# ARTIFICIAL INTELLIGENCE BASED HOLOGRAPH

Submitted in partial fulfillment of the requirements

of the degree of

**Bachelor of Engineering**

in

**Electronics and Telecommunication**

by


| | |
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| ABIR AKHALAK KHAN | (16DET58) |
| MULLA HANNAN ABDULGANI | (16DET106) |
| OWESH SHAIKH | (15ET44) |
| FAHEEM PADARWALA | (15ET37) |


Under the guidance of

**Prof. Zarrar Ahmed Zafarullah Khan**


Department of Electronics and Telecommunication Engineering

Anjuman-I-Islam's Kalsekar Technical Campus
Sector 16, New Panvel , Navi Mumbai
University of Mumbai


2018-19

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2018-19

# CERTIFICATE


Department of Electronics and Telecommunication Engineering
Anjuman-I-Islam's Kalsekar Technical Campus
Sector 16, New Panvel , Navi Mumbai
University of Mumbai

This is to certify that the project entitled **ARTIFICIAL INTELLIGENCE BASED SMART HOLOGRAPH** is a bonafide work of **ABIR AKHALAK KHAN(16DET58), MULLA HANNAN ABDULGANI(16DET106), OWESH SHAIKH(15ET44), FAHEEM PADARWALA(15ET37)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of Bachelor of Engineering in Department of Electronics and Telecommunication Engineering.

| | |
|---|---|
| Supervisor | Examiner |
| Head of Department | Director |

# Project Report Approval for Bachelor of Engineering

This project entitled **"ARTIFICIAL INTELLIGENCE BASED SMART HOLOGRAPH"** by **ABIR AKHALAK KHAN, MULLA HANNAN ABDULGANI, OWESH SHAIKH, FAHEEM PADARWALA** is approved for the degree of **Bachelor of Engineering in Electronics and Telecommunication**.

Examiner

.....

Supervisor

.....

Date**:** _____

Place: _____

# Declaration

I declare that this written submission represents my ideas in my own words and where others ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

…….
ABIR AKHALAK KHAN
(16DET58)

…….
MULLA HANNAN ABDULGANI
(16DET106)

…….
OWESH SHAIKH
(15ET44)

…….
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(15ET37)

Date: _____

# Acknowledgments

We have take efforts in this project . However, it would not have been possible without the kind support and help of many individuals I would like to extend my sincere thanks to all of them .

We are highly indebted (**Prof.Zarrar Ahmed Zafarullah Khan**) for their guidance and constant supervision as well as for providing necessary information regarding project & also for their support in completing project

We would like to express my gratitude towards my parents and staff of Anjuman-I-Islam's Kalsekar Technical Campus for their kind co-operation and Encouragement which help me in completion of the project. We would thank and appreciations also go to my colleague in developing the project and people who have willingly helped me out with their abilities.

ABIR AKHALAK KHAN (16DET58)
MULLA HANNAN ABDULGANI (16DET106)
OWESH SHAIKH (15ET44)
FAHEEM PADARWALA (15ET37)

# ABSTRACT

A 3D Holograph display projects an image from a monitor down towards on an acrylic pyramid, which then creates a 3D effect. In AI based holographic display we are introducing a chat bot which will help us to interact with humans.A 3D holographic displays will be capable of displaying footage of internal organs and structures generated from MRI, CT, PET, or ultrasound data sets. Users will have the ability to enlarge, isolate, rotate, and pan through image volumes in real-time as dynamic features, such as beating hearts or inflating lungs, are visualized. We are also imposing a technology called augmented reality in our holograph which will superimpose a computer generated image on a user's view of the real world, thus providing a composite 3D view on a display. The problem in single side display is that we are not able to see all the view of the 3D object simultaneously. So 3D holographic display will projects a 3D view of an image in a more explanatory manner, and AI will help user to interact with machine.
User will have a 3D gaming Experience on Holograph.

**Keywords: Artificial Intelligence, Pingpong,Sensor, Unity, Blender**

# Artificial Intelligence Based 3D Holograph

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**Guided By: Prof.Zarrar Ahmed Zaferullah Khan**

# Abstract :


- A 3D Holograph display projects an image from a monitor down towards on an acrylic pyramid, which then creates a 3D effect.
- In AI based holographic display we are introducing a chatbot which will help us to interact with people.
- We are also imposing a Software technology called Blender and Unity in our holograph which will superimpose a computer generated image on a user's view of the real world, thus providing a composite 3D view on a display.
- The problem in single side display is that we are not able to see all the view of the 3D object simultaneously.
- So 3D holographic display will projects a 3D view of an image in a more explanatory manner, and AI will help user to interact with machine.

## Proposed Outcome :

- It is an Artificial Intelligence based 3D Holograph, which will perform the task as per the given command for eg: the device can communicate with user and can search, navigate, respond to the human command.

- A medical application of our project is **Health monitoring system** will detect the heart beat of the person and display it on 3D hologram .

- We have also developed a Game using **Blender** which will give a unremarkable and a way beyond 3d gaming experience.

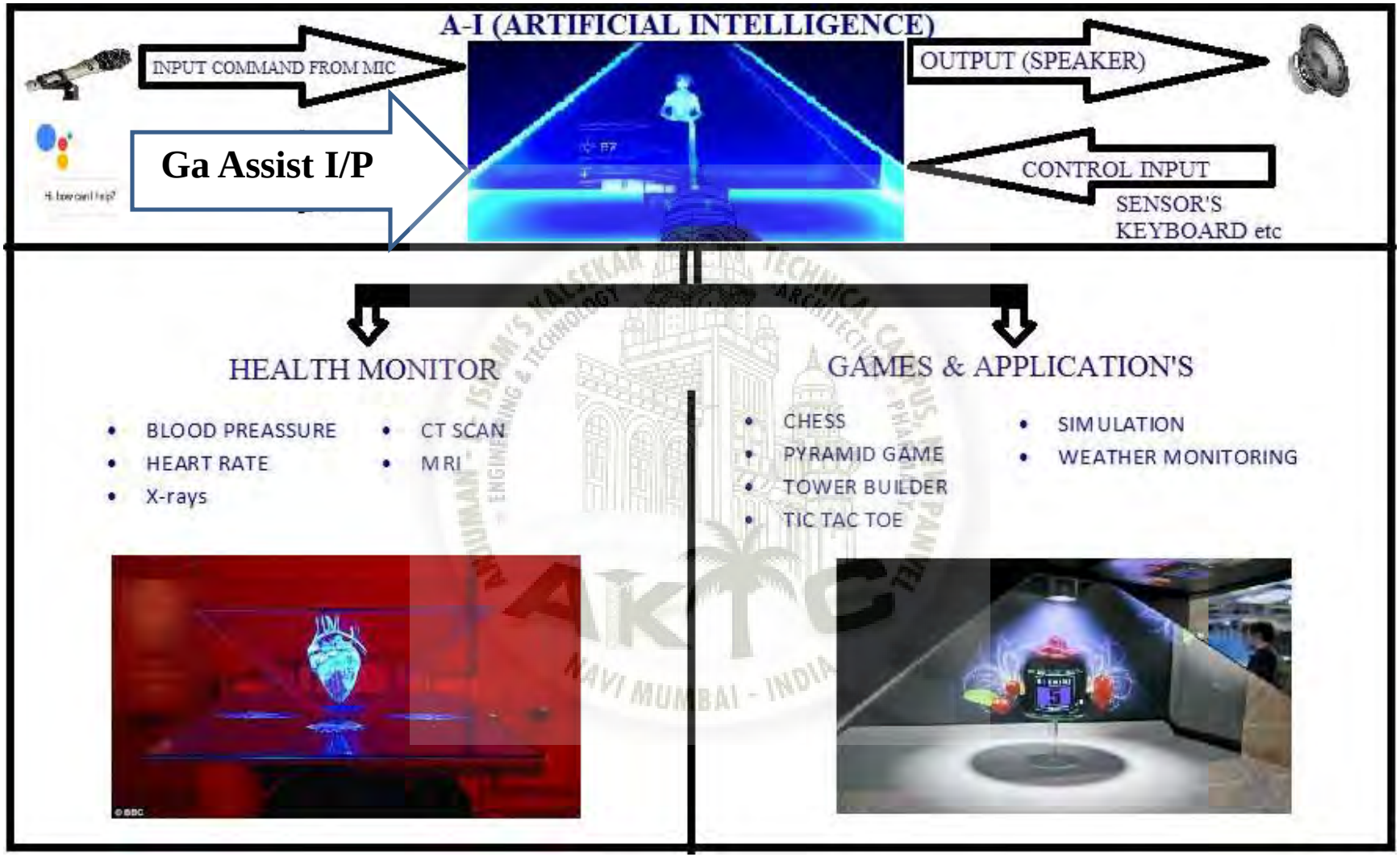
# Literature Review :

