

Holographic Visuals Involving Automation

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ABSTRACT : *This template described here deals with the report wherein Holography is the main theme of the whole template and its applications with several automation techniques. The arrangements as per standards for the holographic image is maintained with respect to the design. Followed by the dream-come-true-vision from the holographic visuals, the entire hall where the experiment is carried out is introduced with a whole new level of automation techniques that can be introduced in future theatres and auditoriums. The entire hall is surrounded by the smell producers that is designed with required components and sensors which will be timed accordingly for the production of relevant smell with respect to the visual and placed at all corners of hall for equal spreading of the smell. In addition to the above mentioned introductions, we also experiment with the motion sensors and temperature control and conditioning.*

Keywords: *holographic, automation, auditoriums*

I. INTRODUCTION

The whole setup is arranged as per the design standards. The holographic film is placed against the glass and is held at a position suitable for the holography to take place. The projections from the projector are directed towards the white screen placed at a position wherein the reflections from the white screen are directed on the holographic film and a clear holography visual is brought to vision. Addition to the holography, the hall in which the whole setup is carried on is mounted with automation techniques like smell sensing, motion sensing and temperature sensing automations. Processor atmega328 mounted on a Arduino Uno board is used for the automation techniques. The spectator will feel the dream-come-true-vision with the real feel of visuals displayed along with the real feel of the the visual being displayed.

Literature review

Principle of Holography

The theory of holography was first developed by Hungarian scientist Dennis Gabor around 1947-48 while working to improve the resolution of a electronic microscope. The first Holograms were of poor quality, but the principle was good. According to the principle of holography, a detailed three dimensional image of a object can be recorded in two dimensional photographic film and the image can be reproduced back in a three dimensional space. The complex patterned information stored in a film is

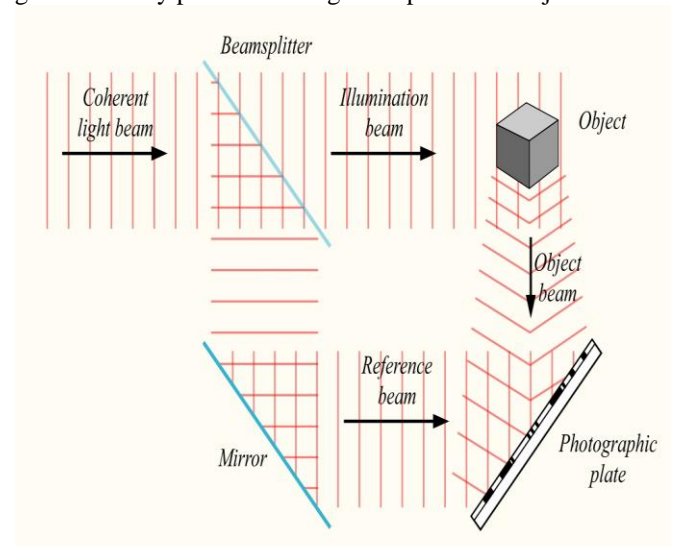
called 'hologram'. Holograms have a strange feature, unlike the conventional photographic film, once we cut hologram into pieces, each piece is capable of reconstructing

the entire image, although it will have a lesser luminosity and clarity.

The holographic concept has lured philosophers of science for decades, and is becoming more and more popular in several front areas of science; attracting the researchers of cosmology, astrophysics, extra-dimensions, string theory, nuclear and particle physics and neurology etc., The holographic principle is now widely being used to relate seemingly unrelated things like quantum mechanics and gravity.

Reconstruction method of holography

As per the diagram illustrated below, the reconstruction procedure should give back the original point object in our normal physical space, but we know that no optical procedure gives a strictly point-like image of a point-like object.

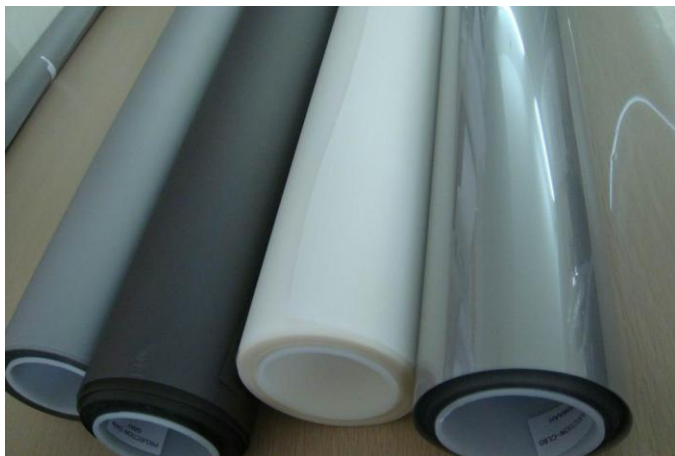


Assuming holography as the basis of physical reality, we claim that some dynamics seen in the observable world, such as fuzziness in quantum mechanics, statistical physics and thermo dynamics come from such a procedure. This fuzziness is basically a noise that has a dynamics of its own.

