmented reality in education. Computers & education, 62, pp. 41-49.

[4] Rambli,D.R.A.,Matcha,W.,&Sulaiman,S.(2013).FunlearningwithARalphabetbook forpreschoolchildren. Procedia computer science, 25, pp. 211-219.

[5] Gopalan,V.(2016).Astudyofstudents'motivationbasedoneaseofuse,engaging,enjoymentandfunusing the augmented realityscience textbook. Revista de la Facultad de Ingeniería, 31(5).

[6] Yilmaz,R.M.,Kucuk,S.,&Goktas,Y.(2017).Areaugmentedrealitypicturebooksmagicorrealforpreschool children aged five to six?. British Journal of Educational Technology, 48(3), pp. 824-841.

[7] Rasalingam, R. R., Muniandy, B., & Rass, R. (2014). Exploring the application of augmented reality technology in early childhood classroom in Malaysia. Journal of Research & Method in Education (IOSR-JRME), 4(5), pp. 33-40.

[8] Jeffri, N. F. S., & Rambli, D. R. A. (2017). Design and development of an augmented reality book and mobile application to enhance the handwriting-instruction for pre-school children. Open Journal of Social Sciences, 5(10), pp. 361.

[9] Hsu,Y.S.,Lin,Y.H.,&Yang,B.(2017).Impactofaugmentedrealitylessonsonstudents'STEMinterest. Research and Practice in TechnologyEnhanced Learning, 12(1), pp. 2.

[10] Bacca,J.,Baldiris,S.,Fabregat,R.,&Graf,S. (2015).Mobileaugmentedrealityin vocationaleducation and training. Procedia Computer Science, 75, pp. 49-58.

AUTHORS

Masyarah Zulhaida Masmuzidin obtained her MSc in Creative Media Technology with Computer Animation and Special Effects from University of Bradford, United Kingdom. Currently, she is a PhD student at Faculty of Art Computing and Creative Industry, Universiti Pendidikan Sultan Idris, Malaysia. Her research interest includes Interactive Multimedia, Child Computer Interaction, Virtual Reality and Augmented Reality.

Nor Azah Abdul Aziz is an Associate Professor at Faculty of Art Computing and Creative Industry, Universiti Pendidikan Sultan Idris, Malaysia. Her research interest includes Gestural Interface Design, Child Computer Interaction, Multimedia Application Development, Islamic Spiritual Psychology , Information Technology, Internet/Web Filtering,Internet & Society.

SELECTIONSORTINGALGORITHMVISUALIZATIONUSINGFLASH

HadiSutopo

DepartmentofInformatics,UniversitasPersadaIndonesiaYAI,Jakarta,Indonesiahadi@topazart.info

ABSTRACT

This paper is intended to develop an algorithm visualization, particularly selection sorting for an Algorithm and Programming course. Algorithm visualization technology graphically illustrates how algorithms work. This visualization can be used to explain how all data move to the proper position in order to be sortedin adisplay computer for education. Thisresearch consistsof 6 steps whichare concept, design, obtaining content material, assembly, testing, and distribution. Duringthe testingstep, theapplicationisrunandchecked toconfirm that itperformsexactlywhat the author has intended and the students can learn selection sorting algorithm by studying the visualization. Subjects of the research were students at Department of Informatics Universitas Persada Indonesia YAI for implementation of the learning. The data were analysed using the analytic descriptive method and interpreted ina narrative waybased onthe research findings. The algorithm visualization indicates that students increase their motivation and ability to program variety of sorting in programming language they learn.

KEYWORDS

Multimedia,Algorithm,Sorting,Flashmovie,ActionScript

FullText:https://aircconline.com/ijma/V3N1/3111ijma03.pdf

VolumeLink:https://www.airccse.org/journal/ijma_current12.html

REFERENCES

[1] Semiawan,ConnyR,(2009)LandasanPembelajarandalamPerkembanganManusia, Jakarta:Center for Human Capacity Development.

[2] Sfenrianto, (2009) "A Model of Adaptive E-Learning System Based on Student's Motivation", ProceedingsfromICCIT-09:InternationalConferenceonCreativeCommunicationandInnovative Technology, 2009. Tangerang: CCIT Journal.

[3] Sedgewick,Robert,(2001)AlgorithmsinC++,ThirdEdiition,Massachusetss:Addison-Wesley

[4] TenenbaumM,Aaron&Augenstein,MosheJ,(1981)DataStructuresUsingPascal,EnglewoodsCliffs, Prentice Hall.

[5] Hearn,Donald,andPaulineBaker,(1996)ComputerGraphicsCVersion,2ndedition.UpperSaddleRiver,NJ: PrenticeHall International, Inc.

[6] Vaughan,Tay,(2006)MultimediaMakingitWork,Yogyakarta:AndiPublisher.

[7] Anleigh,PrabathK&Thakar,Kiran,(1997)MultimediaSystemsDesign,UpperSaddleRiver:PrenticeHall.

[8] Bhatnager,Gaurav,SikhaMethaandSugataMitra,(2001)IntroductiontoMultimediaSystems,London: Academic Press.

[9] Luther,ArcC,(1994)AuthoringInteractiveMultimedia.Boston:APProfessional.

[10] Sutopo,AriestoH,(2003)MultimediaInteraktifdenganFlash.Yogyakarta:Grahailmu.

[11] Ypenburg,Derrick,(2009)ActionScript3.0,Berkeley,CA:PeachpitPress.

[12] Franklin,Derek&JobeMakar,(2002)MacromediaFlashMXActionScripting AdvancedTrainingfromtheSource,Berkeley,CA:MacromediaPress.

[13] Sutopo,AriestoH,(2003)IntegrasiFlashdenganASP,Jakarta:ElexMediaKomputindo.

AUTHORS

Hadi Sutopo was born in Cilacap, Indonesia on April 15, 1945. He is Doctor of Education in Educational Technology of the Jakarta State University, graduated in November 2009. In 1998 he earned Master of Information Systems at Post Graduate Program Gunadarma University, Jakarta. In 1995 he graduated from the Universitas Persada Indonesia YAI. Jakarta, majoring in Informatics.

Hadiis currently a lecturer of Multimedia at the Universitas Persada Indonesia YAI and some otheruniversitiesin Jakarta, Indonesia since 1998. He wrote many books on multimedia and information technology. The books are Pemrograman Berorientasi Objek dengan Java (Yogyakarta, Indonesia: Graha Ilmu, 1995), Desain Buku dengan Adobe InDesign Jakarta, Indonesia: Elex Media Komputindo, 2006), and Pemrograman Flash dengan PHPdan MySQL(Yogyakarta,Indonesia: GrahaIlmu, 2007). Current interestresearchisinformationtechnology especiallymultimedia.

Dr. Hadi Sutopo, MMSI is a member of Indonesian Association of Educational Technology (IPTPI)and Association of Education and Communication Technology (AECT). He works in editorial team of Educational Technology Journal and Multimedia Journal in Jakarta, Indonesia.

THEIMPACTOFVRGRAPHICALUSERINTERFACEONOCULUSTOUCH CONTROLLER AND OCULUS RIFT

NatchaphakMeeusahandBennapaPattanapipat

MultimediaTechnology,FacultyofMassCommunicationTechnology,RajamangalaUniversityof Technology Thanyaburi, Thailand

ABSTRACT

It is undeniably true that Virtual Reality (VR) has continuously been developed since 1800s and still have been produced till today. However, very few studies have attempted to study on the design of Virtual Reality Graphical User Interface (VR-GUI) that effectively empowers users to interact and immerse in a simulated world, via hardware and software with ease. Therefore, the aims of this research are to compare four different types of VR GUI Controller designs including (2D, 2D animation, 3D, and 3D animation) and to determine UI response time of the Oculus Touch Controller andcomparetheresults with UIresponsetime ofOculus Rift todeterminewhat VR GUI isappropriate for which ages. 168 participants were purposely selected, aged from 12 to 17, 18 to 33,and 34 to 45. The experiment results showed that VR GUI had a significant impact on UI response time resulted fromdifferent types of VR GUI controllers. Lastbut not least, analysisof VR GUIcontroller user data had suggested that VR GUI developers should design appropriate VR GUI controllers that match all agegroups inorder for themtoexperiencea fullyimmersive, perceptuallyreal environment asquickly and efficiently as possible.

