GESTURE AND OBJECT RECOGNITION FOR 3D MODELLING IN AR ENVIRONMENT

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Abstract: Augmented reality combines virtual and actual reality, thus making available the user new tools to efficiently transfer the knowledge for several processes in different environments. Creating 3D models of an object or the surface requires complex tools and techniques. We have come up with an idea to create a real time 3-Dimensional model using Kinect sensor and lidar sensor of real-world objects using Augment Reality.3D modeling objects can be utilized by educational institutes, research activities-organization, factories, etc. to create Augmented Reality (AR). We are trying to create an automatic system that will capture the 3D structure of a real time object and by creating 3D model, we are visualizing the environment. However, using our system, it simplifies 3D modelling of an object or a surface in real time. Using tools of Augment Reality along with Artificial Intelligence, we are trying to create a virtual environment where one can interact with virtual object present in the real world. Using Lidar scanner and Kinect, we will create a 3D model in the real time so one can interact with it and it can also be used in various purposes. Gesture and object Recognition will be utilized in creating Virtual environment where a person can interact with objects.

Keywords: Augmented Reality, Artificial Intelligence, Lidar, 3D model.

Introduction:

AR is a variant of the well-known concept of Virtual Reality Technology (VR). Augmented reality abbreviated as AR is the experience that designers use the enhanced parts of user's physical world with computer's generated input. It is the platform where one can visualize the virtual environment and can interact with animated or virtual objects, the main motivation pops up here since we are interacting with animated objects.

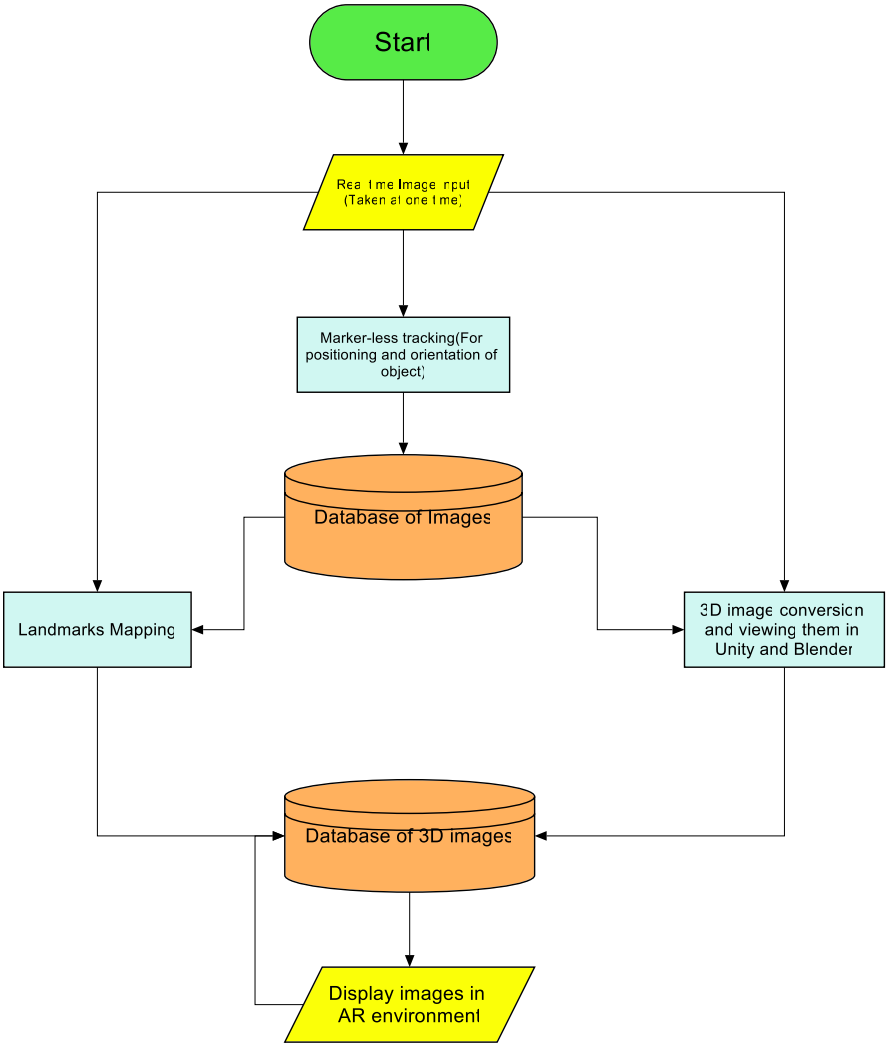
Literature Review:

