

Hologram with Haptic Feedback

*A literature review report submitted in partial fulfilment of the requirements for
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in

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CERTIFICATE

This is to certify that literature review report for the project entitled “**Hologram with Haptic Feedback**” is a bonafide report of the project presented during VIIth semester (CS451 - Seminar and Project Preliminary) by **Mohit Rajan E**, in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology (B.Tech) in Computer Science & Engineering.

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ABSTRACT

This paper is intended to analyze and discuss the developments made so far in the field of holography and holographic projection, it discusses the doability and the eventuality in the field of touchable holograms, which works in gear with hand gestures. In this paper, first some elementary matters about what a hologram is and a concise description of how they are devised is discussed. Then how hologram interact with our hand gestures and provide haptic feedback is discussed. In this paper the focus is on the feasibility or doability study of some methods and the analysis and consequences of these methods. Challenges in the whole process will be confronted and then some discussion about future scopes of this technology and where this technology can lead us is done.

Contribution by Author

Author Contribution Goes Here

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ACKNOWLEDGMENT

Your Acknowledgement Goes Here

Student 1

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Chapter 1

Introduction

1.1 Overview

Haptic holography is a combination of computational modeling and spatial display. It enables a person to see, feel, and interact with free standing holographic pictures of material surfaces that is three-dimensional in nature. In this project, holographic displays are merged with a force-feedback device to render images with programmatically, real-world material properties and behavior.

A method to produce haptic area in the air using spatial modulation of ultrasound is initiated. Method to create airborne ultrasonic tactile stimulation is based on vibrotactile radiation pressure and sensor feedback systems. The initiated approach produces a spatially standing haptic image that enables user to touch 3D images depending on vibrotactile feedback.

1.2 Problem Statement

In the current education system students are taught to learn formulas and how to use them but not to reason or understand the logic behind them, causing them to forget it in a short period. It is a typical longitudinal learning approach. Our brain system is not just longitudinal in learning process, but much more complex. Current education system evolved on the basis of visual and auditory senses and their application leads to memorizing the content of learning rather than creating a holistic perception. It is observed that the current education system uses mainly audio methods to teach students. In India around 10% of students suffer from some form of learning disability[1]. Research also point to the fact that visual working memory is better in students with learning disability rather than auditory working memory[2]. It can be inferred that a modern method of learning should be developed in order to increase the efficiency of learning process.

To address this issue we propose a system which uses a holographic display with haptic feedback by the interaction of using hand gestures. This project will focus on developing a system as described above to introduce a new approach to learn basic geometry.

1.3 Objective

To create a system which also includes somesthetic senses to learning. To achieve this a holographic display with haptic feedback is proposed. The proposed system

can be used to project objects in mid-air which can be interacted by using the hand gestures to view new objects, change or modify its properties like size, view etc.

Chapter 2

Literature Review

The world population is the sum of all humans on Earth. As of today, it is estimated to number 7.004 billion by the United States Census Bureau. The USCB estimates that the world population exceeded 7 billion on March 12, 2012. According to a separate estimate by the United Nations Population Fund, it reached this milestone on October 31, 2011. The world's population is unevenly distributed,

Rank	Country	Population	Percentage
1	China	1,347,350,000	19.24%
2	India	1,210,193,422	17.28%
3	United States	313,269,000	4.47%

Table 2.1: World Population Table

with six of Earth's seven continents being permanently inhabited on a large scale. As of 2012, Asia is the most populous continent, with its 4.1 billion inhabitants accounting for over 60% of the world population. The world's two most-populated countries alone, China and India, constitute about 37% of the world's population. Africa is the second-most-populated continent, with around 1 billion people, or 15% of the world's population. Europe's 733 million people make up 11% of the world's population, while the Latin American and Caribbean regions are home to 589 million (9%).

Chapter 3

Design

The proposed system consist of three sub-systems

- Display
- Haptic feedback
- Hand gesture regonazing system.
- Software compontent ? (is this required?)

3.0.1 Display

Hologram was selected as the method of display. Since previous research has shown learning gemotry with hologram is better than tradional methods[3].

