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Digital Holograhic System for Post Flood Assessment Using Aerial Projection

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ABSTRACT: Virtual Reality is seen as the high-end of human- computer interactions and it has the potential to target a wide range of applications. To improve the standardization and automation of disaster operation management, a new method of emergency management based on the activity network technology is presented. Firstly, the emergency plan is built upon emergency response activities by using the activity network technology. While a virtual trajectory may be represented using straight lines connecting waypoints of interest, this simple model does not accurately represent typical user behavior. We implemented the model within a framework that can be used for redirect food distribution within different virtual and physical environments. It is useful for the evaluation of redirected of parameters under varying conditions.

KEYWORDS: Virtual Reality (VR), Holography, Flood Relief, Aerial Projection, Sensing System.

I. INTRODUCTION

A hologram is the recorded interference pattern between a point sourced of light of fixed wavelength (reference beam) and a wavefield scattered from the object(object beam). A hologram is recorded in a two- or three- dimensional medium and contains information about the entire three-dimensional wavefield of the recorded object. When the hologram is illuminated by the reference beam, the diffraction pattern recreates the light field of the original object. The viewer is then able to see an image that is indistinguishable from the recorded object. The holographic plate is a kind of recording medium, in which the 3D virtual image of an object is stored. While in a recording media (e.g a CD) the grooves contain information about sound that can be used to reconstruct a song, a holographic plate contains information about light that is used to reconstruct an object.

The information about light is coded in the form of bright and dark micro interferences. Usually, these are not visible to the human eye due to the high spatial frequencies. Reconstructing the object wave by illuminating the hologram with the reference wave creates a 3D image that exhibits the effects of perspective and depth of focus.

This photographic technique of recording light scattered from an object and presenting it as a 3D image is called Holography. The objects representations generated by this technique are the most lifelike 3D renditions because it records information in a way closer to what our eyes use to see the world around us. Therefore, it is an attractive imaging technique since it allows the viewer to see a complete three-dimensional volume of one image.

Throughout the years, several types of holograms have been created. These include transmission holograms, that allow light to be shined through them and the image to be viewed from the side, and rainbow holograms. These are common in credit cards and driver‟s licenses (used for security reasons).

While various holograms have been used in movies like Star Wars and Iron Man, the real world technology has not achieved the same level as presented in those cinematic stories. Currently, holograms are still static, but they can look incredible such as in the case of large-scale holograms that are illuminated with lasers or displayed in a darkened room with carefully directed lighting. Some holograms can even appear to move as the viewer walks past them, looking at them from different angles. Others can change colours or include views of different objects, depending on how the

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viewer looks at them.

One of the interesting traits of a hologram is that cutting one in half, each half will contain the pattern to recreate the original object. Even if a small piece is cut out, it will still contain the entire holographic image. Another feature is that making a hologram of a magnifying glass will create a hologram that will magnify the other objects in the hologram To create a hologram, holography uses the wave nature of light. In a normal photograph, lenses are used to focus an image on film or an electronic chip, recording where there is light or not.With the holographic technique, the shape a light wave takes after it bounces off an object is recorded. It uses interfering waves of light to capture images that can be 3D. When waves of light meet they interfere with each other, analogous to what happens with waves of water. The pattern created by the interference of waves contains the information used to make the holograms .True 3D holograms could not be a practical reality without the invention of the laser. A laser creates waves of light that are coherent. It is this coherent light that makes it possible to record the light wave interference patterns of holography. While white light contains all of the different frequencies of light traveling in all directions, laser light produces light that has only one wavelength and one color.

In its basic form, three elements are necessary to create a hologram: an object or person, a laser beam, and a recording medium. A clear environment is also recommended to enable the light beams to intersect .The laser beam is separated into two beams and redirected using mirrors. One of the beams is directed at the object, while the other - the reference beam - is directed to the recording medium. Some of the light of the object beam is reflected off the object onto the recording medium. The beams intersect and interfere with each other, creating an interference pattern that is imprinted on the recording medium. This medium can be composed of various materials.