| Author Name | Paper Title | Work Done |
|---|---|---|
| Keehoon Hong, Yongiun Lim | Table-Top Electronic Holographic Display Satisfying Steriopsis Along 360 Degree | The Proposed System Properly Provide Stereoscopic Holograph image along 360 degree. |
| Juan liu, Gaolei Xue, and Yongtian Wang | Recent progress on holographic 3D display at Beijing Institute of Technology | With the rapid development of computer, photoelectronic and display technologies, it is possible to realize real-time and dynamic full-color holographic 3D display . |
| Ma sa hiro Yamaguchi | Full-Parallax Holographic Light-Field 3-D Displays and Interactive 3-D Touch | The number of pixels reproduced by SLM needs to be increased for higher quality LFD |
| M. Zens1 , J. Ruhhammer1, F. Goldschmidtboeing | POLYDIMETHYLSILOXANE STRAIN GAUGES FOR BIOMEDICAL APPLICATIONS | Results of such measurements may lead to better diagnostic tools, new treatment optionsand thus better outcomes for patients |

# Gaps in Literature Review :

- The paper that we are going to review has used 3D holograph technology to display real time objects.
- We are going to use Visualization of Medical Imaging Data on 3D holographic display.
- We are going to implement Real time gaming Application for hologram.

# Proposed Methodology :

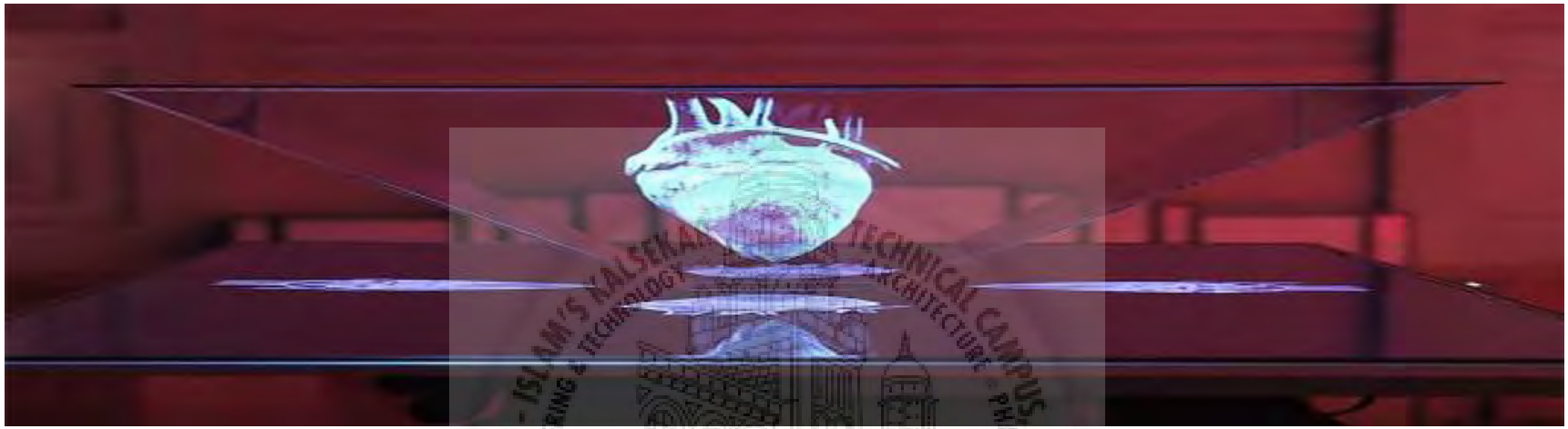


# Software :

•Unity is used to build high-quality 3D and 2D games, deploy them across mobile, desktop, VR/AR .

•Whether you're interested in coding 2D or 3D video games, Unity is one of the most comprehensive and user-friendly game development engines on the market.

# Role of unity in our project :



- Using **UNITY 3D** we made an asset of a of a heart which will be displayed on the Hologram thus providing a composite 3D view on a display .

- Dividing the screen into four parts for a proper holographic viewing experience was a major task, which is done by unity.

- Interfacing of an microcontroller like arduino, heart sensor & and communication between blender animation software can be done.

# Blender :


❖Blender is the free and open source 3D creation suite. It supports the entirety of the 3D pipeline modeling, rigging, animation, simulation, rendering, compositing and motion tracking, even video editing and game creation.