KEYWORDS

VRGUI,OculusTouchController,OculusRift,VirtualReality,Generation,Interactive. Full

Text: **https://aircconline.com/ijma/V13N6/13621ijma03.pdf**

VolumeLink:**https://airccse.org/journal/ijma_current21.html**

REFERENCES

[1] Zuckerberg, M. (2015) The future of connection. Presented at Facebook F8', Facebook's Developerconference, 25 March, 2015. Available at Internet: https://bit.ly/3CJqhcC [2021-02-11]

[2] Dorabjee, R., Bown, O., Sarkar, S., & Tomitsch, M. (2015). Back to the future: identifying interface trends from the past, present and future in immersive applications. In Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction (pp. 540-544).

[3] Bowman, D.A. (2013). 3Duser Interfaces Bruno, F., &Muzzupappa, M. (2010). Product interface design: A participatoryapproach based on virtualreality. Internationaljournalofhuman-computer studies, 68(5), 254-269.

[4] Norman,D.A.(2010).Naturaluserinterfacesarenotnatural.interactions,17(3),6-10.

[5] Fröjdman, S. (2016). User experience guidelines for design of virtual reality graphical user interfaces controlled by head orientation input. Bachelor Degree Project in Cognitive Science, University of Skövde, Sweden (pp. 58).

[6] Molina, J. P., González, P., Lozano, M. D., Montero, F., & López-Jaquero, V. (2003). Bridging the gap: developing 2D and 3D user interfaces with the IDEAS methodology. In International Workshop on Design, Specification, and Verification of Interactive Systems. Springer, Berlin, Heidelberg, (pp.303-315)

[7] Nielsen,J.(1995)Ten Usabilityheuristics.Nielsen NormanGroup[website], January1,1995.Availableat Internet: https://bit.ly/3jDwQ8d [2021-02-11]

[8] Bowman,D.A.,Coquillart,S., (2008)3Duserinterfaces:newdirectionsandperspectives. IEEEComputer Graphics and Applications, 28(6), 20-36.

[9] Seibert,J.,&Shafer,D.M.(2018).Controlmappinginvirtualreality:effectsonspatialpresenceandcontroller naturalness.VirtualReality,22(1),79-88.

[10] Bruno, F.,&Muzzupappa,M.(2010).Product interfacedesign: Aparticipatoryapproachbasedon virtual reality. International journal of human-computer studies, 68(5), 254-269.

[11] Salomoni, P., Prandi, C., Roccetti, M., Casanova, L., & Marchetti, L. (2016, January). Assessing the efficacyofa diegeticgameinterfacewith OculusRift.In 201613thIEEEAnnual Consumer Communications& Networking Conference (CCNC) (pp. 387-392). IEEE.

[12] Sauzéon, H., N'Kaoua, B., Arvind Pala, P., Taillade, M., & Guitton, P. (2016). Age and active navigation effects on episodic memory: a virtual realitystudy. British Journal of Psychology, 107(1), 72-94.

[13] Plancher, G., Gyselinck, V., Nicolas, S., & Piolino, P. (2010). Age effect on components of episodic memory and feature binding: A virtual reality study. Neuropsychology, 24(3), 379.

[14] Adams, H., Narasimham, G., Rieser, J., Creem-Regehr, S., Stefanucci, J., & Bodenheimer, B. (2018). Locomotive recalibration and prism adaptation of children and teens in immersive virtual environments. IEEE transactions on visualization and computer graphics, 24(4), 1408-1417.

[15] Narasimham, G., Adams, H., Rieser, J., & Bodenheimer, B. (2020). Encoding Height: Egocentric Spatial MemoryofAdultsandTeens ina Virtual Stairwell. In ACMSymposium on Applied Perception 2020(pp. 1-8).

[16] Björling, E. A., Cicero, R., Sankar, A., & Sekar, A. (2019). Thought Disposal: Co-Designing a virtual interaction to reduce stress in teens. In Proceedings of the 18th ACM International Conference on Interaction Design and Children (pp. 562-567).

[17] Optale, G., Urgesi, C., Busato, V., Marin, S., Piron, L., Priftis, K., ... & Bordin, A. (2010). Controlling memoryimpairment in elderlyadults using virtualrealitymemorytraining: a randomized controlled pilot study. Neurorehabilitation and neural repair, 24(4), 348-357.

[18] Hou, W. J., & Chen, X. L. (2021). Comparison of Eye-Based and Controller-Based Selection in Virtual Reality. International Journal of Human–Computer Interaction, 37(5), 484-495.

[19] Shum, L. C., Valdés, B. A., & Van der Loos, H. M. (2019). Determining the accuracy of oculus touch controllers for motor rehabilitation applications using quantifiable upper limb kinematics: Validation study. JMIR Biomedical Engineering, 4(1), e12291.

[20] Jost, T. A., Nelson, B., & Rylander, J. (2021). Quantitative analysis of the Oculus Rift S in controlled movement. Disability and Rehabilitation: Assistive Technology, 16(6), 632-636.

[21] Otte, K., Kayser, B., Mansow-Model, S., Verrel, J., Paul, F., Brandt, A. U., & Schmitz-Hübsch, T. (2016). Accuracy and reliability of the kinect version 2 for clinical measurement of motor function. PloS one, 11(11), e0166532.

[22] Borrego, A., Latorre, J., Alcañiz, M., & Llorens, R. (2018). Comparison of Oculus Rift and HTC Vive: feasibility for virtual reality-based exploration, navigation, exergaming, and rehabilitation. Games for health journal, 7(3), 151-156.

[23] Suznjevic, M., Mandurov, M., & Matijasevic, M. (2017, May). Performance and QoE assessment of HTC Vive and Oculus Rift for pick-and-place tasks in VR. In 2017 Ninth international conference on quality of multimedia experience (QoMEX) (pp. 1-3). IEEE.
[24] Fisher, R. A. (1992). Statistical methods for research workers. In Breakthroughs in statistics Springer, New York, NY. (pp.66-70).
[25] Williams, L. J., & Abdi, H. (2010). Fisher's least significant difference (LSD) test. Encyclopedia of research design, 218, 840-853.
[26] Allcoat, D., & von Mühlenen, A. (2018). Learning in virtual reality: Effects on performance, emotion and engagement. Research in Learning Technology, 26.
[27] Bhagat, K. K., Liou, W. K., & Chang, C. Y. (2016). A cost-effective interactive 3D virtual reality system applied to military live firing training. Virtual Reality, 20(2), 127-140.
[28] de Bruin, E. D., Schoene, D., Pichierri, G., & Smith, S. T. (2010). Use of virtual reality technique forthetraining of motor control in the elderly. Zeitschrift für Gerontologie and Geriatrie, 43(4), 229- 234.

ANALTERNATIVEGREENSCREENKEYINGMETHODFORFILMVISUALEFFECTS

JinZhi

DepartmentofCreativeProfessions&DigitalArts,UniversityofGreenwich,UnitedKingdom

ABSTRACT

Thisstudyfocusesonagreenscreenkeyingmethoddevelopedespeciallyforfilmvisualeffects.Therearea series of ways of using existingtools for creating mattes fromgreen or bluescreenplates. However, it isstilla time-consumingprocess, andtheresultsvaryespeciallywhenit comestoretainingtinydetails, suchas hair andfur.This paper introduces analternativeconcept and methodfor retaining edgedetails of characters ona greenscreenplate, also, a number of connected mathematical equations areexplored. At the end of this study, a simplified process of applying this method in real productions is also tested.