A developed film from a regular camera shows the negative view of the original scene, with light and dark areas. Looking at it, it is still possible to more or less understand what the original scene looked like. However, when looking at a revealed holographic tape, there is nothing that resembles the original scene. There can be dark frames of film or a random pattern of lines and swirls, and only with the right illumination is the captured object properly shown. Using a transmission hologram made with silver halide emulsion as an example, there needs to be the right light source to recreate the original object beam. This beam is recreated due to the diffraction grating and reflective surfaces inside the hologram that were caused by the interference of the two light sources. The recreated beam is identical to the original object beam before it was combined with the reference wave. Furthermore, it also travels in the same direction as the original beam. This means that since the object was on the other side of the holographic plate, the beam travels towards the viewer. The eyes focus the light, and the brain interprets it as a 3D image located behind the recording medium.

In the modern era there has been an increasing amount of interest in physical fitness and health with the most people, there are people who have a full desire for that, but it may force them time or place conditions on the sometimes unsteadiness on a specific date for the exercise. The prevalence of Vitamin D deficiency ranged from 40% to 99%, with most of the studies reporting a prevalence of 80%–90%. It was prevalent in all the age groups and high- risk groups alike. Creativity meaning become in the use of optimal technology as solution of human life problems, and in recent year‟s technology is available and developed to facilitate human beings needs. Based on that project provided a self care machine to monitor people‟s health periodically in every place and at any time, thus facilitated a lot trouble discipline on a specific place or a specific time in the day and helped them to calculate calories,minerals,vitamins and motivate them to eat healthy food.

II. PROJECT BACKGROUND

There are mainly two existing types of gesture recognition methods, i.e vision based and accelerometer and gyroscope based.These have some limitations like ambient optical noise, slower dynamic response, and relatively large data processing of vision-based method.

Gesture recognition is a topic in computer science and language technology with the goal of interpreting human gestures via mathematical algorithms. It is a subdiscipline of computer vision. Gestures can originate from any bodily motion or state but commonly originate from the face or hand. Current focuses in the field include emotion recognition from face and hand gesture recognition. Users can use simple gestures to control or interact with devices without physically touching them. Many approaches have been made using cameras and computer vision algorithms to interpret sign language. However, the identification and recognition of posture, gait, proxemics, and human behaviors is also the subject of gesture recognition techniques. Gesture recognition can be seen as a way for computers to begin to understand human body language, thus building a richer bridge between machines and humans than primitive text user interfaces or even GUIs (graphical user interfaces), which still limit the majority of input to keyboard and mouse and interact naturally without any mechanical devices.

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The another existing method is based on gyroscope.The basic effect upon which a gyroscope relies is that an isolated spinning mass tends to keep its angular position with respect to an inertial reference frame, and, when a constant external torque (respectively, a constant angular speed) is applied to the mass, its rotation axis undergoes a precession motion at a constant angular speed (respectively, with a constant output torque), in a direction that is normal to the direction of the applied torque (respectively, to the constant angular speed). External forces acting on the center of mass of the rotating part do not affect the angular position of the rotation axis.

III. DISADVANTAGES OF EXISTING SYSTEM

- Humans are liable to work post flood food supply management system.
- They don"t know need of the people.
- It takes more time to supply items
- Less accuracy.

IV. PROPOSED SYSTEM

In this paper we proposed a technique which is based on , virtual reality that is projected from helicopter or far distance.The projected image displays a listed basic needs like food ,water, medicine.The person needs medicine need to stand on that projected medicine image then the dispatch section will distribute medicine for them.This emergency plan is built upon emergency response activities by using the activity network technology.While a virtual trajectory may be represented using straight lines connecting waypoints of interest, this simple model does not accurately represent typical user behavior.We implemented the model within a framework that can be used for redirect food distribution within different virtual and physical environments. It is useful for the evaluation of redirected of parameters under varying conditions.

V. DESIGN AND TECHNOLOGY

In hologram ,which detects wave length distribution of a light source using a multiplex Fresnel hologram. In order to measure the wavelength distribution of the light source, a spectrometer is usually used, but in this case it is difficult to measure the wavelength distribution while using the light source.To separate the block in light source food, cloth etc. We using Transmission and receiver section.In this project, virtual reality is projected from helicopter or far distance.The projected image with listed basic needs like food ,water, medicine.The person needs medicine need to stand on that projected medicine image then the dispatch section will distribute medicine for them.