ExperimentAL Studies

Design process and implementation

The experimental procedures involves steps for the functioning of whole setup we are presenting in this template. Firstly, the visuals are loaded onto the projector and is directed towards the white screen planted on a suitable position and its reflections are directed towards the holographic film mounted on a glass plate and arranged as per design standards. The image is reconstructed in the holographic film and an image very much closer to reality is viewed from the film.



The holographic film has features like,

- The flammability standards, prevents mildew and bacterial growth.
- The raw material ingredients consists of safe low lead, low cadmium, no smell.
- The thickness of the film is very average, average thickness is about 0.28mm.
- The film is combined with ease, and the intensity is constant.
- Good tensile strength and is not easy to tear or break.
- High softness(60phr), high resilience which is not easy to deform.
- Water or neutral liquids can be wiped and easily cleaned.

Arduino uno board specifications :

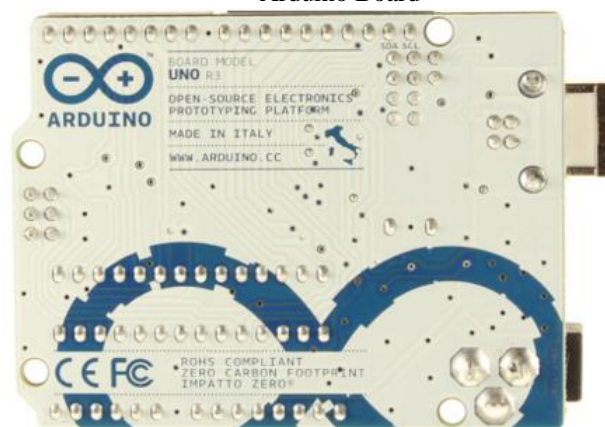
The arduino interacts with the world through actuators and sensors. Sensors are electronic components that describes the world to your application. One common way sensors work is that their electrical properties change as an effect of the changes in the condition in which it's operating. For example, the resistance of a photo-resistor changes when the intensity of light incident on it changes. The thermistor are another example of such sensors, whose resistance changes when the operating temperature changes.

A flex sensor is a different category of sensor, where the resistance changes depending on the extent of the flex or bend. Such changes can be read as electrical signals on the Arduino's input pin. Depending on the kind of sensor, the signal either can be digital or analog. Actuators on the other hand are the electronic components that are used to react to an external event. For example, when it gets dark, the light should be switched on. Sensors and actuators, thus, are used to achieve complementary objectives-one senses and other reacts. Examples of actuators are Solenoids and Servos.

The Arduino is an open-source electronics prototyping platform composed of two major parts: the Arduino board (hardware) and the Arduino IDE (software). The Arduino IDE is used to write the program that will interact with our Arduino and the devices connected to it. In the Arduino world, such a program is called a Sketch.



Arduino Board



The Arduino board is a small-form microcontroller circuit board. Arduino UNO is the latest version of the basic Arduino board.

For the smell sensing and producing procedure, the visual which is being displayed is studied by us first and the time intervals between the different objects occurrences is noted down. With respect to the noted timings, we need to design and interface Arduino UNO board and interface with the smell motor and fans for driving the smell produced by the compound used. Several organic compounds are used for respective smell functions and are some are heated to produce smells in accordance with the visual being displayed and for others we use method of distribution and spreading.

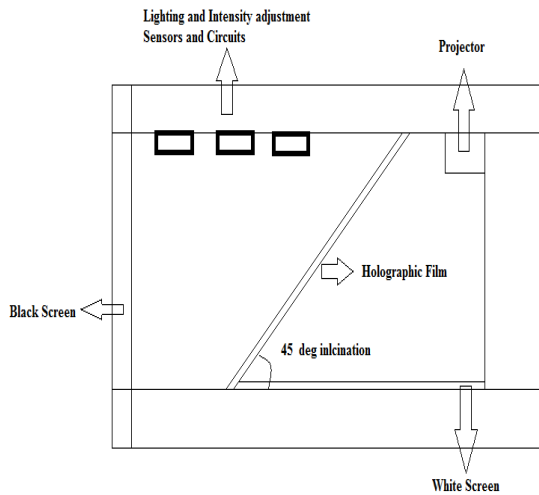
For eg.,at a particular time interval, the visual involves a couple having a cup of coffee, then at that particular time, we need to set and time the Processor to drive the motor, which drives the setup for the production of coffee smell with required quantity and by the help of fan, the smell reaches the spectators and disappears as the time ends.