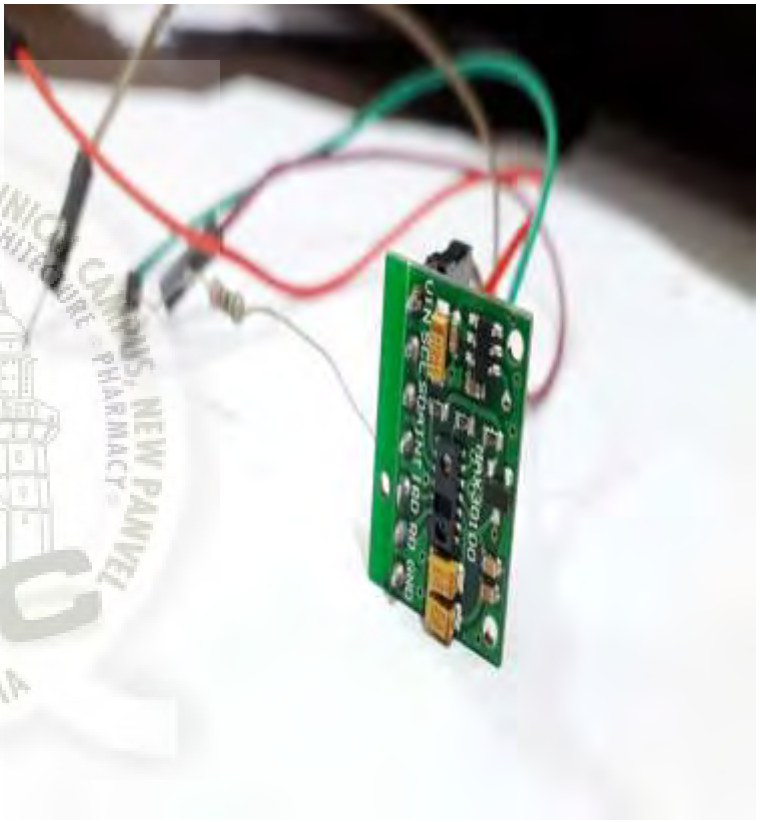
➢ **Blender is a complete game engine, allowing you to create a fullyfunctional 3d game right inside Blender.**

*The game engine includes:*

•Ability to port your models to any third-party game engine
•Create or code your own game logic
•Python scripting API for advanced control and AI
•Support for all OpenGL™ dynamic lighting, toon shading, animated materials as well as Normal and Parallax Mapping
•Playback of games inside Blender without compiling or preprocessing
•3D spatial audio using OpenAL
•Pingpong game is developed on Blender using the rigid body
•The ball output surface is made hard

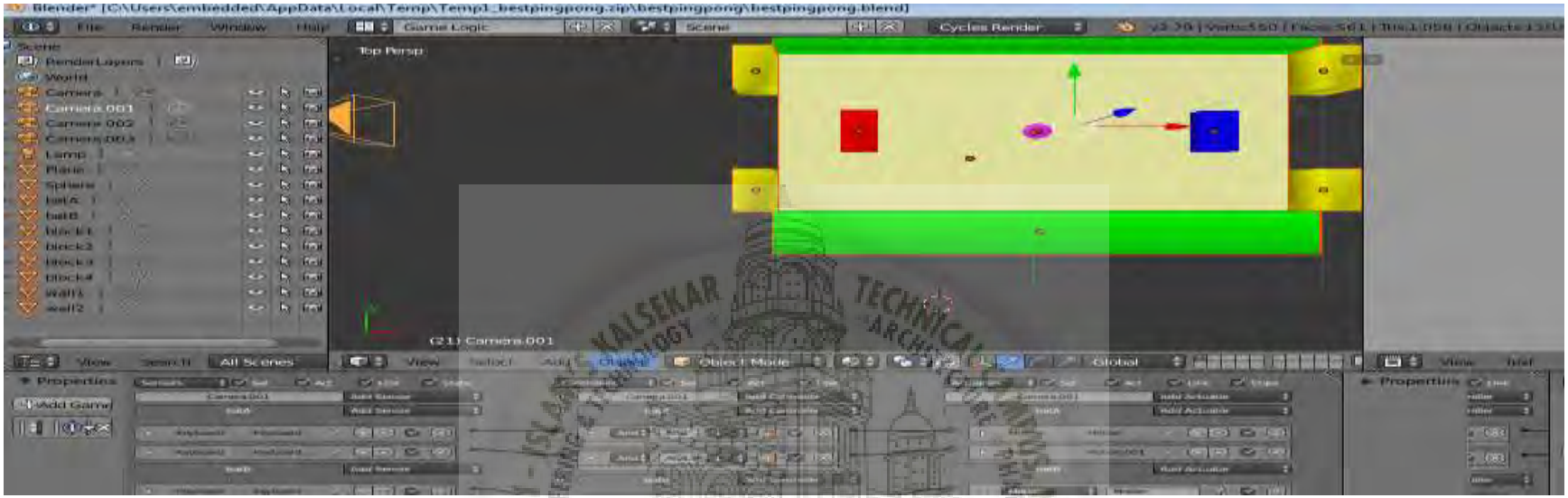
# HEART SENSOR (MAX3010000) :

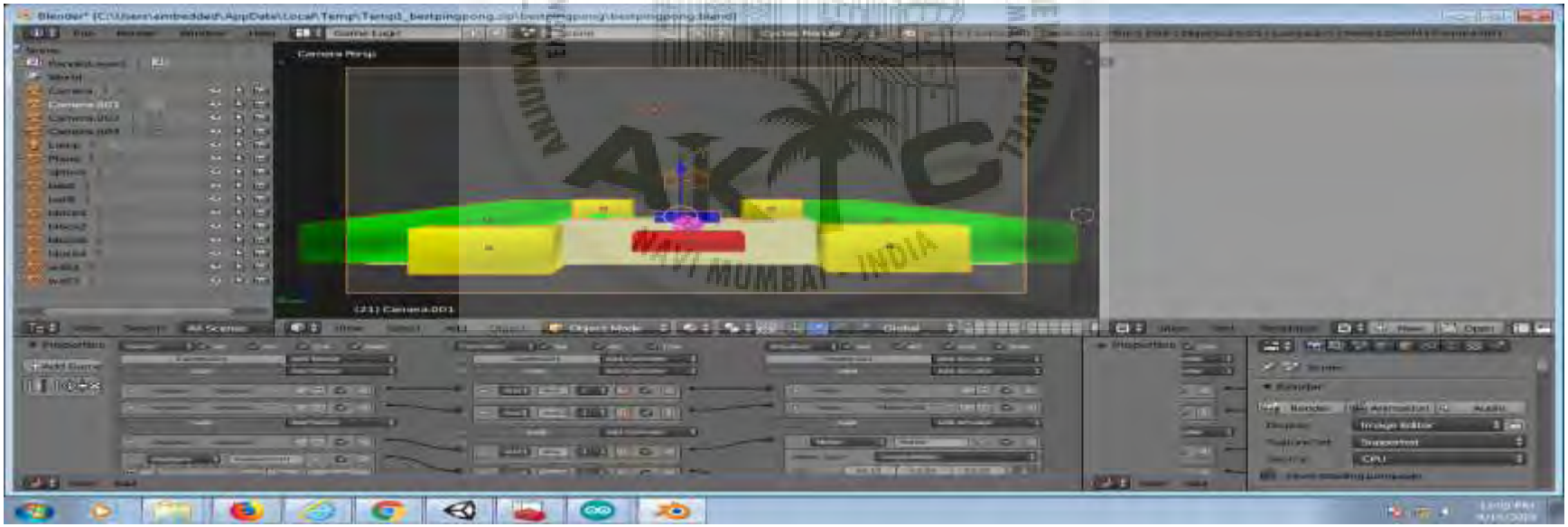
- The MAX30100 is an integrated pulse oximetry and heart-rate monitor sensor
- It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals.
- This heart sensor is interfaced with Ardunio and the out put is displayed on Unity animation software .