S.NO.	TITLE	Year of Publication	AUTHOR	RESULT (ACCURACY or ANY OTHER PARAMETER)	FINDING / Achievement	DRAWBACK
1.	SPAROGRAM: The spatial augmented reality holographic display for 3D visualization and exhibition	2014	1.Minju Kim, 2.Jungjin Lee, 3. Kwangyun Whon	--	This system is significantly different from the general three-dimensional visualization method in the way that we used both the real space surrounding the physical object and the object itself as a display area at the same time	Current system matches the physical object and the 3D information exactly, but the process is limited to one viewer.
2.	3D Virtual Reconstruction and Augmented Reality Visualization of Damaged Stone Sculptures	2018	1.Francesco Gherardinia, 2.Mattia Santachiarab, 3.Francesco Lealia	--	The selection of the "missing parts" requires the study and the investigation of models with similar characteristics, according to art-historical and archaeological studies.	The usage of a VR viewer necessitates a dual rendering pipeline, requiring the scene to be rendered twice: this could be a crucial aspect in the case of very complicated sceneries, necessitating the virtual model to be destroyed and reduced.
3.	AR Oriented Pose Matching Mechanism from Motion Capture Data	2018	1.Javid Iqbal, 2.Manjit Singh Sidhu, 3.Mutahir Bin Mohamed Ariff	Pose matching Mechanism: **Accuracy**:93.5% **Learning time in sec:** 120sec	The effectiveness and the efficiency of the proposed method is tested and evaluated in terms of frame level accuracy and the cumulative learning time of the dance steps.	--
4.	A Lightweight Approach for Augmented Reality on Camera Phones using 2D Images to Simulate 3D	2007	-Petri Honkamaa -Jani Jäppinen -Charles Woodward	The key elements of our solution are camera motion tracking combined with user interaction, and applying 2D images to create illusion of 3D.	On phones with sufficient processing power, usability could be improved with a tracking algorithm detecting camera movement in all six degrees of freedom.	However, due to the limitations of mobile media API fast enough video capturing can be achieved only using phone specific extensions

5.	A collaborative apparel new product development process model using virtual reality and augmented reality technologies as enable	2019	R. K. J. De Silva, T. D. Rupasinghe & P. Apeagyei	Applicability of VR & AR as tools to have the potential to make huge improvement to the apparel product development by engineered process modelling	AR tools are applicable at the point of consumer integration. For example, concept tests and fit assessments002 E	Future research needs to be conducted to develop VR and AR products that reduce time for NPD cycle and improve consumer responsiveness.
6.	Application of 3D body scanning technology to human measurement for clothing Fit	2010	Phoebe Apeagyei	Body scanners will allow consumers to benefit from a modern form of custom tailoring	-Mass-produced clothing will also be improved as a result of applying body scanning technology -3D body scanning technology is future for clothing industry	The need to be scanned when minimally clothed sometimes implies apparent intrusiveness and the posture for the scan is not natural in such circumstances.
7.	Final Thesis -3D Modelling for Augmented Reality	2010	Frida Schlaug	Resulting is easy to use and cheap that it doesnot require expensive equipment.	Adding depth in the 3D creation with low cost goal and targeting professional 3D creators to implement modelling in AR environment improves precision	Navigation of coordinates are not clear enough to imply while projecting shadows in 3d models. FPS is very low from 10-18 ft/s^2.
8.	3D animation model with augmented reality for natural science learning in elementary school	2018	F Hendajani A Hakim MD Lusita GE Saputra AP Ramadhana	Making 3D animation model on blender should be done with care for proper accuracy. Especially when it comes to marking the section of image objects, blender use must be done accurately.	The application can improve the understanding of Animation model in a precise manner. The science behind concept of animation model and object recognition is clarified.	Proper care of measurement should be done by section to section and inch by inch for precise output.

Methodology used:

3D modeling is the process of developing the coordinated representation of any object or surface in three Dimension via specialized software. Using 3D modeling techniques, we will convert the models in Augmented Reality which will enhance the viewing experience and better understanding of the real time objects. **Augment reality (AR)** is the enhanced version of the physical world which is achieved by using the digital visual technologies and that let people superimpose the digital content like images, sound, text etc. over real life scenes.


Start
Real time Image input (Taken at one time)
Marker-less tracking(For positioning and orientation of object)
Database of Images
Landmarks Mapping
3D image conversion and viewing them in Unity and Blender
Database of 3D images
Display images in AR environment

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