Real 3D – Digital Holography Machine

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Project Overview

Motivation

In today's world, holograms are used in different facets of life like in medical, students are given training that involves life-like holograms. The entertainment industry uses holograms in games and advertisement to attract the customers. In the educational world also holograms can make a huge impact by engaging student in a more real and practical education. So all this makes it important, for a low cost and high quality generation of holograms to be used in different sectors of our industry.

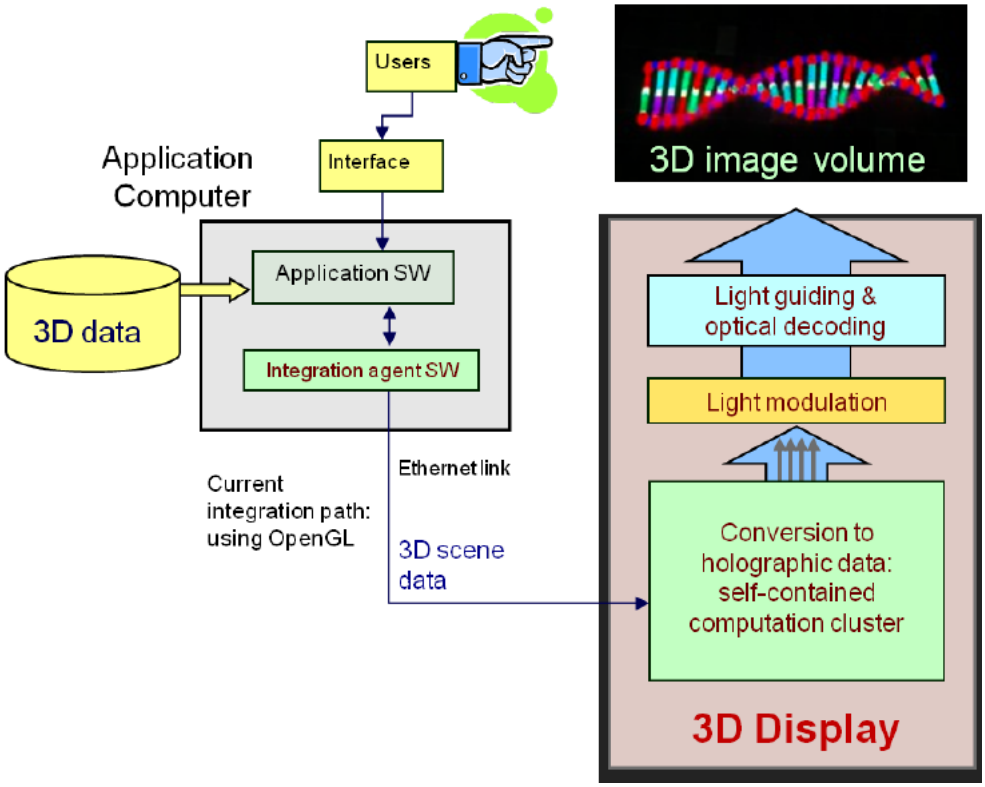
Summary

Hologram Technology is a three-dimensional projection which can be seen without using any special equipment such as cameras or glasses. The image can be viewed from any angle, so as the user walks around the display the object will appear to move and shift realistically. We, by this project, plan on providing our users with an efficient, low latency and low cost machine to generate high resolution holograms.

Methodology

Architecture

The display comprises the three subsystems that are typical in any holographic display. Three-dimensional scene data (which enters the display) is converted by the computation subsystem into holographic data, which is converted into photons by the light-modulation subsystem. The modulated light passes through the light-processing subsystem and emerges from the display and is shown to the users.



Project Environment and Tools

- Need of a dark room to perform the experiment so that no external disturbance can tamper with the inference results from the lasers.
- Good ventilation as different chemicals will be used to obtain interference patterns from the photographic plate.

Challenges

- Need a undisturbed environment to correctly record the interference patterns, which is hard in real world applications.
- Quite heavy computational compression algorithms which require much advanced and fast computer systems.
- Holographic representation of moving objects can create parallax and difficulty in visualising.
- **No vertical stereoscopy**: In-Plane tilting of one's head breaks the illusion of 3D in 3D cinema.

Uniqueness

- Hologram of moving bodies, unlike the traditional method of static bodies.
- Digital holography for 3D and 4D real-world objects' capture, processing, and display

Evaluation

Objective

The objective of this project would be come with a finalized holograph machine which is optimized in terms of cost ,usability performance and quality which can be easily deployed in different sectors of the industry.

Deliverables

At the end of this project our aim is to come up with an optimized machine for this product and some working prototypes based on the finalized design.

Timeline

Week 1	Recruitment of Project Staff and Purchase of Equipments
Week 2	Setting up Computer Systems and Lasers
Week 3	Discussion with Project Members on the idea and come up with implementation.
Week 4	Basic Setup to carry out first holographic generation experiment
Week 5	Carry out first experiment of holograming a toy car using lasers
Week 6-7	Analysing the interference results of the experiment and improve it
Week 7-8-9	Extending the idea to big size objects.
Week 10	Deploying the idea to real world applications.

Resources and Budgets

Budget			
Resource Name	Quantity	Cost per piece	Total Amount
High-Resolution Photographic Films	500	$ 10	$ 5000
Computer Systems	20	$5000	$100000
Motherboard	20	$200	$4000
Circuital Items	30	$10	$300
Resistant-Glass Box	10	$500	$5000
Lasers	50	$3	$150
Laser Supports	50	$2	$100
Processing Kits	10	$100	$1000
Chemical Solutions	50	$100	$5000
Cardboard	100	$2	$200
Manpower	10	$1200	$12000
Consumables	10	$2000	$20000
Overhead	1	$5000	$5000
Total	-	-	$157750

In order to complete our project, we would ask for a annual budget of $157750.

Reference

https://www.researchgate.net/publication/268387890_The_First_20_Years_of_Holographic_Video_-_and_the_Next_20pf9