# Ping pong game developed using Blender :

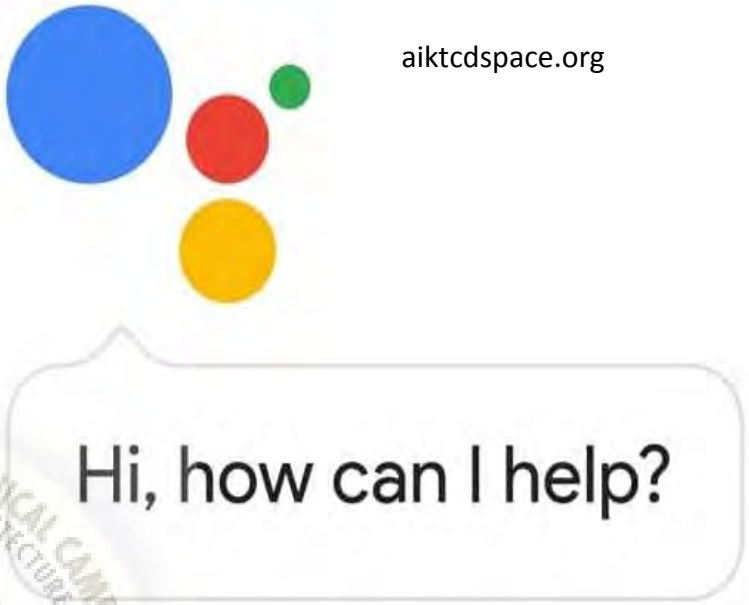






# Artificial Intelligence :

*Using Google Assistant as(AI) and USB mic as (input)device*




Google Assistant is an artificial intelligence-powered virtual assistant developed by Google that is primarily available on mobile and smart home devices.

**❑GET ANSWERS**

Get real-time answers including the latest on weather, traffic, finance or sports. Quickly find translations while you're travelling.

**❑ENJOY ENTERTAINMENT**

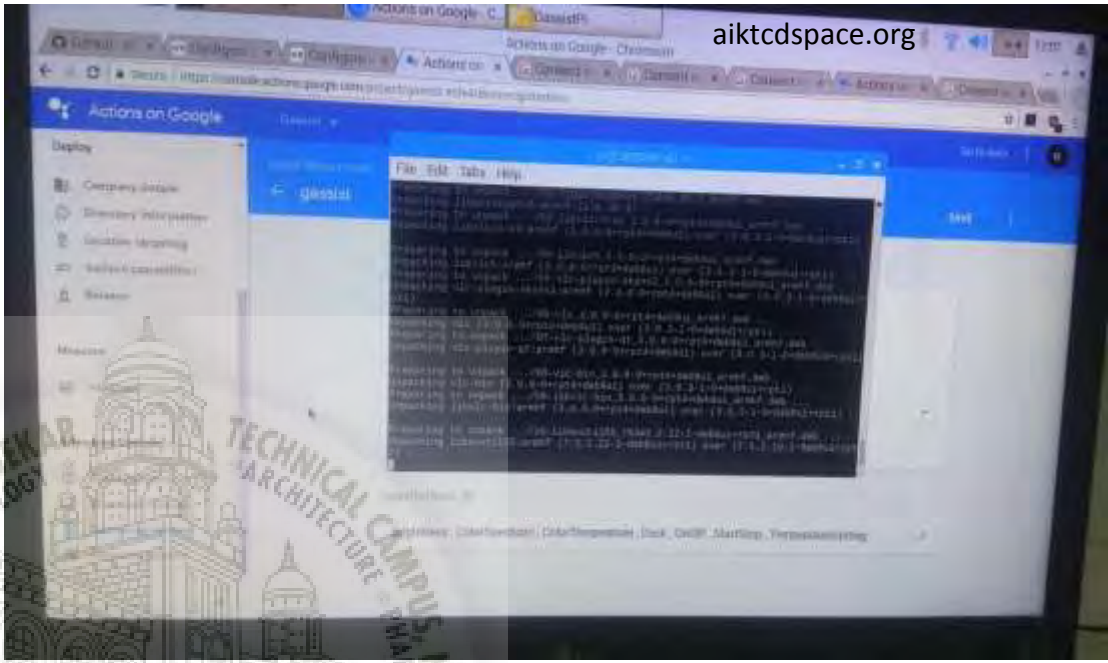
With a simple voice command, play music, podcasts and radio, or stream videos to your TV with Chromecast.

**❑MANAGE TASKS**

With your permission, your Assistant can add items to your shopping list and stock up on essentials. Set alarms, manage your calendar, and make calls hands free.

# How AI works

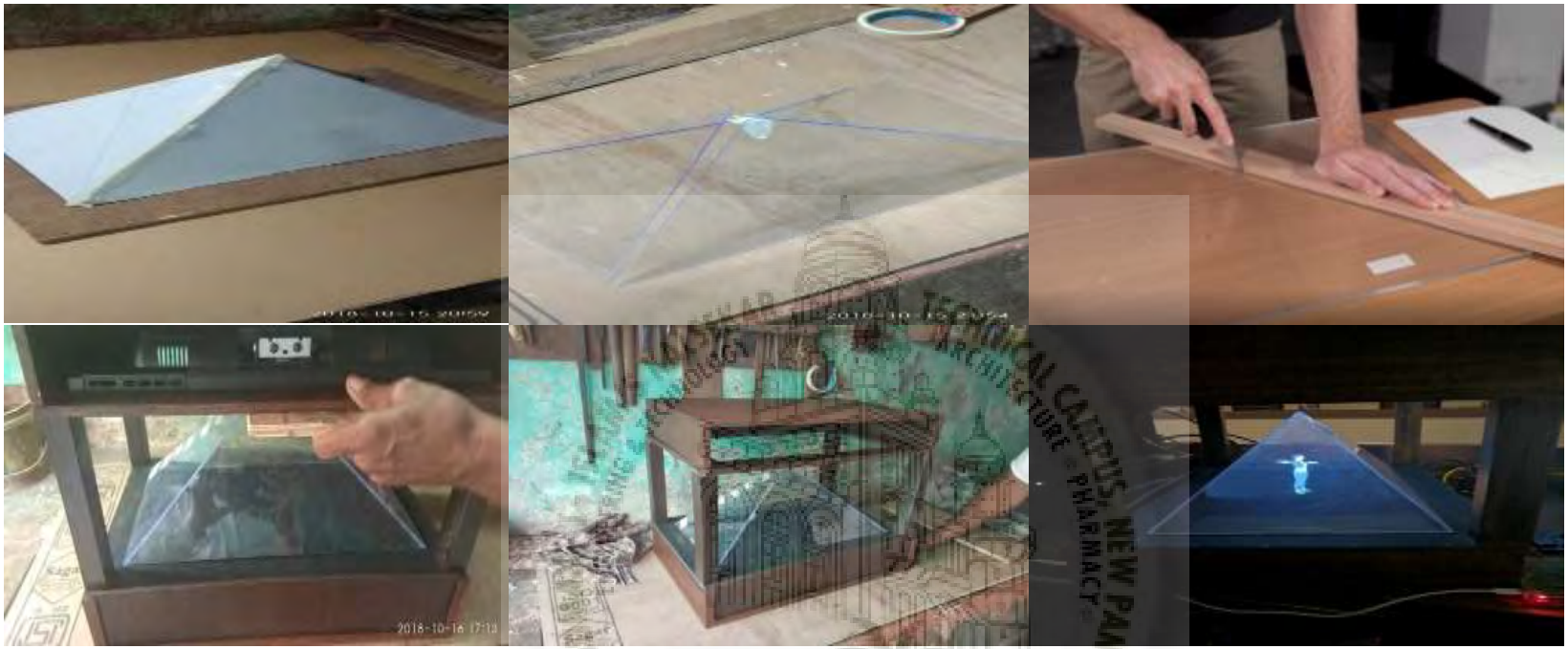
*(All features are applicable to all boards, unless and otherwise mentioned)*