KEYWORDS

DigitalCompositing,GreenScreenKeying,VisualEffects

FullText:**https://aircconline.com/ijma/V7N2/7215ijma01.pdf**

VolumeLink:**https://airccse.org/journal/ijma_current15.html**

REFERENCES

[1] Richard, J(1994)"RKOFilm Grosses: 1931-1951", HistoricalJournal ofFilm RadioandTelevision14,1, pp55.
[2] GORBACHEV,B.K(1961).Tekhnikakombinirovannykhs''emok.Moscow,2nded.
[3] Snider.,David.,GlennK.,KenC.,andMichaelM(1993)DigitalMoving-PictureExchange:FileFormatand Calibration, SMPTE Journal, pp712-714.
[4] Mike.S(2011).TheArtofDigitalColor.Fxfuide
[5] Mark,C.V.,Craig,B(2002).TheInvisibleArt:TheLegendsofMovieMattePainting.ChronicleBooks,pp33.
[6] Livingstone, M(2002)TheFirst StagesofProcessingColorandLuminance: WhereandWhat.Visionand Art: The Biology of Seeing. New York: Harry N. Abrams, pp46–67.
[7] Chrles,P(2003).DigitalVideoandHDTV:AlgorithmsandInterfaces.Morgan-Kaufmann.24,pp291-292.
[8] Larry,G.,andeugene,E(2007).GPUGems3.Chapter24.
[9] Lee,L(2010).ProfessionalDigitalCompositing.WileyPublishing,Inc.,Indianapolis,pp47-51.
[10] Hazewinkel,M(2001).Absolutevalue,EncyclopediaofMathematics,Springer

AUTHORS

Dr Jin Zhi has a very wide higher education background in tradition art, design and digital moving images, film production as well asfilm visual effects and 3DCGI. Jinis currentlyworkingatCreativeProfessions &DigitalArts,UniversityofGreenwich.In the past 10 years, Jin worked in various VFX studios including The Moving Picture, London and Cinesite Kodak Visual Effects. Meanwhile, Dr Jin also worked as a visiting lecturer in anumber of universities in theUK as well asSouth Korea such as University of Westminster, London and Konkuk University in Seoul, South Korea.As a film VFX Compositor, Jin's visual effects works are included in followingcommercialfeaturefilms:Prometheus(2012),WrathoftheTitans(2012), John Carter (2012), Harry Potter and the Deathly Hallows: Part 2 (2012). Jin's expertise and research interests widelycovered in differentareasin film &television post-production, especiallyfilm digital compositing,film& TV visualeffects productions, creating3D CGelements for featurefilmsas well asdigitalmovingimagedesign, etc. In addition, Dr Jin has been certified as a NukeTrainer bythe FoundryUK in 2015.

THEDEVELOPMENTOFADIGITALSTORYBOOKANDANAUGMENTEDREALITY (AR)-BASED PROVERBS APPLICATION

JamilahHamid[1],NorHasbiahUbaidullah[1]andAhmadYasirBahador[21]FacultyofArts,Comput

ing&CreativeIndustry,SultanIdrisEducationUniversity, Malaysia
[2]SekolahMenengahMethodist,TgMalim,Perak,Malaysia

ABSTRACT

LearningMalayproverbs is very important tosustaintherich heritage of theMalaycivilizationamong young generations. However, pilot study and literature review show that students face problems in understanding proverbs when learning using conventional method. Thus, this paper discusses the development of a digital storybook to help the learning of selected Malays proverbs under the unity theme using Augmented Reality (AR) technology. The application development was divided into two parts; development of the AR-based proverbs application and the development of a digital story. For the first part, the application was developed based on the combination of waterfall methodology, learning theory principles and AR application development guidelines. For the second part, the development is relied on the digital story development guidelines. This application development can serve as important guidelines for the developers to develop suitableapplications using AR technology to help students learn a range of important learning concepts.

KEYWORDS

Augmentedreality,digitalstorybook,learningtheory,Malayproverbs,mobileapplication.Full

Text: **https://aircconline.com/ijma/V10N6/10618ijma12.pdf**

VolumeLink:**https://airccse.org/journal/ijma_current18.html**

REFERENCES

[1] TheStatisticsPortal.(2017).RetrievedAugust17,2017,fromhttps://www.statista.com/topics/1002/mobile-app-usage/

[2] Syahar,A.(2016).Penggunatelefonpintarcecah11juta.RetrievedAugust17,2017,from http://www.utusan.com.my/bisnes/korporat/pengguna-telefon-pintar-cecah-11-juta-1.181716].

[3] Mariah,A. (2016). 10 trend penggunaan aplikasi mudah alih di Malaysia. Retrieved August 17, 2017, from http://www.astroawani.com/berita-teknologi/10-trend-penggunaan-aplikasi-mudah-alih-di-malaysia-122355

[4] Mehdipour,Y.,&Zerehkafi,H.(2013).Mobilelearningforeducation:Benefitsandchallenges.International Journal of Computational, 3(6), 93–101 (251–259). https://doi.org/10.1080/87567555.2011.604802

[5] Ma,M.,Fallavollita,P.,Seelbach,I.N.A.,Heide,A.M.V.,Euler,E.,Waschke,J.,&Navab,N.(2016).Personalized augmented reality for anatomy education. Clinical Anatomy, 453, 446–453. https://doi.org/10.1002/ca.22675

[6] Londei, R.,Esposito, M.,Diotte,B.,Weidert,S.,Euler,E.,Thaller, P.,Fallavollita, P. (2015).Intraoperative augmented reality in distal locking. International Journal of Computer Assisted Radiology andSurgery,1395–1403.https://doi.org/10.1007/s11548-015-1169-2

[7] Antonioli, M., Blake, C., & Sparks, K. (2014). Augmented reality applications in education. The Journal of Technology Studies, (2009), 96–107.

[8] Nazatul-Aini, A. M., &Nooraidah, K. H. (2014). Mobilelearningapplication based on augmentedrealityfor science subject: Isains. ARPN Journal of Engineering and Applied Sciences, 9(9), 1455–1460.

[9] Lu, S., & Liu, Y. (2015). Integrating augmented reality technology to enhance children's learning in marine education. Environmental Education Research, 4622.https://doi.org/10.1080/13504622.2014.911247

[10] Redondo,E., Rierra, A. S., & Fonseca, D. (2015). Geo-located teaching usinghandheldaugmentedreality: Good practices to improve the motivation and qualifications of architecture students. Universal Access Inf Soc, 14, 363–374. https://doi.org/10.1007/s10209-014-0362-3

[11] Yilmaz, R. M., Kucuk, S., & Goktas, Y. (2016). Are augmented reality picture books magic or real for preschool children aged five to six?. British Journal of Educational Technology. https://doi.org/10.1111/bjet.12452

[12] Radu, I. (2014). Augmented reality in education: A meta-review and cross-media analysis. Pers Ubiquit Comput, (18), 1533–1543. https://doi.org/10.1007/s00779-013-0747-y

[13] Koutromanos, G., Sofos, A., & Avraamidou, L. (2015). Theuse of augmented realitygamesin education:A review of the literature. Educational Media International, 52(4), 254–271. https://doi.org/10.1080/09523987.2015.1125988

[14] Santos, M. E. C., Lübke, W. A. ., Taketomi, T., Yamamoto, G., Rodrigo, M. M. T., Sandor, C., & Kato, H. (2016). Augmentedrealityasmultimedia: Thecase forsituated vocabularylearning. Research and Practice in Technology Enhanced Learning, 11(4), 1–23. https://doi.org/10.1186/s41039-016-0028-2.

[15] MohdMahzan, A.,Noor Azam, A.R., Noraziah,M.A.,&Abdul Razq,A.(2015).Mesejperpadauandalam buku teks Bahasa Melayu Tingkatan 4 dan 5: Analisis terhadap Bahasa Melayu(The social unitymessage on the form 4 and 5 Malaylanguage textbooks: Analysis Malay proverbs). Jurnal Pendidikan Bahasa Melayu -JPBM (Malay Language Education Journal MyLEJ), 5(Mei), 44–52.

[16] AhmadMahmood, M., Zaitul Azma, Z. H., Nor Azuwan, Y., & Norizan, C. S. (2011). Pengetahuan makna peribahasa dalam kalangan pelajar sekolah menengah. Jurnal Linguistik, 13, 1–16.