3.0.2 Haptic feedback

Haptic feedback is added to add a somesthetic senses to learning. And also as a response to convay the previous commanf by the user has been registred.

3.0.3 Hand Gesture

Hand Gestures are used as the input to the system and will be used by the user to intract with the system. Required bellow part? The hand geuster is proccess using Google MediaPipe libaray.

3.1 Proposal

In mathematics, Stirling's approximation (or Stirling's formula) is an approximation for large factorials. It is named after James Stirling.

The formula as typically used in applications is:

$$\ln(n!) = n \ln n - n + O(\ln(n))$$

Chapter 4

Work Plan

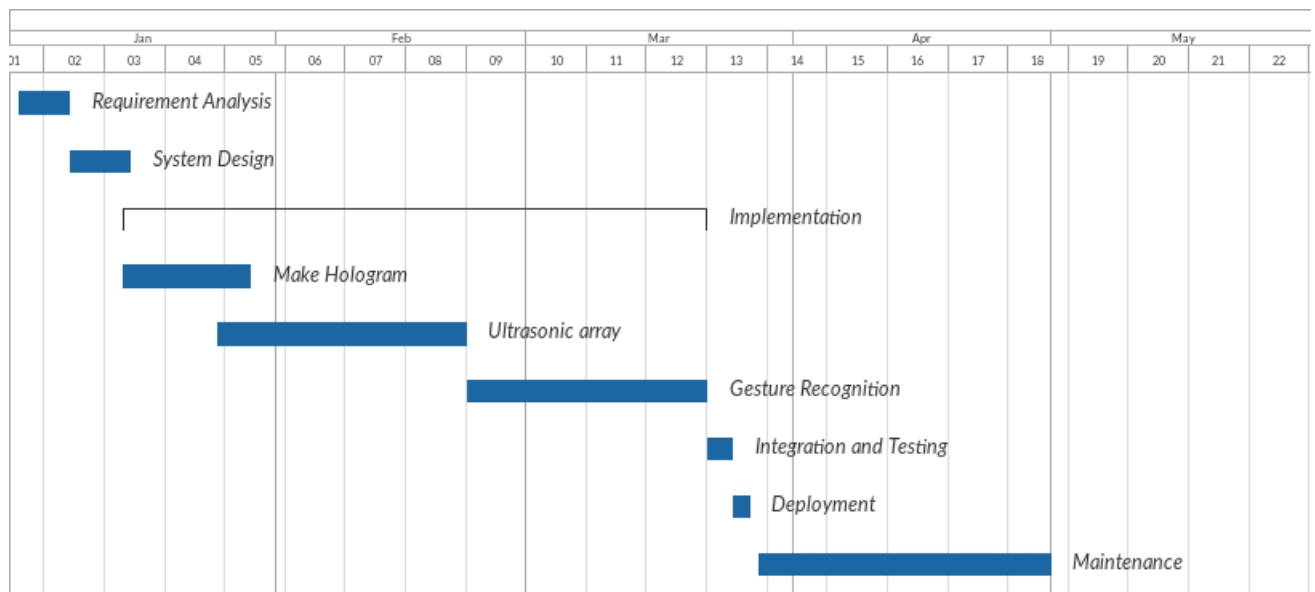


Figure 4.1: Work Plan

4.1 Budget

Chapter 5

Conclusion

An intrusion detection system (IDS) [1] is a device or software application that monitors network and/or system activities for malicious activities or policy violations and produces reports to a Management Station.

Donald Ervin Knuth [2] is a computer scientist and Professor Emeritus at Stanford University. He is the author of the seminal multi-volume work The Art of Computer Programming. Knuth has been called the "father" of the analysis of algorithms

Bibliography

- [1] K. Scarfone and P. Mell, “Guide to intrusion detection and prevention systems (idps),” *NIST Special Publication*, vol. 800, no. 2007, p. 94, 2007.
- [2] Wikipedia, “Donald knuth.” http://en.wikipedia.org/wiki/Donald_Knuth.