1. Headless auto start on boot.
2. Voice control of GPIOs without IFTTT, api.ai, Actions SDK (Only for Raspberry Pi Boards - non OSMC).
3. Voice control of NodeMCU without IFTTT and MQTT.
4. Radio streaming.
5. Voice control of servo connected to RPi GPIO (Only for Raspberry Pi Boards - non OSMC).
6. Safe shutdown RPi using voice command.
7. Stream Music from YouTube.
8. Indicator lights for assistant listening and speaking events.
9. Startup audio and audio feedback for wakeword detection.
10. Pushbutton service to stop Music or Radio playback.
11. Parcel tracking using Aftership API.
12. RSS Feed streaming.
13. Control of Kodi or Kodi Integration.
14. Streaming music from Google Play Music.
15. `Casting of YouTube Videos to Chromecast and ` Chromecast media control by voice.
16. Voice control of Radio/YouTube/Google Music volume ` levels.
17. Control Sonoff Tasmota Devices/Emulated Wemo.
18. Track Kickstarter campaigns.
19. Emulated Philips Hue HUB service and control of ` ` Emulated Hue Lights.

20. Search recipes and get push message of ingredients and link to recipe.
21. Remote control of Magic Mirror.
22. Sending voice messages from the phone to the raspberry.
23. Play your Spotify playlist.
24. Custom wake word activation for all Pi boards.
25. Mute microphones to prevent listening to Ok-Google hotword (Only Raspberry Pi Boards - ` non OSMC).
26. Create custom conversations.
27. Control of lights added to Domoticz.
28. Stream music from Gaana.com.
29. Stream your playlist from Deezer.
30. Custom actions in French, Italian, German, Dutch and Spanish.
31. Send commands over MQTT to the Google Assistant (Only Armv7 boards).
32. Control Assistant using IR Remote (Only Raspberry Armv7 boards).
33. Send Voice Messages from the SBC to the Mobile using Pushbullet (Only Armv7 boards).
34. Send Click tell SMS messages.
35. CES 2019 Like Live Translator or Interpreter (Needs Cloud Speech).
36. Control Demoticz, Son off devices from other assistant devices.

# Hardware and Essential materials used :



1. **Plexi glass for 3d Projection**
2. **Lcd Display**
3. **Wooden cabinet**
4. **Supply cable**
5. **Microcontroller (Arduino UNO)**
6. **USB Mic**

# This is how Our Hardware model looks

# Limitations of Our Project :

- Required Powerful System Configuration which is not available
- No availability of graphic card
- The Assets are Paid on Unity
- There is no Open forum and Community available
- The Communication protocol are paid
- There is no proper platform to learn & get guidance for Unity & Blender
- Problem in Interfacing Unity and Blender
- Rendering Problem

# Reference :


- **Full Parallax Holographic Light-Field 3D Displays and Interactive 3-D**

- **TABLE TOP ELECTRONICS HOLOGRAPHIC DISPLAY SATISFYING STEREOPSIS ALONG 360 DEGREE By Keehoon Hong, Yongium Lim, Hayan Kim, Minsik Park, Jinwoong Kim**

- **Digital Holography Research Section, Electronics Telecommunication Research Institute, Yuseonggu, Daejeon, 34129, Korea.**

- **https://www.euclideonholographics.com/**

**Bio: After over 20 years of development in 3D graphics engines**

# Thank You

# Contents

## LIST OF FIGURES

# Chapter 1 : Introduction

## 1.1 HISTORY OF HOLOGRAPH

**Figure 1.1: Holograph**

Holography dates from 1947, when British (native of Hungary) scientist Dennis Gabor developed the theory of holography while working to improve the resolution of an electron microscope.Gabor coined the term hologram from the Greek words holos, meaning ”whole,” and gramma, meaning ”message”. Further development in the field was stymied during the next decade because light sources available at the time were not truly ”coherent” (monochromatic or one-color, from a single point, and of a single wavelength). This barrier was overcome in 1960 by Russian scien- tists N. Bassov and A. Prokhorov and American scientist Charles Towns with the invention of the laser, whose pure, intense light was ideal for making holograms. In that year the pulsed-ruby laser was developed by Dr. T.H. Maimam. This laser system Leith(unlike the continuous wave laser normally used in holography) emits a very powerful burst of light that lasts only a few nanoseconds (a billionth of a sec- ond). It effectively freezes movement and makes it possible to produce holograms of high-speed events, such as a bullet in flight, and of living subjects. The first holo- gram of a person was made in 1967, paving the way for a specialized application of holography: pulsed holographic portraiture.

In 1962 Emmett Leith and Juris Upatnieks of the University of Michigan rec- ognized from their work in side-reading radar that holography could be used as a 3-D visual medium. In 1962 they read Gabor’s paper and ”simply out of curiosity” decided to duplicate Gabor’s technique using the laser and an ”off-axis” technique borrowed from their work in the development of side-reading radar.

The result was the first laser transmission Upatnieksholo gram of 3-D objects (a toy train and bird). These transmission holograms produced images with clarity and realistic depth but required laser light to view the holographic image. Their pioneering work led to standardization of the equipment used to make holograms. Today, thousands of lab- oratories and studios possess the necessary equipment: a continuous wave laser, op- tical devices (lens,

mirrors and

beam splitters) for directing laser light, a film holder and an isolation table on which exposures are made. Stability is absolutely essen- tial because movement as small as a quarter wave-length of light during exposures of a few minutes or even seconds can completely spoil a hologram. The basic off- axis technique that Leith and Upatnieks developed is still the staple of holographic methodology.