[17] Johan, A. (2010). Pembelajaran peribahasadalam kalanganmuridsekolah rendah. Perkongsian Profesional Bagi Guru-Guru Permulaan. Singapore: Ministry of Education, Singapore. Retrieved from http://malaylanguagecentre.moe.edu.sg/qql/slot/u181/KhazanahIlmu/Perkongsian Profesional/MLCSFinal-65-81.pdf

[18] Hasmidar, H.,&Jafizah, J. (2016).Theinterpretation ofproverbsandtheirrelationtothinkingskills: An analysis based on relavance theory. Jurnal Bahasa, 16(1), 94–119.

[19] Robin, B.R. (2016).Thepower ofdigital storytellingtosupportteachingandlearning.DigitalEducation Review, (30), 17–29.

[20] Yuksel-arslan, P., Yildirim, S., & Robin, B. R. (2016). Aphenomenological study: teachers' experiencesof using digital storytelling in early childhood education. Educational Studies, 42(5), 427–445. https://doi.org/10.1080/03055698.2016.1195717

[21] Grant, N. S., & Bolin, B. L. (2016). Digital storytelling: A method for engaging students and increasing cultural competency. The Journal of Effective Teaching, 16(3), 44–61.

[22] Mardian Shah, O., Solehah, M., & Beseknorliana, R. (2016). Buku Teks Bahasa Malaysia Tingkatan 1. Kuala Lumpur: Dewan Bahasa dan Pustaka..

[23] Yilmaz, K. (2011). The cognitive perspective on learning: Its the cognitive perspective on learning: Its theoretical underpinnings and implications for classroom practices. The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 8655. https://doi.org/10.1080/00098655.2011.568989

[24] Bower, M., Howe, C., Mccredie, N., Robinson, A., &Grover, D. (2014). AugmentedRealityin education – cases , places and potentials. Educational Media International, 51(1), 1–15. https://doi.org/10.1080/09523987.2014.889400

[25] Endsley, T. C., Sprehn, K. A., Brill, R. M., Ryan, K. J., Vincent,E. C., & Martin, J. M. (2017). Augmented reality design heuristics: Designing for dynamic interactions.In Proceedings of the Human Factors and Ergonomics Society 2017 Annual Meeting (pp. 2100–2104). https://doi.org/10.1177/1541931213602007

[26] Basir, N. (2012). Perpaduan etnik menerusi penggunaan bahasa melayu. Kangar, Perlis. Retrieved from https://www.researchgate.net/publication/269223543%0APERPADUAN.

AUTHORS

Dr.JamilahHamidisasaSeniorLecturerinFacultyofArt,Computingand Creative Industry, Sultan Idris Education University. Sheholds a Bachelor ofScience in Education (Hons.) majoring in Mathematics and Master of Science (Information Technology). She obtained her PhD in Internet and Web Computing from Sultan Idris Education University, Malaysia. She has been teaching in high education institutions since 1991 in several subjects such as Programming, Methodology in Courseware Development, Educational Technology and Teaching Methodology. Her research interests are on Virtual Reality, Augmented Reality, Educational Technology and Educational Software.

Dr. Nor HasbiahUbaidullah is working as an Associate Professor at Universiti PendidikanSultanIdris.ShereceiveddegreeinComputer SciencefromUniversiti Kebangsaan Malaysia and Master of Science in Information System from Universityof Salford. She obtained her PhD degree in Information Technology from Universiti Kebangsaan Malaysia. Her research areas include Courseware Engineering,DSS,LearningDisabilityChildren,Systems/ProductDevelopment, Programming C++ and JAVA.

Ahmad Yasir bin Bahador is a secondaryschool teacher at SMK Methodist. He holds a certificate in education majoring in PengajianMelayu from Kota Baharu Teaching Collage. He obtained a bachelor degree in IT Education and Master degreeinMultimediaEducationfromUniversitiPendidikanSultanIdris,Malaysia. Hehasbeen teachinginschoolsince1997in severalsubjectssuchasBahasaMelayu (Malay Language), Kemahiran Hidup (Life Skills), LiterasiKomputer(Computer Literacy)and AsasSainsKomputer (Basic Computer Science). He has 12 years' experience in teaching Form 1 Bahasa Melayu. His research interests are on Educational Technology and Educational Software.

THE RESULTS OF THE BLENDED LEARNING ACTIVITIES COURSE OF INNOVATIONANDINFORMATIONTECHNOLOGYFORCOMMUNICATION AND LEARNING

ThanatchaRattanaphantandSenaweeRoekmongkol

MajorofDigitalTechnologyforEducation,FacultyofEducationRajabhatNakhonSi ThammaratUniversity,NakhonSiThammarat, Thailand

ABSTRACT

The objectives of this research were: 1) to find the effectiveness of theblended learning management activity package 2) to compare the learning achievement 3) to study memory retention and 4) to study the satisfaction with the blended learning activities. The research sample consisted of 3 0 1 st year students enrolled in the Innovation and Information Technology for Communication and Learning course in the 2nd semester of the academic year 2 0 2 0 in the Major of General Science, Faculty of Education, Rajabhat NakhonSi Thammarat University. Theresearchtools were: 1) a blended learning management activity package, and 2) an online questionnaire on the satisfaction of the learners with theblended learningactivities. Thestatistics usedinthedata analysis weremean, S. D.and hypothesis testing using t-test Dependent. 1) The developed efficiency was 8 0 .5 8 /8 7 .6 7 , which was the efficiency according to the specified criteria8 0 /8 0 . 2) The statistically significant comparison ofthelearningachievementafter receivingthelearningmanagement washigher thanbeforethelearning management at the.05 level. 3) Thestudyof memoryretentionafter 2 weeks of learning managementwas not significantly different at the .05 level and 4) The overall of the satisfaction blended learning activities were at the highest level.

KEYWORDS

BlendedLearningActivities,MemoryRetention,Satisfaction

FullText:**https://aircconline.com/ijma/V14N1/14122ijma02.pdf**

VolumeLink:**https://airccse.org/journal/ijma_current22.html**

REFERENCES

[1] Allen. I. E. and Seaman. J. (2007). Growing by Degrees:Online education in the United States, The SloanConsortium. [Online] Available from:
http://www.sloanc.org/publications/survey/pdf/growing_by_degrees.pdf.[2020,April,4].

[2] NorM. H., Nadia A. A. Z.,RasyidiJ., and NoorA. Z.M. N..(2021).NeedAnalysis:Portable WebSever Development Kits for Teaching and Learning. [Online] Available from:
https://aircconline.com/ijma/V13N3/13321ijma01.pdf.[2022,February,19].

[3] Center for Media Literacy. (2008). Literacy for the 21st century: An overview & orientation guide to media literacy education (2 nd ed.). Center for Media Literacy.

[4] Bachelor of Education. (2562). Course of Innovation and Information Technology for Communication and Learning. Faculty of Education, Rajabhat Nakhon Si Thammarat University, pp. 8.

[5] MonchaiT. (2002). Design anddevelopmentofcoursewarefor computer-assisted instruction. Bangkok:King Mongkut's Institute of Technology North Bangkok, pp. 136-146.

[6] Kornphan T. et al. (2561). Developing Blended Lessons for Developing Communication Skills for Students Sergeant at Naval Chumphon School. Journal of Humanities and Social Sciences Chulachomklao Royal Military Academy. Year 8 (2564), pp. 11-24.

[7] RawiphonC. (2021). Development of Web Application for Packing Design. [Online] Available from: https://aircconline.com/ijma/V13N5/13521ijma01.pdf. [2022, January, 15].

[8] Tawee W. and Nuansri C. (2012). The Development of Computer-Assisted Instruction on Parallel Lines for SecondarySchool Students 2. Journal of Graduate Studies. Rajabhat Nakhon Sawan University, pp. 69-84.

[9] Alongkorn U. (2017). Effects of collaborative, blended learning on the ability to work in groups, subjects, occupations and technology 4 of Mathayomsuksa 5 students (Master of Education Thesis). Silpakorn University, pp. 80-84.

