P3-6

Applying Mobile Augmented Reality Technology In Dental Education

Yi-Chen Hsu[1], Tran Thi Ngoc Trang[1], Chien-Fu Tseng[3], Pei-Yun Liu[2], Ding-Han Wang[1]*, Ming-Lun Hsu[1]*

[1]Department of Dentistry, School of Dentistry, National Yang-Ming University
[2]Department of Nursing, School of Nursing, National Yang-Ming University
[3]Department of Dentistry, Taoyuan General Hospital, Ministry of Health and Welfare

I. Abstract

With the development of information technology, mobile devices becoming widely used in public. Education is no longer limited to face to face learning, but on digital platforms to set up their own classroom for theories study. Dental students who need lots of 3D image concept can supported by immersive mobile Augmented reality (mAR) technique to satisfied their needs, encourages learning and have fun experience. At the same time, a concrete image helps clinicians convey information to patients, increasing their participation in decision making and cooperate with treatment.

II. Concept

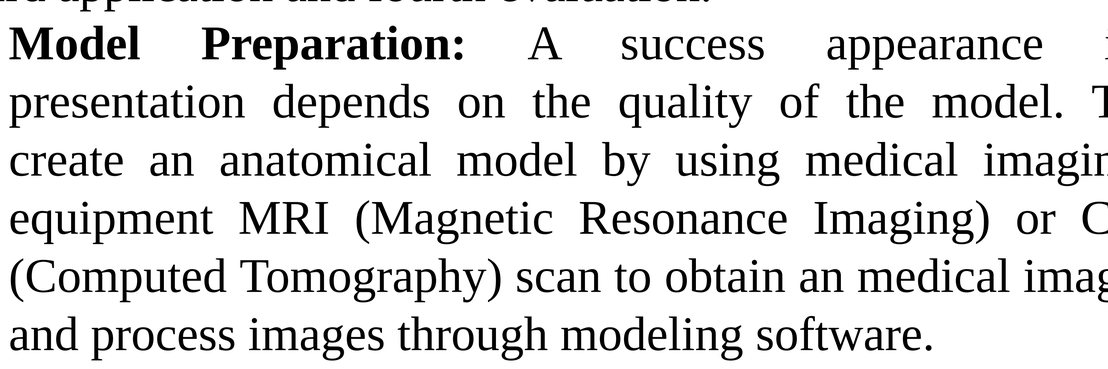
mAR is one of the latest technologies in the field of IT which integrates real-world environment and virtual objects through mobile devices. To promote a more effective and meaningful learning environment, we present the novelty of the mAR system as an educational approaches, allowing students and users to construct visualization which are invisible in some of the case to develop their own cognitive ability.

III. Methods

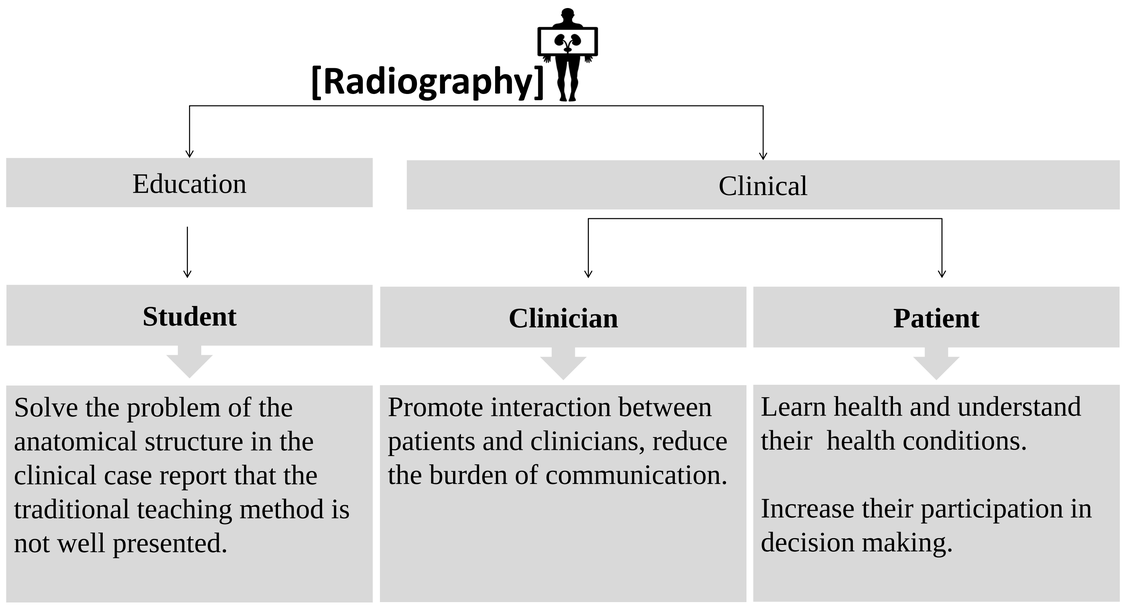
To build a 3D model, we need to import medical image which is DICOM format as the raw data of the model. After 3D model is created, we upload into AR platform to experience AR technique. We divide this study into four parts: first model preparation, second system development, third application and fourth evaluation.