DenisyukAlso in 1962 Dr. Yuri N. Denisyuk from Russia combined holography with 1908 Nobel Laureate Gabriel Lippmann's work in natural color photography. Denisyuk's approach produced a white-light reflection hologram which, for the first time, could be viewed in light from an ordinary incandescent light bulb.

Another major advance in display holography occurred in 1968 when Dr. Stephen

A. Benton invented white-light transmission holography while researching holo- graphic television at Polaroid Research Laboratories. This type of hologram can be viewed in ordinary white light creating a "rainbow" image from the seven colors which make up white light. The depth and brilliance of the image and its rainbow spectrum soon attracted artists who adapted this technique to their work and brought holography further into public awareness.

Benton's invention is particularly significant because it made possible mass pro- duction of holograms using an embossing technique. These holograms are "printed" by stamping the interference pattern onto plastic. The resulting hologram can be duplicated millions of times Bentonfor a few cents apiece. Consequently, embossed holograms are now being used by the publishing, advertising, and banking indus- tries.

In 1972 Lloyd Cross developed the integral hologram by combining light transmission.
holography with conventional cinematography to produce moving 3- dimensional images.
Sequential frames of 2-D motion-picture footage of a rotating subject are recorded on
holographic film. When viewed, the composite images are
synthesized by the human brain as a 3D image.

## 1.2 INTRODUCTION TO HOLOGRAPH

The commonly and widely used way of imaging of the reality is the photography. A photograph is basically the recording of the differing intensities of the light reflected by the object and imaged by a lens. However, information about dimensions of the object contained not only in amplitude (intensity), but also in a phase of light waves. A great difference between holography and photography is the information recorded. This difference is why photographs are two dimensional (2-D) images while holograms are three dimensional (3-D) images. Photographs contain only one view point of an object. Our eyes need a minimum of two view points in order to see depth. Vision using two viewpoints of an object is called stereoscopic vision. Each eye receives a slightly different view point of an object, our brain combines the two and we perceive depth. We can fool our eyes into seeing photographs in three dimensions by taking two slightly different views of an object and allowing each eye to see only one image, the right image for the right eye and the left image for the left eye. We can do this with a stereoscope (for pictures) or with polarized glasses (for movies). The shortcoming of stereoscopic images is that when we move our head from side to side or up and down, we still only see the same two view points, whereas we should be seeing continuously changing viewpoints of the object. The image therefore doesn't quite appear to be three dimensional. In order to make a record of a three dimensional object we need to record this continuous set of View points of the object.

Estimating sizes of the objects and considering shape and direction of shadows from these objects, we can create in our mind general representation about volumetric properties of the scene, represented in a photo. But, if sizes of the objects are identical and there are no shadows, volumetric content of the photographed scene is completely lost. For example, we can not define in the photo of snowflakes on a dark background, which of them is closer, and which of them is farther.

Holography is the only visual recording and playback process that can record our three-dimensional world on a two-dimensional recording medium and playback the original object or scene to the unaided eyes as a three dimensional image. The image demonstrates complete parallax and depth-of-field and floats in space either behind, in front of, or straddling the recording medium.

### 1.2.1 NEED OF HOLOGRAPH

Machine Learning is a field which is raised out of Artificial Intelligence(AI). Ap- plying AI, we wanted to build better and intelligent machines. But except for few mere tasks such as finding the shortest path between point A and B, we were unable to program more complex and constantly evolving challenges. There was a realisa- tion that the only way to be able to achieve this task was to let machine learn from itself. This sounds similar to a child learning from its self. So machine learning was developed as a new capability for computers. And now machine learning is present in so many segments of technology, that we dont even realise it while using it.[3]

Finding patterns in data on planet earth is possible only for human brains. The data being very massive, the time taken to compute is increased, and this is where Machine Learning comes into action, to help people with large data in minimum time.[3]

If big data and cloud computing are gaining importance for their contributions, machine learning as technology helps analyse those big chunks of data, easing the task of data scientists in an automated process and gaining equal importance and recognition.[3]

The techniques we use for data mining have been around for many years, but they were not effective as they did not have the competitive power to run the algo- rithms. If you run deep learning with access to better data, the output we get will lead to dramatic breakthroughs which is machine learning.

## 1.3 INTRODUCTION TO UNITY


**Figure 1.2: Unity**

Unity 3D is a cross platform game development tool. Unity Game Engine is easy to install and it is free so it can be installed either on MAC or Windows. With unity 3D it is possible to make AR, VR app projects. It was first introduced in 2005. Compared to other game engines like cry engine and Unreal Engine, unity3D is basically more developer friendly. Companies like miniclip also uses unity3D game Engine. With unity 3D it is possible to make high quality 3D and 2D games for almost any platforms.

Unity framework is built with C++ Language users can interact with the engine with Javascript, C, BOO language. It is not open source. Unity gives their own advertising and storage support which is based on cloud. It has large number of API set and Library functions which can be easily used for development purpose. It also gives shader supports so graphics looks so beautiful and accurate. It basi- cally supports 20 different platforms Like Android, Windows, Mac, Linux, Xbox, PlayStation, iOS, but also the Windows phone, WiiU, PS Vita, Android TV, and of course, all of the current VR platforms.

Unity is consistently updating their software so it can be more developer friendly so that developers can make more user friendly good video games. It gives multi- player support also. Basically it is a complete Game engine for developers as it has many features.

Shader which is used to make graphics more realistic. OpenGL OpenGL replaces flash and other platforms. Multiplayer support : It gives multiplayer support. Sprite Editor With unity sprite editor it is so easy to use sprite images. I dont think unity has any kind of lacking as prior it used to support FLASH but flash technology is not used anymore so unity removed flash feature . Unity Developers interface is actu- ally light black which enables developer to focus on exact things. Prefebs , models, scripts can be separated on each folders. User Interface It can be modified as per developers wish. So , For all this reasons I think Unity 3d is a complete Game Engine.

Original objects, perfabs, and Instances In Unity it's very important to realize what state an object within the scene is in. Many new developers will create an object for thier game, drop it into the scene, change it in some way, and then wonder why those changes are not being applied to further copies of that object created within the scene. You can divide all (placeable) objects in Unity into 3 basic categories. The source asset of the object, the prefab based on the

source asset, and the instances of that prefab. Let's try to summarize the qualities of each form that an asset can exist in. Source Assets

- are found in the Asset Library.
- are not placed directly into the game scene.
- are the basis of Prefabs (which can be placed into the game scene) and can be seen by "extending" the prefab (using the arrow icon seen on the right side of the prefab icon in the library). Prefabs...
- are found in the Asset Library.
- is the source of each instance of that object within the scene.
- can have their properties changed in the inspector window (which will change all instances that stem from that prefab). Instances...
- are shown in the scene window and listed in the hierarchy window.
- is the source of each instance of that object within the scene.
- are shown as blue in the Hierarchy window (as opposed to white "unique" objects Essentially it's important to realize that instances used within your scene, if changed, will have thier own settings different then the prefab they are based on. It can be somewhat confusing at first, but just remember to look at the actual words that make up properties in the inspector, should you want to see which properties have been changed. Property names in instances that have become boldedare properties that have been changed for that specific instance. This means that if you go back and change that same property in the original prefab then that instance will retain that particular property.