AUTHORS

Firstauthor:Ms.ThanatchaRattanaphant1
E-mail : thanatcha_rat@nstru.ac.th
Occupation : Lecturer
Workplace:MajorofDigitalTechnologyforEducation, FacultyofEducation Rajabhat Nakhon Si Thammarat University, Nakhon Si Thammarat, Thailand
EducationalBackground:Ph.D.(ComputerEducation),KingMongkut'sUniversityofTechnology North Bangkok

Correspondingauthor:Mr.SenaweeRoekmongkol2
E-mail :
senawee_roe@nstru.ac.thOccupation:Lecturer
Workplace:Major ofDigitalTechnologyfor Education,FacultyofEducation RajabhatNakhon SiThammaratUniversity,NakhonSiThammarat,Thailand
EducationalBackground:M.Ed(EducationTechnology),KasetsartUniversity

GAMIFICATIONELEMENTSANDTHEIRIMPACTSONTEACHINGAND LEARNING – A REVIEW

MohdHishamuddinAbdulRahman,Ismail@IsmailYusufPanessai,NoorAnidaZaria MohdNoor and Nor Syazwani Mat Salleh
DepartmentofComputing,FacultyofArt,Computing&Creative Industry,Universiti PendidikanSultan Idris, Tanjung Malim, Perak, Malaysia

ABSTRACT

This paper discusses the results of a literature review to identify the elements of gamification in learning that have been applied in previous studies and their impacts on student learning, withonlytaking intoaccounttherelated studieswithinthe last three years(2016 to2018).This isdoneto determine the most effective and suitable elements of gamification to be applied in our study and at the same time to identify research gaps that need to be fulfilled in future researches. The results ofthis review show thatgamificationhas positive impact onstudent learningparticularlyin their engagement and achievement. Furthermore points, leaderboard and digital badge are themost applied gamification elements in the studies. The findings will be used as a guide forusin designing a gamified collaborative learning activities in the 3-dimensional virtual world that will becarried out later.

KEYWORDS

Gamification,Game-basedLearning,VirtualWorld

FullText:https://aircconline.com/ijma/V10N6/10618ijma04.pdf

VolumeLink:https://www.airccse.org/journal/ijma_current18.html

REFERENCES

[1] Dicheva,D.,Dichev,C.,Agre,G.,&Angelova,G.(2015).Gamificationineducation:Asystematic mappingstudy.JournalofEducationalTechnology&Society,18(3),9.

[2] Vlachopoulos,D.,&Makri,A.(2017).Theeffectofgamesandsimulationsonhighereducation:a systematicliteraturereview.InternationalJournalofEducationalTechnologyinHigherEducation,14(1), 22.

[3] GoogleTrend(2017).Game-basedlearning.Retrievedfromhttps://trends.google.com/trends/ explore?date=today%205-y&q=gamebased%20learning.

[4] Hoe,T.W.(2015).Gamifikasidalampendidikan:Pembelajaranberasaskanpermainan. Tanjong Malim: Universiti Pendidikan Sultan Idris.

[5] Tsay,C.H.H.,Kofinas,A.,&Luo,J.(2018).Enhancingstudentlearningexperiencewith technology-mediatedgamification:Anempiricalstudy.Computers&Education,121,1-17.

[6] Alsawaier,R.S.(2018).Theeffectofgamificationonmotivationandengagement.TheInternational Journalof InformationandLearningTechnology,35(1),56-79.

[7] Chan,K.Y.G.,Tan,S.L.,Hew,K.F.T.,Koh,B.G.,Lim,L.S.,&Yong,J.C.(2017).Knowledge forgames,gamesforknowledge:designingadigitalroll-and-moveboardgameforalawoftortsclass. ResearchandPractice inTechnology EnhancedLearning,12(1),7.

[8] Sepehr, S., & Head, M. (2013, October). Competition as an element of gamification for learning: an exploratorylongitudinalinvestigation.InProceedingsoftheFirstInternational ConferenceonGameful Design, Research, andApplications (pp. 2-9). ACM.

[9] Szegletes, L., Koles, M., & Forstner, B. (2015). Socio-cognitive gamification: general framework for educationalgames.JournalonMultimodalUserInterfaces,9(4),395-401.

[10] Alexiou, A., & Schippers, M. C. (2018). Digital game elements, user experience andlearning: A conceptualframework.EducationandInformationTechnologies,1-23.

[11] Cózar-Gutiérrez,R.,&Sáez-López,J.M.(2016).Game-basedlearningandgamificationininitial teachertraininginthesocialsciences:anexperimentwithMinecraftEdu.InternationalJournalofEducationalTechnology inHigherEducation, 13(1),2.

[12] González,C.S.,Gómez,N.,Navarro,V.,Cairós,M.,Quirce,C.,Toledo,P.,&Marrero-Gordillo, N.(2016).Learninghealthylifestylesthroughactivevideogames,motorgamesandthegamificationofeducationalactivitie s.Computers inHumanBehavior,55,529-551.

[13] Hew,K.F.,Huang,B.,Chu,K.W.S.,&Chiu,D.K.(2016).EngagingAsianstudentsthrough gamemechanics:Findingsfromtwoexperimentstudies.Computers&Education,92,221-236

[14] Pesare,E.,Roselli,T.,Corriero,N.,&Rossano,V.(2016).Game-basedlearningandgamification topromoteengagementandmotivationinmedicallearningcontexts.SmartLearningEnvironments,3(1),5.

[15] Spires,H.A.,&Lester,J.C.(2016).Game-basedlearning:creatingamultidisciplinary communityof inquiry.OntheHorizon, 24(1),88-93.

AUTHORS

Dr.MohdHishamuddinAbdulRahmanisaseniorlectureratthe FacultyofArt,Computing&Creative Industry,UniversitiPendidikanSultanIdris(UPSI).Hisresearchinterestsaretowardseducational technology,multimedia,virtuallearningenvironment,game-basedlearningandgamification,virtualandaugmentedrealityandalsoonnewmediainteachingandlearning.

Dr. Ismail @ Ismail Yusuf Panessai is a senior lecturer at the Faculty of Art, Computing &CreativeIndustry,UniversitiPendidikanSultanIdris (UPSI).His research interests are towardsArtificial Intelligence,ArtificialIntelligenceineducation,VRPandControlSystem.

Dr. Noor Anida Zaria Binti Mohd Noor is a senior lecturer at the Faculty of Art, Computing & Creative Industry, Universiti Pendidikan Sultan Idris (UPSI). Her research interests are towards Information Technology,KnowledgeManagement,KnowledgeIntegrationandProjectManagement.

Dr.NorSyazwaniBintiMatSallehis asenior lecturerat the Faculty of Art,Computing&Creative Industry,UniversitiPendidikanSultanIdris(UPSI).HerresearchinterestsaretowardsICTsin Education,Art&Design,GraphicDesignandPersonalizedLearning.

ANEVALUATIONOFTHEUSEOFAUDIOGUIDANCEINAUGMENTED REALITYSYSTEMSIMPLEMENTEDATSITESOFCULTURALHERITAGE

BenjaminWilson,JoshuaHullandDamianSchofield

DepartmentofComputerScience,StateUniversityofNewYork,Oswego,NewYork,13126,USA

ABSTRACT

Recently, museums and historic sites have begun reaching out beyond their traditional audience groups, using more innovative digital display technology to find and attract a new audience. Virtual, mixed, and Augmented Reality (AR) technologies are becoming more ubiquitous in our society and “virtual history” exhibits are starting to be available to the public. There are numerous studies focusing on AR, however a scant amount of research is being done at historical sites. An initial experiment used repeated measures (ANOVA) to compare and rank three different types of AR devices usedat a siteofculturalheritage. Afurther experiment was thenundertakento observe participants using two different AR devices with and without sound to determine if which device used or the presence of sound impact the usability of the device, or the user’s satisfaction/preference of specific devices. Several surveys, including demographic and usability surveys, were provided in order to collect a range of user data. A two-way repeated measures (ANOVA) were used to analyze the quantitative data gathered. No significant effects were observed based on the quantitative data provided by the surveys, indicating that all devices were equally usable and satisfactory, and that sound did not have a significant impact in this instance. However, thequalitativedata indicatedthat users mayprefer usingAR technologyonasmartphone device and preferred to use this device paired with sound.