i **Model Preparation:** A success appearance in presentation depends on the quality of the model. To create an anatomical model by using medical imaging equipment MRI (Magnetic Resonance Imaging) or CT (Computed Tomography) scan to obtain an medical image and process images through modeling software.

ii **System Development:** To present components and 3D models in a specific platform, a portable medical education platform combine 3D model and AR technology has been created. Camera as a medium for image creation to capture the image, and convert into an code for platform to retrieves a specific 3D model. Finally, it presents a 3D model in the interface of your mobile device.



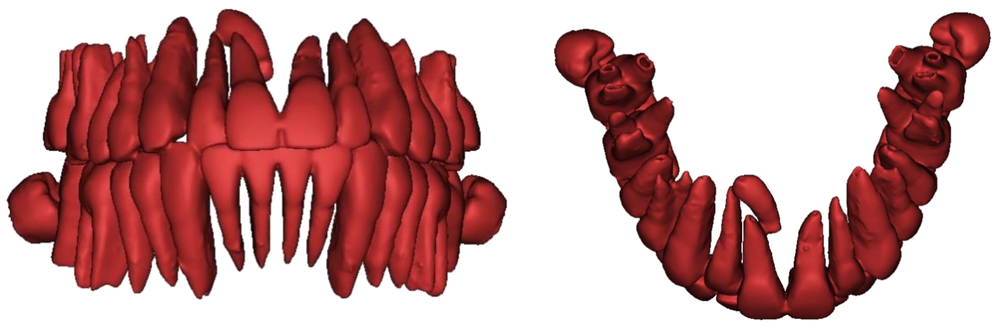
iii **Application:** where can the system platform be applied or be used for a particular purpose? The application will run using in education, clinical performance and SDM (shared decision making).



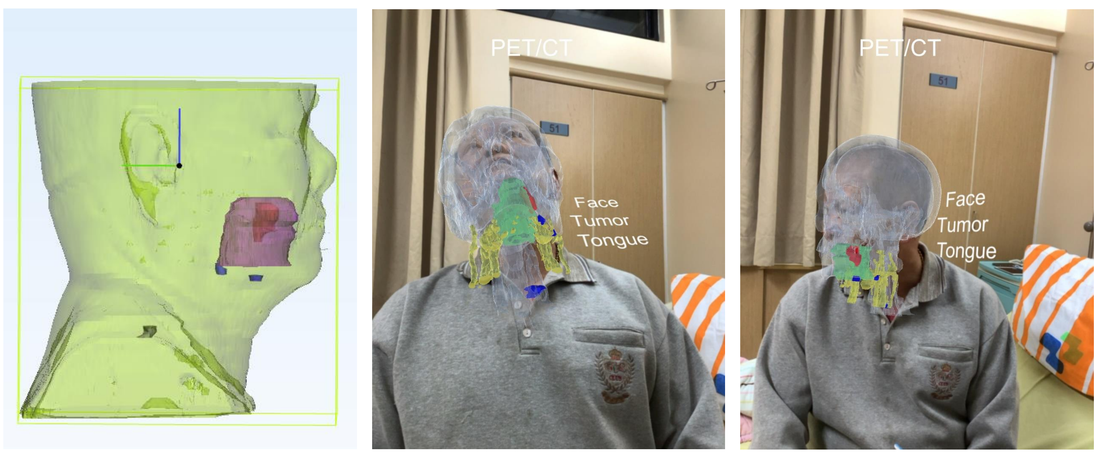
iv **Evaluation:** Whether mAR system platform is feasible for use in academic and clinical performance? We schedule to use a questionnaire to collect the feedback from user after using mAR platform.

IV. Result

Traditional teaching material can only display 2D drawings, or one entity model for students to observe the details. Now, by using mAR system, Students can use their mobile phones to approach 3D models. It can be used to see the images according to users needs, the platform can be zoomed in and out, and rotated in three directions.



On patient side, educate patients to easily recognize the medical image of the human body using a 3D image visualization. They learn about their health and understand the conditions. During consultation, the more they understand, the more participating they join the treatment plan.



VI. Conclusion

Three dimensional medical model reconstructed based on 2D image has been used in recent years, which can clearly identify the difference and more information in details than 2D drawing. Integrating Mobile augmented reality (mAR) technique, it can be used at any location, and observe the virtual model form any point of view. we see it as an assisting tool in education for dental learning and clinical performance between healthcare workers and patients. At the same time, this could be an advanced teaching method applied in followed COVID-19 epidemic.

Acknowledgements

The study was funded by Ministry of Science and Technology of Taiwan under MOST 110-2622-B-A49A-503

國立陽明交通大學
NATIONAL YANG MING CHIAO TUNG UNIVERSITY