

RESEARCH STRATEGY: A CONSTRUCTIVE PLAY FOR ANATOMY LEARNING SYSTEM BASED ON HUMAN FINGER GESTURES ON HOLOGRAPHIC DISPLAY

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INTRODUCTION

- **Construction play has helped children to think creatively and to be imaginative.** Additionally, construction play contributed as the most recommended approach in the influence on use of language and social interaction, because kids during construction play, like to collaborate together and thus plan their “construction structures”, such as Lego, puzzle, block building, etc.
- Therefore, in this research, **we propose the use of digital three-dimensional (3D) displays to be taken into account to represent those construction blocks or pieces of human anatomy parts.** This is due to the digital 3D in this era has attracted significant consideration in entertainment [4], medical fields [5], and the digital signage [6]. Additionally, this study chooses holography [7] display, which is a display that reflects the image displayed on a flat panel display, such as a liquid crystal display (LCD) on the surface of a quadrangular display made of a half mirror, so that the image appears as an object floating in the display. This makes a combination between the real world and digital by changing 3D model into a 3D holographic experience.
- In accordance with the interaction of construction play, **this research utilizes an immersive user interface based on finger gestures in which a user can interact and construct (direct manipulation) the 3D objects displayed on a hologram environment.**

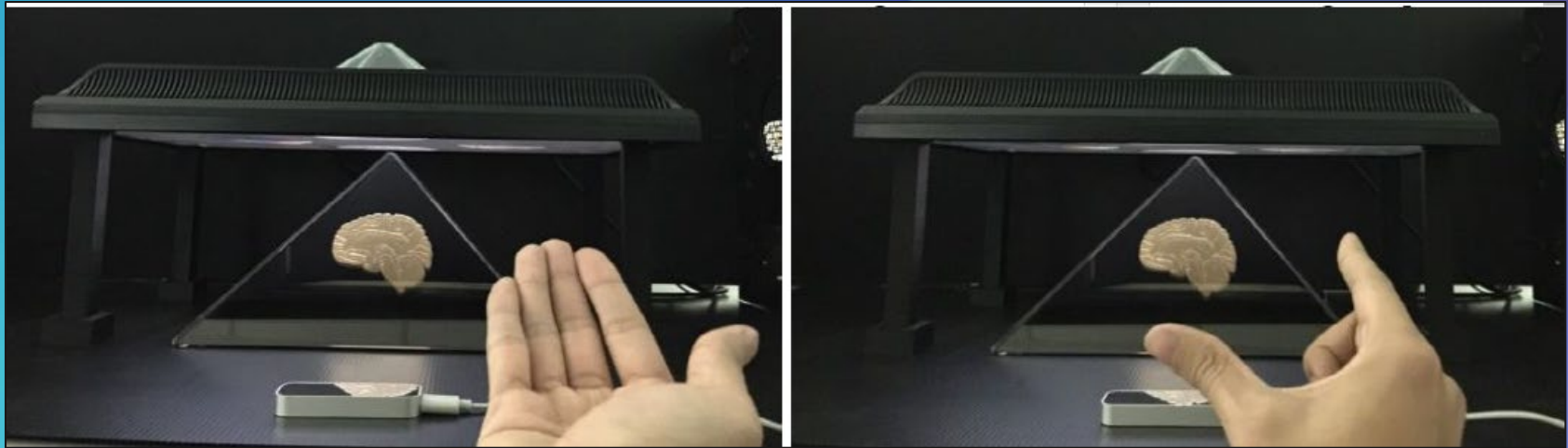
- To effectively address the emerging challenges for children education and skills delivery, **there are educational kits have attempted to bring their educational approaches by using digital multimedia software (tablets and phone apps) for learning human anatomy.** Several apps in android PlayStore, for instances, atlas for human anatomy, 3D bones and organs, Internal Organ in 3D, etc.
- **These apps enable kids to learn by watching 3D animation or 3D organ parts of human anatomy.** However, the problem with these apps is the interaction, which is only using tapping and dragging motion, which are not really interesting for kids. Some apps tried to use drag and drop interaction, but still have a problem for children to visualize and feel the actual experience with their own hand and also it is only displayed in limited side screen [9].