KEYWORDS

AugmentedReality,AudioGuide,CulturalHeritage,HumanComputerInteraction(HCI),Usability

FullText:**https://aircconline.com/ijma/V14N2/14222ijma01.pdf**

VolumeLink:**https://airccse.org/journal/ijma_current22.html**

REFERENCES

[1] C.Yoon(2018)“AssumptionsthatledtothefailureofGoogleGlass”,NYC-Design.
[2] P. A. Rauschnabel (2018) “Virtually enhancing the real world with holograms: An exploration of expected gratifications of using augmented realitysmart glasses”, Psychology& Marketing, 35(8), 557-572.
[3] D. Schofield, T. Johnson, D. Hufnal, P. Chapagain, S. Colletta, and P. Lear (2021)“Augmentingcultural experience: Evaluatingtheuseofaugmentedrealitytechnologytoenhancethevisitor experienceat ahistoric site”, Journal of Studies in Social Sciences and Humanities 7 (2) 129-145
[4] D. Ivancic, D. Schofield, and L. Dethridge (2013) “The effects of perspective and presentation: User experience in a virtual art gallery”, International Journal of Computer Research, 20(1) 53-77.
[5] S. Sharples, S. Cobb, A. Moody, and J. R. Wilson (2008) “Virtual realityinduced symptoms and effects (VRISE): Comparison of head mounted display(HMD)”, desktop and projection displaysystems. Displays, 29(2) 58-69.
[6] Y. A. A. Pizarro, A. A. De Salles, S. Severo, J. L. Garzón, and S. M. R. Bueno (2014) “Specific Absorption Rate (SAR) in the head of Google glasses and Bluetooth user's”, In IEEE Latin-America Conference on Communications (LATINCOM), 1-6.
[7] D. Wagner, T. Pintaric, F. Ledermann, and D. Schmalstieg (2005) “Towards massively multi-user augmented reality on handheld devices”, In International Conference on Pervasive Computing, Springer, Berlin, Heidelberg, 208-219.
[8] P.Walsh(2020)“InnovativeTechnologyIsTheFutureOfEducation”,Forbes,July.
[9] P. Vate-U-Lan, (2012, July). An augmented reality 3d pop-up book: the development of a multimedia project for English language teaching. In IEEE International Conference on Multimedia and Expo (2012)890-895.
[10] J. L. Soler, J. Ferreira, M. Contero, and M. Alcañiz (2017) “The power of sight: using eye tracking to assess learning experience in virtual reality environments”, In Proceedings of INTED2017, 8684- 8689.
[11] W. S. Khor, B. Baker, K. Amin, A. Chan, K. Patel, and J. Wong (2016)“Augmented and virtual reality in surgery - the digital surgical environment: applications, limitations and legal pitfalls”, Annals of Translational Medicine, 4(23).
[12] J. Carmigniani, B. Furht, M. Anisetti, P. Ceravolo, E. Damiani, and M. Ivkovic (2011) “Augmented reality technologies, systems and applications. Multimedia Tools and Applications”, 51(1) 341-377.
[13] T. P. Caudell, and D. W. Mizell (1992) “Augmented reality: an application of heads-up display technology to manual manufacturing processes”, In Proceedings of the Twenty-Fifth Hawaii International Conference on System Sciences, IEEE, Vol. 2 659-669.
[14] Q. M. Bui, T. N. Le, V. T. Nguyen, M. T. Tran, and A. D. Duong (2012) “Applying fast planar object detection in multimedia augmentation for products with mobiledevices”, In 4th International Conferenceon Intelligent Human-Machine Systems and Cybernetics, IEEE, Vol. 2 292-297.
[15] B. B. Bederson (1995) “Audio augmented reality: a prototype automated tour guide”, In Conference Companion on Human Factors in Computing Systems, 210-211.
[16] R.T.Azuma(1997)“AsurveyofaugmentedreIity.Presence:TeleoperatorsandVirtual \Environments”,6(4)355-385.
[17] S. Feiner, B. MacIntyre, T. Höllerer, and A. Webster (1997) “A touring machine: Prototyping 3Dmobile augmented reality systems for exploring the urban environment”, Personal Technologies, 1(4) 208- 217.
[18] G. Reitmayr, and D. Schmalstieg (2021)” Mobile collaborative augmented reality”, In ProceedingsIEEE and ACM International Symposium on Augmented Reality, 114-123.
[19] H. Kaufmann, and D. Schmalstieg (2002) “Mathematics and geometry education with collaborative augmented reality”, In ACM SIGGRAPH 2002 Conference Abstracts and Applications, 37-41.
[20] M. Mohring, C. Lessig, and O. Bimber (2004) “Video see-through AR on consumer cell-phones”, In Third IEEE and ACM International Symposium on Mixed and Augmented Reality, 252-253.
[21] A. Henrysson, M. Billinghurst, and M. Ollila (2005)“Face toface collaborative ARonmobile phones”,In Fourth IEEE and ACM International Symposium on Mixed and Augmented Reality, 80-89.
[22] R. M. Yilmaz, and Y. Goktas, Y. (2017) “Using augmented realitytechnologyin storytellingactivities: examining elementary students’ narrative skill and creativity”, Virtual Reality, 21(2) 75-89.
[23] T. Chandrasekera, and S. Y. Yoon (2018) “Augmented Reality, Virtual Reality and Their Effect onLearning Style in the Creative Design Process”, Design and Technology Education, 23(1).
[24] A. Ruiz-Ariza, R. A. Casuso, S. Suarez-Manzano, and E. J. Martínez-López (2018) “Effect of augmented reality game Pokémon GO on cognitive performance and emotional intelligence in adolescent youth”, Computers and Education, 116 49-63.
[25] J. M. Harley, E. G. Poitras, A. Jarrell, M. C. Duffy, and S. P. Lajoie, S. P. (2016) “Comparing virtual andlocation-basedaugmentedrealitymobilelearning:emotionsandlearningoutcomes”,Educational