Likely, temperature conditioners are installed at respective places inside the hall, if the visual involves a scene with bright sunny day, then that scene is studied earlier and at that point of time the processor is interfaced with the fans for driving the hot air, so that the spectators will get warm inside the hall with respect to the visual being displayed. The spectator will feel the reality of the visuals being displayed.

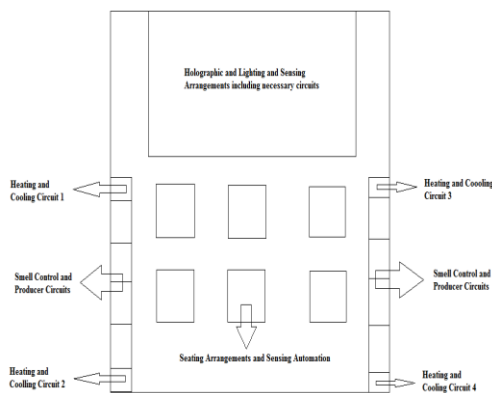
In addition to all these automation techniques, the whole screening of the visuals involves highlighting of the main object in the visual, automatically by the use of high-intensity LED's flashing over the main object automatically. This part is also controlled by the atmega328 processor. Additionally, the force sensitive resistors are used for motion sensing inside

the hall and for the screening of the visuals only when all the spectators are seated preferably in the hall. An IR transmitter and receiver are used for this process.

Design implementation using blocks



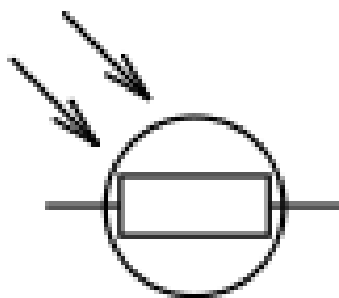
a. Figure for the arrangement and placing of requisites for Holographic Projection (Side View)



a. Figure for the hall arrangements with all the aspects of our project (Top View)

Use of LDR 3 – pin resistor :

A photoresistor or light-dependent resistor (LDR) or photocell is a light-controlled variable resistor. The resistance of a photoresistor decreases with increasing incident light intensity; in other words, it exhibits photoconductivity. A photoresistor can be applied in light-sensitive detector circuits, and light-and-dark-activated switching circuits.



A photoresistor is made of a high resistance semiconductor. In the dark, a photoresistor can have a resistance as high as few megaohms($M\Omega$), while in the light, a photoresistor can have a resistance as low as a few hundred ohms. If incident light on a photoresistor exceeds a certain frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electrons (and its hole partners) conduct electricity, thereby lowering resistance. The resistance range and sensitivity of a photoresistor can substantially differ among dissimilar devices. Moreover, unique photoresistors may react substantially differently to photons within certain wavelength bands.

A photoelectric device can be either intrinsic or extrinsic. An intrinsic semiconductor has its own charge carriers and is not an efficient semiconductor, for example, silicon. In intrinsic devices the only available electrons are in the valence band, and hence the photon must have enough energy to excite the electron across the entire bandgap. Extrinsic devices have impurities, also called dopants, added whose ground state energy is closer to the conduction band; since the electrons do not have as far to jump, lower energy photons (that is, longer wavelengths and lower frequencies) are sufficient to trigger the device. If a sample of silicon has some of its atoms replaced by phosphorus atoms (impurities), there will be extra electrons available for conduction. This is an example of an extrinsic semiconductor.

Here, in our presented presentation too, the LDR resistors are used for the light intensity adjustments. The number of LDR's used depends on the flashing intensity required and the dimension of the screen. It is interfaced with the Arduino UNO Board for its functioning. The whole interfacing is done with Python programming.

Use of Gear Motor :



Gear motor is a single compact device which comprises both : electric motor and gears, usually for reducing the rotational speed and increasing torque of the output shaft.

Depending on application, almost all types of motors can be employed in gearmotors : asynchronous, synchronous, direct current, etc., Similarly, the reduction gears can be of many types: worm, cogwheel, planetary, planetary-lantern, and wave transmissions. Type of gears and lubrication system might limit the position in which the assembly can operate.

Here the gear motors can be used to drive the small production unit.

This whole presentation, to be practically implemented, requires wooden blocks for the holding of heat and smell components and settings, metal frames for holding the holographic film and glass plates, Along with this, it also holds the projector for to be used for projecting at a suitable position.

This presentation can be practically implemented and used for :

- Advertisements
- Theatres
- Concert Halls
- Auditoriums
- Recreation centres
- Presentation purposes
- Home theatres etc.,

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