## 1.4 INTRODUCTION TO ARDUINO and SERIAL COM


**Figure 1.3: Arduino uno**

The Arduino UNO is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc.[2][3] The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.[1] The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable.[4] It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts.

Technical specifications[edit]

- Microcontroller: Microchip ATmega328P [7]
- Operating Voltage: 5 Volts
- Input Voltage: 7 to 20 Volts
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6
- DC Current per I/O Pin: 20 mA
- DC Current for 3.3V Pin: 50 mA
- Flash Memory: 32 KB of which 0.5 KB used by bootloader
- SRAM: 2 KB
- EEPROM: 1 KB
- Clock Speed: 16 MHz
- Length: 68.6 mm

# Chapter 2 Literature

# Survey

## 2.1 PAPERS REFERED

We refered the following papers while developing the project 1.

### Paper 1

#### Title

TABLE TOP ELECTRONICS HOLOGRAPHIC DISPLAY SATISFYING STERE- OPSIS ALONG 360 DEGREE

By Keehoon Hong, Yongium Lim, Hayan Kim, Minsik Park, Jinwoong Kim Digital Holography Research Section, Electronics Telecommunication Research Institute, Yuseonggu, Daejeon, 34129, Korea.

#### Outcomes

we have implemented a table top electronic holographic display which sat- isfies stereopsis along 360 degree, the time division multiplexing of viewing windows by rotating the holographic projection system.Each viewing window on the circumferential viewing zone provides different prospective holograph images corresponds to its position, and thus the observer can the stereoscopic holograph.

### 2.Paper 2

#### Title

Recent progress on holographic 3D display at Beijing Institute of Technology Juan liu, Gaolei Xue, and Yongtian Wang Beijing Institute of Technology Bei- jing, China wyt@bit.edu.cn

#### Outcomes

In this recent work including compressive holographic 3D display, multiplex- ing encoding method for full-color holographic display, the medium for holo- graphic 3D display and occlusion culling method are presented. There are still many problems associated with the holographic display technology need to be studied. With the rapid development of computer, photoelectronic and display technologies, it is possible to realize real-time and dynamic full-color holo- graphic 3D display soon.

## 3.Paper 3

### Title

Artificial Intelligence and Human Thinking Robert Kowalski Imperial College London United Kingdom rak@doc.ic.ac.uk

### Outcomes

In this paper there are two ways in which the ALP agent model, building upon many different developments in Artificial Intelligence, can be used by ordinary people to improve their own human intelligence. It can help them express their thoughts more clearly and coherently, and it can help them make better choices. I believe that the application of such techniques is a fruitful direction of research for the future, and a promising area for collaboration between researchers in AI and researchers in more humanistic disciplines implementation project based on Vuforia and Rawajali is designed. The Vuforia uses image recognition to trace and register image marker, the Rawajali manages and uses 3D model flexibly. This paper proposes an application framework, the function of system core class and application workflow. The test result shows that the project has the strong availability and applicability, at the same time, it owns good application foreground. The Heart Rate and Beat Monitor is an easy to use .

## 4. Paper 4

### Title

Artificial Intelligence Revolution and Indias AI Development: Challenges and Scope Harjit Singh Neighbourhood Campus Dehla Seehan, Punjabi University, Patiala, Punjab, India

### Outcomes

In This paper discusses recent advancements in AI at global level and their im- pact on global as well as local levels. In politics, AI is experimented by Barack Obama, Narendera Modi, Hillery Clinton and Donald Trump and they found it very useful technology. The use of AI helped to better use of resources, energy and time in the election campaign to reach the target audience. The high com- puting power is used to analyze public opinion and the nature of voters across all regions perfectly. In the recent US presidential elections, AI is used in jour- nalism up to the mark. AlphaGo an AI based machine developed by Google DeepMind, created a history in the recent months by defeating the world cham- pion of Chinese ancient board game Go. Use of machine intelligence to capture user interests and online behavior is very common now on the web. Information is extracted from the data to make an intelligent guess to display advertisements of products that are of interest to the user

## 5. Paper 5

### Title

Implementation of Mobile Augmented Reality Based on Vuforia and Rawajali Cheng Xiao, Zhang Lifeng School of Information Science and Technology, Jiu-
jiang University Jiujiang, Jiangxi Province, China 410290@qq.com, 12437234@qq.com

### Outcomes

This paper proposes an implementation project of Mobile Augmented Reality. First use camera of smart phone to collect image information in real world; sec- ond, recognize image with Qualcomm Vuforia technology on Android platform; third, handle the 3D model with Rawajali framework technology; at last, display that the virtual world and real world fuse together on the screen. This project is practical and has a good prospect of application. It will be used as the foundation of guide tour of Bailudong Academy game software.