TechnologyResearchandDevelopment,64(3),359-388.
[26] C. Suso-Ribera, J. Fernández-Álvarez, A. García-Palacios, H. G. Hoffman, J. Bretón-López, R. M. Banos, andC.Botella (2019)"Virtualreality, augmentedreality, andin vivoexposuretherapy: a preliminary comparison of treatment efficacy in small animal phobia", Cyberpsychology, Behavior, and Social Networking, 22(1) 31-38.
[27] C. F. Tsai, S. C. Yeh, Y. Huang, Z. Wu, J. Cui, and L. Zheng (2018) "The effect of augmented reality and virtual reality on inducing anxiety for exposure therapy: a comparison using heart rate variability", Journal of Healthcare Engineering, 1-8.
[28] D. Mouraux,E.Brassinne,S. Sobczak, A. Nonclercq,N. Warzée, P.S.Sizer,andB.Penelle(2019)"3D augmented reality mirror visual feedback therapy applied to the treatment of persistent, unilateral upper extremity neuropathic pain: a preliminary study", Journal of Manual & Manipulative Therapy, 25(3) , 137-143.
[29] P.A.Rauschnabel,R.Felix,andC.Hinsch (2019)"Augmentedrealitymarketing:HowmobileARappscan improve brands through inspiration", Journal of Retailing and Consumer Services, 49 ,43- 53.
[30] T. Hilken, K. de Ruyter, M. Chylinski, D. Mahr, and D. I. Keeling (2017) "Augmenting the eye of the beholder: exploring the strategic potential of augmented reality to enhance online service experiences", Journal of the Academy of Marketing Science, 45(6), 884-905.
[31] R. Yung, and C. Khoo-Lattimore (2019) "New realities: a systematic literaturereview on virtual reality and augmented reality in tourism research", Current Issues in Tourism, 22(17) 2056-2081.
[32] D. I. Han, M. C. Dieck, and T. Jung, T (2018) "User experience model for augmented reality applications in urban heritage tourism", Journal of Heritage Tourism, 13(1) ,46-61.
[33] C. D. Kounavis, A. E. Kasimati, and E. D. Zamani (2012) "Enhancing theTourism Experience through Mobile Augmented Reality: Challenges and Prospects", International Journal of Engineering Business Management, 4 ,10.
[34] A. Tomiuc (2012) "Navigating Culture. Enhancing Visitor Museum Experience through Mobile Technologies. From Smartphone to Google Glass", Journal of Media Research-Revista de Studii Media, 7(3:20) 33-46.
[35] T. Jung, M. C. Dieck, H. Lee, and N. Chung, Effects of virtual reality and augmented reality on visitor experiences in museum. Information and Communication Technologies in Tourism, (2016) 621-635.
[36] C.Edwards(2013)"BetterthanReality?",EngineeringandTechnology,8(4)28-31.
[37] K. D. Johnson, J. C. Díaz, andR. B. Pickering(2012)"VirtualToursfor Museum Exhibits. Proceedings of Electronic Visualisation and the Arts Conference", (EVA 2012), London, UK, 100- 106.
[38] D. Tsichritzis and S. J. Gibbs (1991) "Virtual Museums and Virtual Realities", In proceedings of the International Conference on Hypermedia and Interactivity in Museums, 17-25.
[39] C. Lin-Hendel(2009) "System and method for constructing and displaying active virtual reality cyber malls, show rooms, galleries, stores, museums, and objects within", (United States Patent No. US7574381B1).
[40] S. A. Yoon and J. Wang (2014) "Making the invisible visible in science museums through augmented reality devices", TechTrends, 58(1) 49-55.
[41] A. Damala, P. Cubaud, A. Bationo, P. Houlier, and I. Marchal (2008) "Bridging the gap between the digital and the physical: design and evaluation of a mobile augmented reality guide for the museum visit", Proceedings of the 3rd International Conference on Digital Interactive Media in Entertainment and Arts, ACM, 120 - 127.
[42] S. Sylaiou, A. Karoulis, Y. Stavropoulos, and P. Patias, (2008) "Presence-Centered Assessment of Virtual Museums' Technologies", DESIDOC Journal of Libraryand Information Technology, 28(4), 55–62.
[43] M. T. Yang and W. C. Liao, W. C. (2014) "Computer-assisted culture learning in an online augmented reality environment based on free-hand gesture interaction" IEEE Transactions on Learning Technologies, 7(2) 107-117.
[44] N. Ghouaiel, S. Garbaya, J. M. Cieutat, and J. P. Jessel (2017) "Mobile Augmented Reality in Museums: TowardsEnhancingVisitor'sLearningExperience", International Journal ofVirtualReality,17(1) 21–31.
[45] M. Ding(2017)"Augmentedrealityin museums, Museums &augmentedreality–A collection ofessaysfrom the arts management and technology laboratory", 1-15.
[46] M.C.T.Dieck,T.JungandD.Han(2016)"Mappingrequirementsforthewearablesmartglassesaugmented reality museum application", Journal of Hospitality and Tourism Technology, 7(3) 230- 253.
[47] P.A.Rauschnabel(2018)"Virtuallyenhancingtherealworldwithholograms:Anexplorationof expected gratificationsofusingaugmentedrealitysmartglasses", Psychologyand Marketing,35(8)557-572.
[48] National HistoricLandmarksProgram(U.S. NationalParkService). (2018,August29). RetrievedJuly 8, 2020, from https://www.nps.gov/orgs/1582/index.htm
[49] B.K.Seo,K.Kim,andJ.I.Park(2010)"Augmentedreality-basedon-sitetourguide:astudyin

Gyeongbokgung",InProceedingsofAsianConferenceonComputerVision,Springer,Berlin,Heidelberg 276- 285.
[50] R.E.Bell,FortOntario,NewYork.OnPoint,22(4)(2017)46-49.
[51] NRIS(NationalRegisterInformationSystem),(2010)NationalRegisterofHistoricPlaces.NationalPark Service.
[52] F.Tscheu,andD.Buhalis(2016)"Augmentedrealityatculturalheritagesites",Informationand Communication Technologies in Tourism, 607-619.
[53] T.Gjøsæter,AffordancesinMobileAugmentedRealityApplications.InternationalJournalofInteractive MobileTechnologies,8(4)(2014)45-55.
[54] E.Cranmer,andT. Jung(2014)"Augmentedreality(AR): Businessmodelsinurban culturalheritage tourist destinations", Proceedings of APacCHRIE Conference, Malaysia, 21-24.
[55] J. R. Lewis(1995)"IBMcomputer usabilitysatisfactionquestionnaires:psychometricevaluationand instructions for use", International Journal of Human-Computer Interaction, 7(1) 57-78.
[56] N.Singh,S.Srivastava,andN.Sinha(2017)"ConsumerpreferenceandsatisfactionofM-wallets:astudyon North Indian consumers", International Journal of Bank Marketing.
[57] A. Poushineh, and A. Z. Vasquez-Parraga (2017) "Discernible impact of augmented reality on retail customer's experience, satisfaction and willingness to buy", Journal of Retailing and Consumer Services, 34 229-234.
[58] U. C. Pendit, S. B. Zaibon, and J. A. Bakar (2014) "Mobile augmented reality for enjoyable informal learning in cultural heritage site", International Journal of Computer Applications, 92(14) 19-26.
[59] A. Härmä, J. Jakka, M. Tikander, M. Karjalainen, T. Lokki, J. Hiipakka, and G. Lorho, (2004) "Augmented reality audio for mobile and wearable appliances", Journal of the Audio Engineering Society, 52(6) 618-639.
[60] S. H. Halili, (2019) "Technological advancements in education" 4.0. The Online Journal of Distance Education and e-Learning, 7(1) 63-69.

AUTHORS

BenjaminWilsonrecentlycompletedamastersdegreeinHuman-ComputerInteractionfromtheStateUniversityof New York at Oswego.

Joshua Hullrecentlycompletedamastersdegreein Human-ComputerInteraction fromtheStateUniversity of New York at Oswego.

DamianSchofieldisafullprofessor anddirectoroftheHuman-ComputerInteractionmastersprogramattheState University of New York at Oswego

TRANSMISSIONOFSUCCESSFULROUTEERRORMESSAGE(RERR)IN ROUTINGAWAREMULTIPLEDESCRIPTIONVIDEOCODINGOVER MOBILE ADHOC NETWORK

KinjalShah,GaganDua,DharmendarSharma,PriyankaMishra,NitinRakesh

DepartmentofComputerScience&Engineering,JaypeeUniversity,Waknaghat,Dist.Solan(H.P)
kinjal.93@gmail.com,d.sharma000@gmail.com,dua.gagan@live.in,mishrapriyanka6@gmail.com,nitin.rakesh@gmail.com

ABSTRACT

Videotransmissionover mobilead-hoc networks is becoming important asthesenetworks become morewidelyusedinthewireless networks. Weproposea routing-aware multiple descriptionvideo coding approach to support video transmission over mobile ad-hoc networks with single and multiple path transport. We build a model to estimate the packet loss probability of each packet transmitted over the network based on the standard ad-hoc routing messages and network parameters without losing theRERR message. Wethen calculatetheframeloss probability inorder to eliminate error without any loss of data.

KEYWORDS

NetworkProtocols,WirelessNetwork,MobileNetwork,Virus,Worms&Trojan Full

Text:**https://aircconline.com/ijma/V3N3/3311ijma05.pdf**

VolumeLink:**https://airccse.org/journal/ijma_current11.html**

REFERENCES

[1].RoutingAwareMultipleDescriptionVideoCodingoverMobileAd-hocNetworks,Yiting Liao,JerryD Gibbson, IEEE Transactions on Multimedia,Vol. 13, no. 1 February2011.

[2]. Y.Wang, A. R. Reibman, and S. Lin, "Multiple description coding for video delivery," Proc. IEEE, vol. 93, no. 1, pp. 57–70, Jan. 2005.

[3]. J. G. Apostolopoulos, "Reliable video communication over lossy packet networks using multiple stateencodingandpathdiversity,"SPIEProc.Vis.Commun.ImageProcess.vol.4310,no.1,pp.392–409,2001.[4]. N. Gogate,D.M.Chung, S. S. Panwar, Y. Wang, F. N. Commun, andP. River, "Supportingimageandvideo applications in a multihop radio environment using path diversity and multiple description coding," IEEE Trans. Circuits Syst. Video Technol., vol. 12, no. 9, pp. 777–792, Sep. 2002.