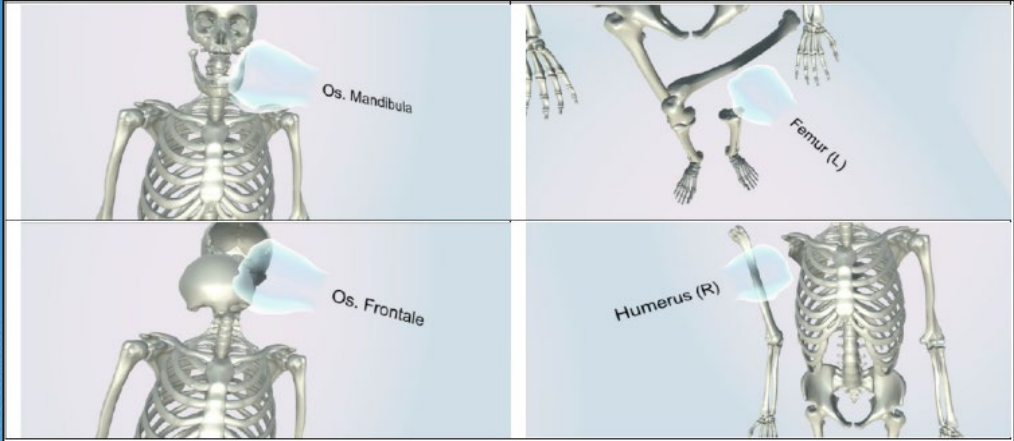
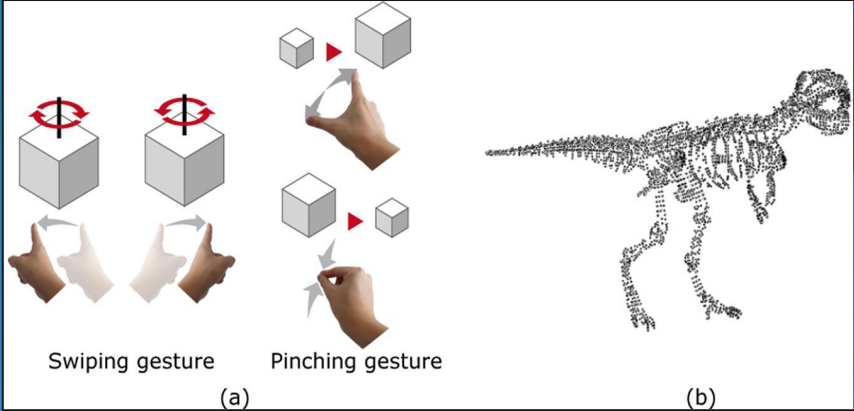
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LITERATURE REVIEW

Literature Review (Hologram and Leap Motion)

- Some studies have applied Leap Motion technology in various purposes. However, these studies only use it in very limited manners. Specifically, they just use simple gestures which enable users to use scaling up function, rotation, and moving gestures to view the 3D objects which will be tedious for a long run usage





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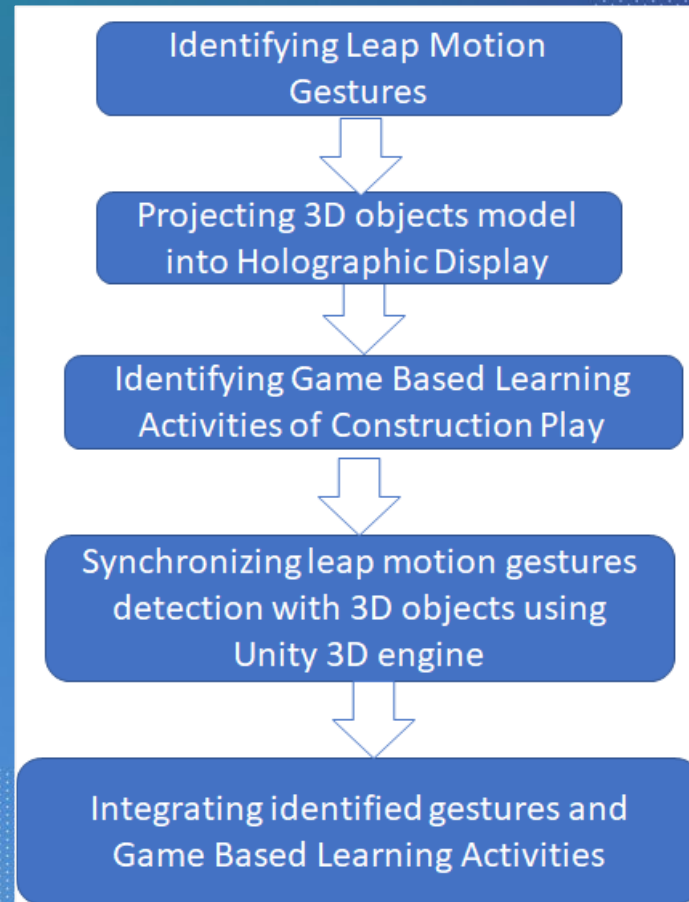
OBJECTIVE

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- Therefore, different from the existing studies, which are using typical viewing interaction, **we aim to develop construction play (blocks construction) game in holographic display for kids with an advance interaction techniques** in which the users are immersed and integrated into various game activities including constructing activity which is all wrapped into a unity of various interactive games. Nevertheless, we also still adopt their methods of existing in terms of viewing interaction and we will improve with more features.
- The users not only can view the human anatomy parts but also can play and wander in the game with different difficulty levels starting from moving objects game to the constructing parts game.