MODULES:

ARDUINO UNO AND ITS PROGRAMMING:

Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It is an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board.

Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Arduino projects can be stand-alone, or they can be communicate with software running on the computer.

The Arduino microcontroller is an easy to use yet powerful single board computer that has gained considerable traction in the hobby and professional market.

The Arduino Uno is a microcontroller board based on the ATmega328.It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Pin Configuration

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically.

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External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board‟s power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector.

The board can operate on an external supply of 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may be unstable.The recommended range is 7 to 12 volts.

The power pins are as follows:

- **VIN**: The input voltage to the Arduino board when it‟s using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). The voltage is supplied through this pin, or, if supplying voltage via the power jack, access it through this pin.
- **5V:** This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 12V), the USB connector (5V), or the VIN pin of the board (7-12V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage the board.
- **3V3:** A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- **GND:** Ground pins.
- **IOREF**: This pin on the Arduino board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs for working with the 5V or 3.3V.

Memory

The ATmega328 has 32 KB (with 0.5 KB used for the bootloader). It also has 2 KB of SRAM and 1 KB of EEPROM.

Input and Output

Each of the 14 digital pins on the Uno can be used as an input or output, using pinMode(), digital Write( ), and digital Read( ) functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull- up resistor (disconnected by default) of 20-50 kohms.

In addition, some pins have specialized functions:

Serial: 0 (RX) and 1 (TX). Used to receive (RX) and Trans mit (TX) TTL serial data:

These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.

- **External Interrupts:** 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.
- **PWM:** 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analog Write() function.
- **SPI:** 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.
- **LED:** 13. There is a built- in LED connected to digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it‟s off.

The Uno has 6 analog inputs, labeled A0 through A5, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though it,it is possible to change the upper end of their range using the AREF pin and the analog Reference () function.

Additionally, some pins have specialized functionality:

- **TWI:** A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.
- **AREF:** Reference voltage for the analog inputs. Used with analog Reference Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

Communication

Microcontrollers depend on a host computer for developing and compiling programs. The software used on the host computer is known as an integrated development environment, or IDE. For the Arduino, the development environment is based on the open source Processing platform which is described by its creators as a “programming language and environment for people who want to program images, animation, and interactions.“ The Arduino

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programming language leverages an open source project known as Wiring.The Arduino language is based on good old-fashioned C.

The Arduino Uno has a number of facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The 16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1).

A Software Serial library allows for serial communication on any of the Uno"s digital pins. The ATmega328 also supports I2C (TWI) and SPI communication.The Arduino software includes a Wire library to simplify use of the I2C bus.SPI library is used for SPI communication.

VI. SUMMARY

- Microcontroller ATmega328
- Operating Voltage 5V
- Input Voltage (recommended) 7-12V
- Input Voltage (limits) 6-20V
- Digital I/O Pins 14 (of which 6 provide PWM output)
- Analog Input Pins 6
- DC Current per I/O Pin 40 mA
- DC Current for 3.3V Pin 50 mA
- Flash Memory 32 KB (ATmega328) of which 0.5 KB used by bootloader
- SRAM 2 KB (ATmega328)
- EEPROM 1 KB (ATmega328)
- Clock Speed 16 MHz

VII. BLOCK DIAGRAM

TRANSMISSION SIDE:

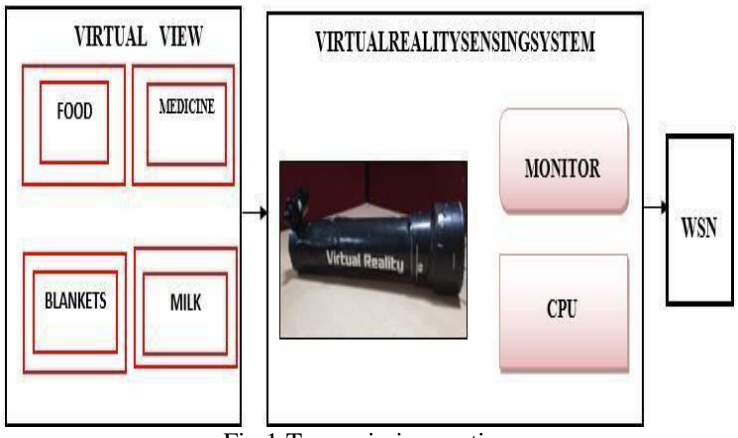

Fig 1:Transmission section

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RECEIVER SECTION:

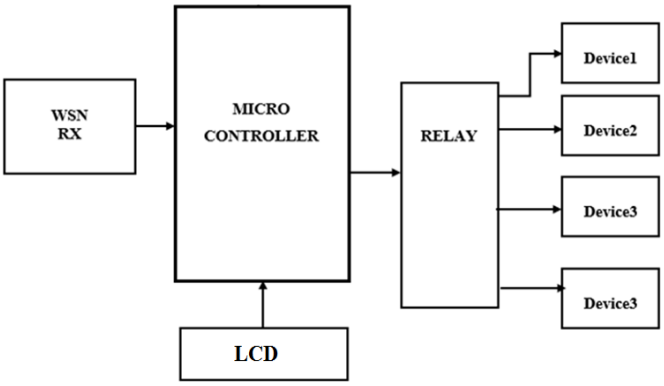

Fig 2:Receiver section

VIII. HARDWARE REQUIREMENT

- Torch Light (Transmission Light)
- Cpu
- Wsn Tx
- Wsn Rx
- Arduino Uno (Micro Controller)
- Lcd Display
- Relay

IX. SOFTWARE REQUIREMENT:

- Arduino ide
- Embedded c
- Proteus simulation
- Dot net

X. EXPERIMENTAL RESULTS

The first picture demonstrates the connection circuit.The picture is the output of the projection view. The last picture shows the particular command in the receiver side lcd display.

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I. BENEFIT

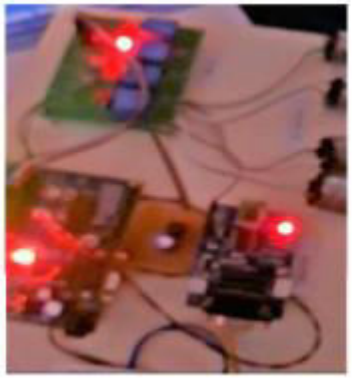

Fig 3: Connection circuit

Fig 4: Projection output

XI. BENEFITS OF THE PROPOSED SYSTEM:

- High resolution dimensional images
- Interactive Display
- Automated System takes place
- Less time to Perform

XII. EXISTING SYSTEM VS PROPOSED SYSTEM

PARAMETERS	EXISTING SYSTEM	PROPOSE D SYSTEM
METHODOLOGY	Gesture recognition method	Virtual reality based method

Table: comparing existed system with proposed system

XIII. ADVANTAGES

- More efficient.
- It understands the necessity of victim and perform accordingly.
- Saves energy and things and utilizes it only when it is needed.

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XIV. OUTCOME OF THE PROJECT

Thus from the proposed project virtual reality is projected from far distance.The projected image as six slots as shown.When the person selects what he wants from the projection then that will be transferred to the person in helicopter through lcd of the receiver section as shown.Then the need will be fulfilled by the dispatch section through motors as shown.Thus it is useful for the evaluation of redirected of parameters under varying conditions.

Fig 5:LCD output

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BIOGRAPHY

Swetha is an under-graduate student in the department of Electronics and Communication Engineering at St. Joseph’s Institute of Technology, Affiliated to Anna University. She is the Secretary of IEEE BTS in the year 2020-21.

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Currently she holds the position of chairperson for the student branch of IEEE Broadcast Technology Society. She will be graduated in Aug-2022. She done her internship in Temenos, Financial Banking Software company.

Sujithra is a student of St. Joseph's Institute of Technology in Electronics and Communication Engineering department and going to be graduated in the year 2022.She is currently working in Temenos, Banking Software company.

Sathiya Priya is an assistant professor of St .Joseph's Institute of Technology. She done her post-graduation and joined St. Joseph's to get work experience for her research interests. She had done many projects and attended some conferences. Her research papers where published in journals as well. She is going to done her PH.D in the year 2023.

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