[5]. S. Mao, S. Lin, S. S. Panwar, Y.Wang, and E. Celebi, "Video transport over ad hoc networks: Multistream coding with multipath transport," IEEE J. Select. Areas Commun., vol. 21, no. 10, pp. 1721–1737, 2003.

[6].B.A.Heng,J.G.Apostolopoulos,andJ.S.Lim,"End-to-endratedistortionoptimizedMDmode selection for multiple description video coding," EURASIP J. Appl. Signal Process., 2006.

[7].V.A.VaishampayanandS.John,"Balancedinterframemultipledescriptionvideocompression,"in Proc. Int. Conf. Image Processing, 1999, vol. 3, pp. 812–816.

[8].T.NguyenandA.Zakhor,"Matchingpursuitsbasedmultipledescriptionvideocodingforlossyenvironments,"in Proc. Int. Conf. Image Processing, Sep. 2003, vol. 1, pp. I–57–60.

[9]. Y.-C. Lee, Y. Altunbasak, and R. M. Mersereau, "A drift-free motion-compensated predictive encoding technique for multiple description coding," in Proc. Int. Conf. Multimedia and Expo., Jul. 2003, vol. 3, pp. III–581–584.

[10]. A.C.Begen,Y.Altunbasak,andO.Ergun,"Multi-pathselection for multipledescription encodedvideo streaming," in Proc. IEEE Int. Conf. Communications, May 2003, vol. 3, pp. 1583–1589.

[11]. S. Mao, Y. T. Hou, X. Cheng, H. D. Sherali, S. F. Midkiff, and Y. Q. Zhang, "On routing for multiple description video over wireless ad hoc networks," IEEE Trans. Multimedia, vol. 8, no. 5, pp. 1063–1074, 2006.

[12]. S. Kompella, S. Mao, Y. T. Hou, and H. D. Sherali, "Path selection and rate allocation for video streaming in multihop wireless networks," in Proc. Military Communication Conf., Oct. 2006, pp.1–7.

[13]. S. Murthy, P. Hegde, V. Parameswaran, B. Li, and A. Sen, "Improved path selection algorithms for multipath video streaming in wireless ad-hoc networks," in Proc. Military Communications Conf.,2007, pp. 1–7.

[14]. S. Lin, S. Mao, Y. Wang, and S. Panwar, "A reference picture selection scheme for video transmission over ad-hoc networks usingmultiple paths," in Proc. IEEE Int. Conf. Multimedia Expo., Aug. 2001, pp. 96–99.

[15].Y.J.Liang,E. Setton,andB. Girod,"Channel-adaptivevideostreamingusing packet path diversityand rate-distortion optimized reference picture selection," in Proc. IEEE Workshop Multimedia Signal Processing, Dec. 2002, pp. 420–423.

[16].J.Hu,S.Choudhury,andJ.D.Gibson,"AssessmentofdeliveredAVC/H.264videoqualityover 802.11aWLANswithmultipathfading,"inProc.1stMultimediaCommunicationsWorkshop,2006.

[17].J.Hu,S. Choudhury,andJ. Gibson,"Video capacity of WLANs witha multiuserperceptualquality constraint," IEEE Trans. Multimedia, vol. 10, no. 8, pp. 1465–1478, Dec. 2008.

[18].Y.LiaoandJ.D.Gibson,"Refinederrorconcealmentformultiplestatevideocodingoveradhoc networks," in Proc. 42nd Asilomar Conf. Signals, Systems and Computers, Oct. 2008, pp. 2243– 2247.

[19]. A. Nasipuri and S.R. Das,"On-demand multipath routing for mobile ad hoc networks," in Proc.8th Int. Conf. Computer Communications and Networks, 1999, pp. 64–70.

[20]. S. J. Lee and M. Gerla, "Split multipath routing with maximally disjoint paths in ad hoc networks," in Proc. IEEE Int. Conf. Communications, 2001, vol. 10, pp. 3201–3205.

[21].M.K.MarinaandS. R.Das, "On-demandmultipathdistance vectorroutinginad hoc networks," in Proc. 9th Int. Conf. Network Protocols, Nov. 2001, pp. 14–23.

[22]. Z. Ye, S. V. Krishnamurthy, and S. K. Tripathi, "A framework for reliable routing in mobile ad hoc networks,"inProc. 22ndAnnu.JointConf. IEEEComputerandCommunications,2003,vol. 1,pp.270–280. [23]. D. B. Johnson and D. A. Maltz, "Dynamic source routing in ad hoc wireless networks," in Mobile Computing, T. Imielinski and H. F. Korth, Eds. New York: Springer, 1996, vol. 353, pp. 153–181.

[24]. S. Mueller, R. P. Tsang, and D. Ghosal, "Multipath routing in mobile ad hoc networks: Issues and challenges," in Performance Tools and Applications to Networked Systems. NewYork: Springer, 2004, vol. 2965, pp. 209–234.

[25].Y.LiaoandJ.D.Gibson,“Routing-awaremultipledescriptionvideocodingoverwirelessad-hoc networks using multiple paths,” in Proc. Int. Conf. Image Processing (ICIP), Sep. 2010.
[26].IEEEStandardPart11:WirelessLANMediumAccessControl(MAC)andPhysicalLayer(PHY) Specifications, IEEE Std. 802.11-2007 (Revision of IEEE Std. 802.11-1999), 2007.
[27]. Y. J. Liang, J. G. Apostolopoulos, andB. Girod, “Analysis ofpacket loss for compressed video: Effect ofburstlossesandcorrelationbetweenerrorframes,”IEEETrans.CircuitsSyst.VideoTechnol.,vol.18,no.7, pp.861–874,Jul.2008

AUTHORS

Kinjal Shah received his B.E degree in Computer Engineering from Arvindbhai.D.Patel Institute of Technology,NewVallabhVidyanagar, Distt.Anand in 2009. He is currently pursuing MTECH degree in Computer Science & Engineeringat Jaypee UniversityofInformation Technology,Waknaghat,Solan173215. His research interest includes Cloud Computing, Cryptography & Network Security, Multimedia Data Transmission in ad-hoc networks.

GaganDua received his B.E. degree in Computer Engineering from ShriKrishan Institute of Engineering & Technology, Kurukshetrain2009. HecompletedhisthreeyearsdiplomainComputerEngineerign from Seth Jai Parkash Polytechnic, Damla (Yamunanagar, Haryana).Currentlyhe ispursuingMTECHdegree in Computer Engineeringat Jaypee UniversityofInformation Technology, waknaghat, Solan173215. His areas of interest are multimedia data communication & microprocessor.

Dharmendar Sharmareceived his B.E degree in InformationTechnologyfrom AjayKumar GargEngineering College, Ghaziabad in 2009. Currentlyheis pursuingMTECHdegree in Computer Science & Engineeringat JaypeeUniversityof Information Technology, waknaghat, Solan-173215. His area of interests are data warehousing & data Mining, data communication & networking.

Priyanka Mishrareceivedher B.E degreeinElectronics&CommunicationEngineeringfrom BBScollegeof Engineering & Technology, Allahabad in 2009. Currently she is pursuing MTECH degree in Electronics & Communication EngineeringatJaypee UniversityofInformationTechnology, waknaghat, Solan-173215.Her area of interests are data communication & networking.

NitinRakesh is Sr. Lecturer in the Department of Computer Science and Engineering & Information Technology, Jaypee University of Information Technology (JUIT), Waknaghat, Solan–173215, Himachal Pradesh, India. In 2004, hereceived the Bachelor’s Degree in Information Technology and Master’s Degreein Computer Science and Engineering in year 2007. Currently he is pursuing his doctorate in Computer Science and Engineering and his topic of research is parallel and distributed systems. He is a member of IEEE,IAENGand isactivelyinvolved in research publication. His research interest includes Interconnection Networks & Architecture, Fault–tolerance & Reliability, Networks–on–Chip, Systems– on–Chip, and Networks–in–Packages, Network Algorithmics, Parallel Algorithms, Fraud Detection. Currently he is working on Efficient Parallel Algorithms for advanced parallel architectures.