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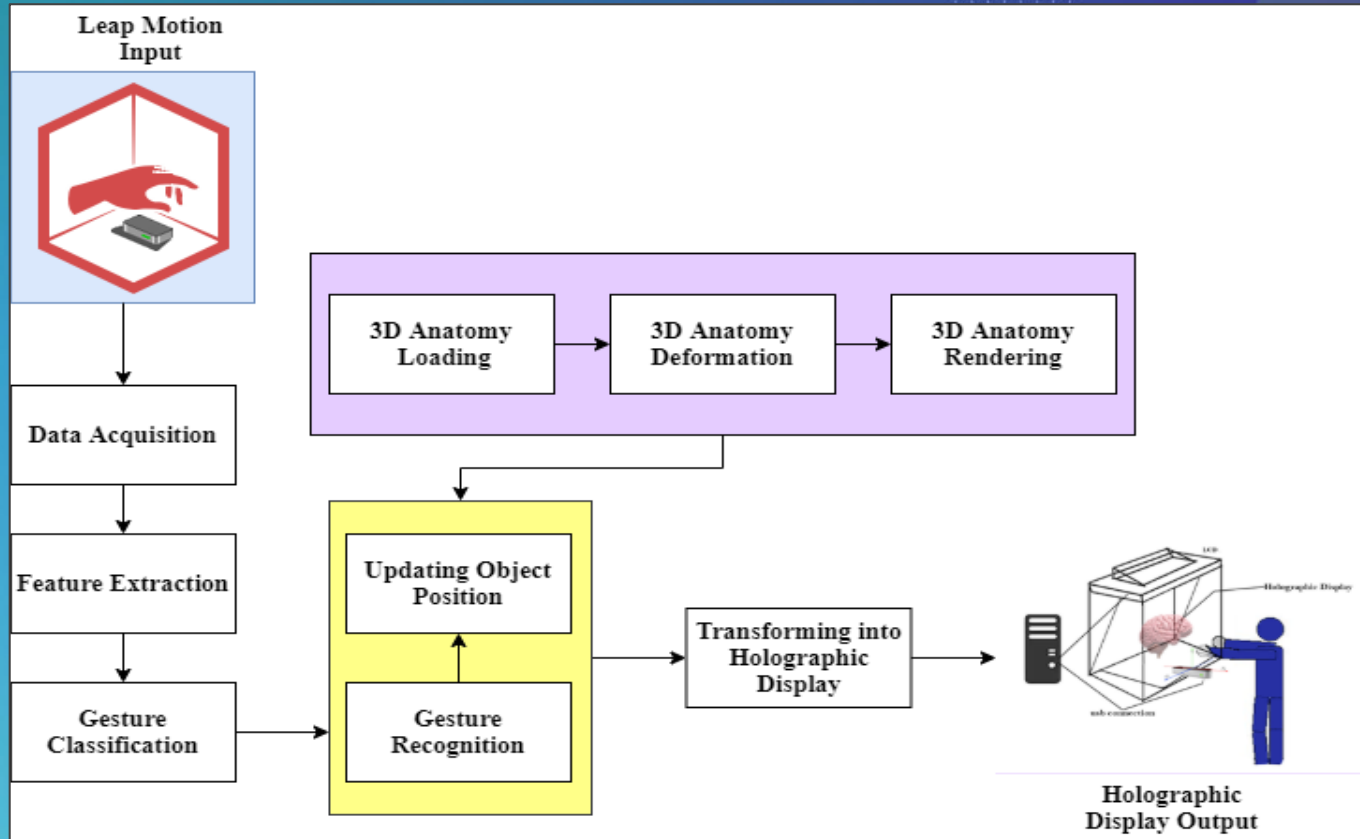
RESEARCH PLAN



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GENERAL FRAMEWORK OF
DEVELOP SYSTEM

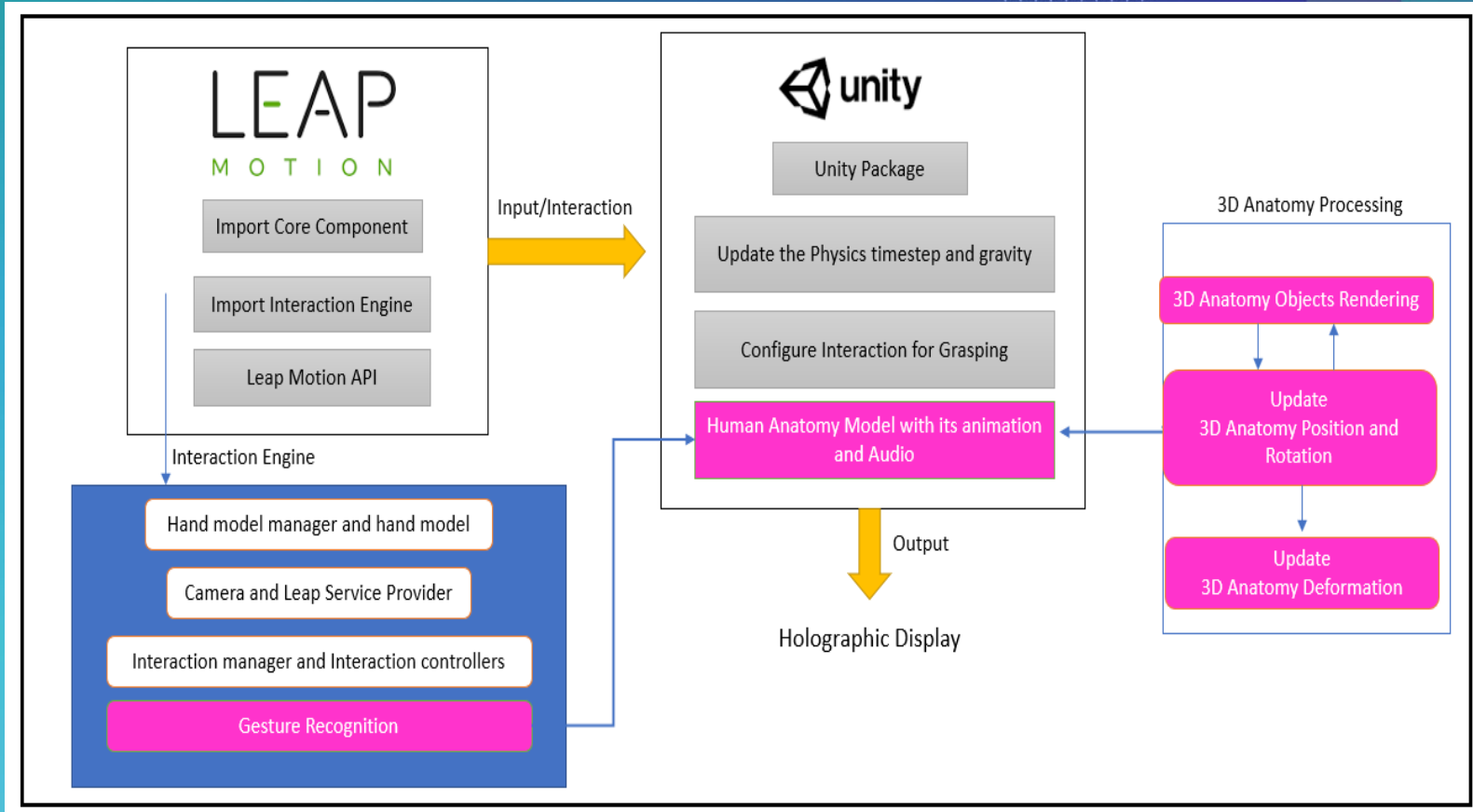
GENERAL FRAMEWORK OF DEVELOP SYSTEM



06

GENERAL ARCHITECTURE

GENERAL ARCHITECTURE



07

CURRENT DEVELOPMENT

CURRENT DEVELOPMENT



08

CONCLUSION

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- **This study integrates the technology of LMC, as hand and finger motion controller, and Unity 3D engine in a case of learning human anatomy course.** This combination is then will be displayed on holographic display platform so that users can view, learn, and interact with the model as hologram object.
- **The interactivity in this study includes, moving, scaling, rotating and constructing play to enrich the engagement of the user.** It is highly suggested to maintain student learning satisfaction and engagement in long term period with many interactions and game-based activities included. Therefore, in the future, we will show more variety based on GBL on the complete human anatomy model, with the inclusion of timer, rewards, levels, etc.



THANK YOU