# Chapter 3

# Software Requirements Specification

## 3.1.1UNITY

## 3.1.1 UNITY 3D

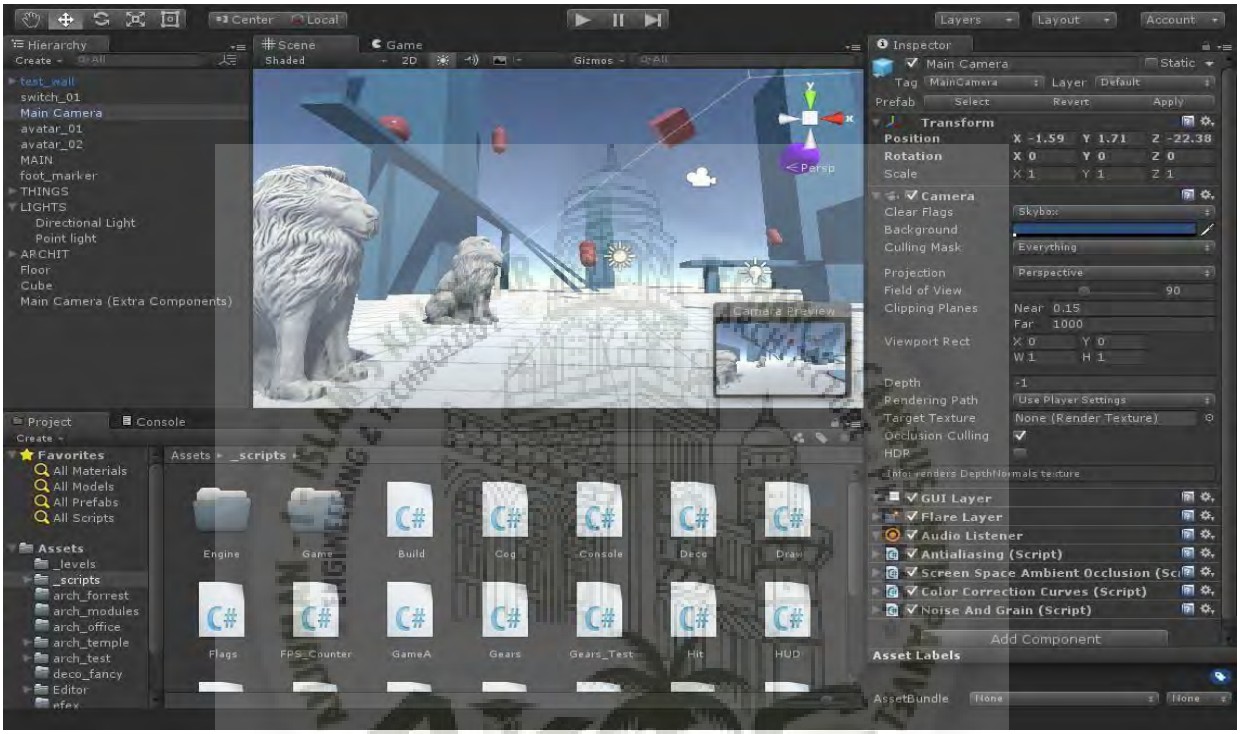



**Figure 3.1: UNITY IMAGE**

In the area of geographic information system, there are always two methods to get 3D virtual reality, one is to use a 2D professional platform such as ArcGIS software to get the virtual reality by secondary development, the other is to use a 3D or 2.5D software as a platform for development, such as the Skyline software. In this paper, we will use a different platform, Unity3D, which is usually treated as game devel- opment software, as a virtual reality development platform. Firstly, the hierarchical approach of geographic information system is adopted in the study area, and thearea

is divided into four layers: Terrain Layer, Building Layer, Transport Layer, Vegeta- tion Layer, additionally, the raw data of Terrain Layer is obtained by GPS measure- ments. Secondly, all the geographical entities which related to different layers are converted to 3D model by AutoCAD and 3dsMax software. Thirdly, the 3D mod- els are 5 imported into the Unity3D, and programming with Javascript language in Visual Programming Language Editor in order to achieve Gameobjects and Scenes. Lastly, the Scenes are integrated and published on the network. The attribute data of study area is stored by MySQL which is connected with Unity game platform by ex- ternal interface. Visitors can download the ActiveX control to browse the study area, the scene is keep on updating 60 times per second, the viewer will subconsciously input and immediately immersed in the virtual scene for spontaneous exploration and observation. With a full range of personalized mode of operation, the users can choose their own way to browse and participate in the virtual reality, and give full play to their imagination according to their own wishes without affecting the others by using the designated keys on the keyboard

### 3.1.2 BLENDER

**Fig 3.1.2**

Blender is the free and open source 3D creation suite. It supports the entirety of the 3D Model Pipeline modeling, rigging, animation, simulation, rendering, compositing and motion A-I tracking, even video editing and game creation. Advanced users employ Blender's API for a Python scripting to customize the application and write specialized tools; often these are are included in Blender's future releases. Blender is well suited to individuals and small studios who benefit from its unified pipeline and responsive development process.

Blender is an all-in-one 3D software that can be used to model, sculpt, texture, animate, camera track, render, and composite awesome looking graphics from start to finish. The best part? It's free for everyone! Free often means low quality, but thankfully that's not the case with Blender. It was written in 1995 by Ton Roosendaal as an in-house software for a Dutch animation studio called NeoGeo. It was originally sold to other studios as well, but in early 2002 Blender needed to be shelved due to economic decline. To keep his

project alive, Roosendaal convinced investors to convert Blender to a GNU General Public License by raising €100,000 in only seven weeks. Blender has been free ever since, and is continually being developed thanks to generous donations
from the community. I started using Blender in
2011 because, like most people, I like free things. I stuck with it over time thanks to its awesome community. I have consumed so much free learning material, benefited from helpful in-depth
critiques on forums, and been motivated by the many contests. Thanks to Blender and its community I've been able to make some crazy artwork and meet new friends along the way

### 3.1.3 PINGPONG (GAME DEVELOPMENT )

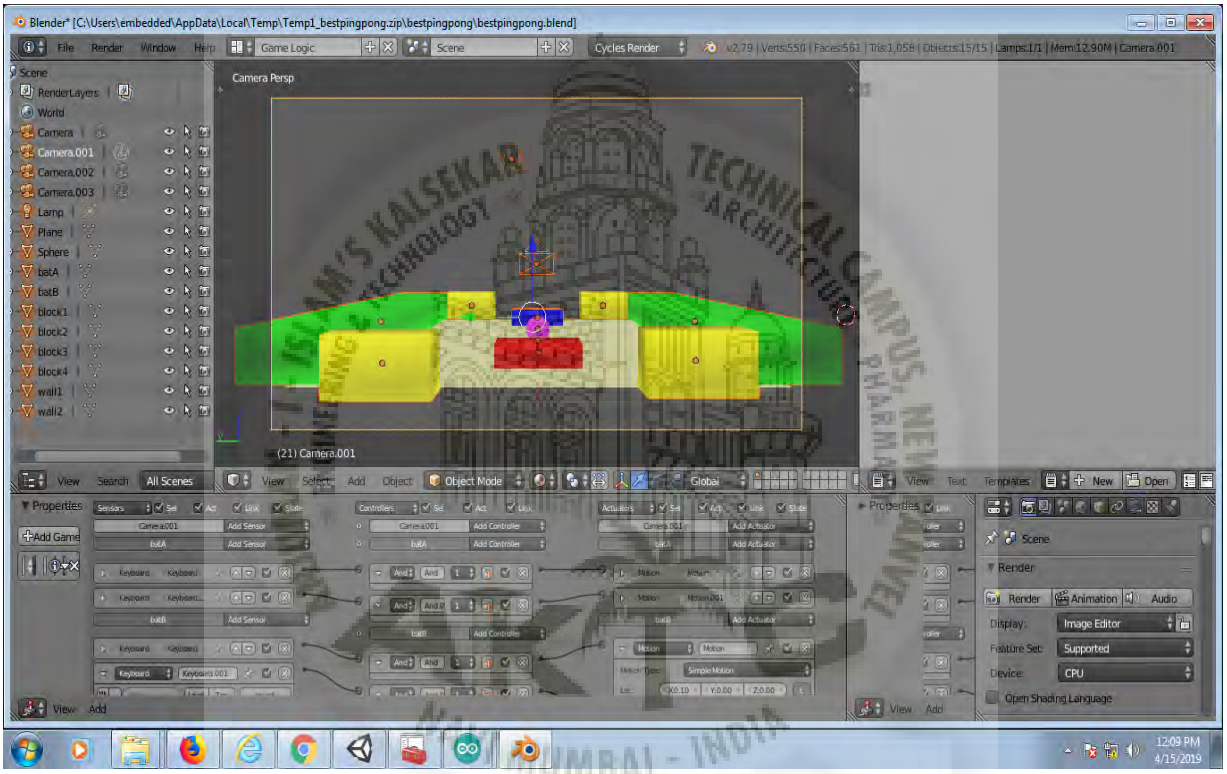



Fig 3.1.3.1

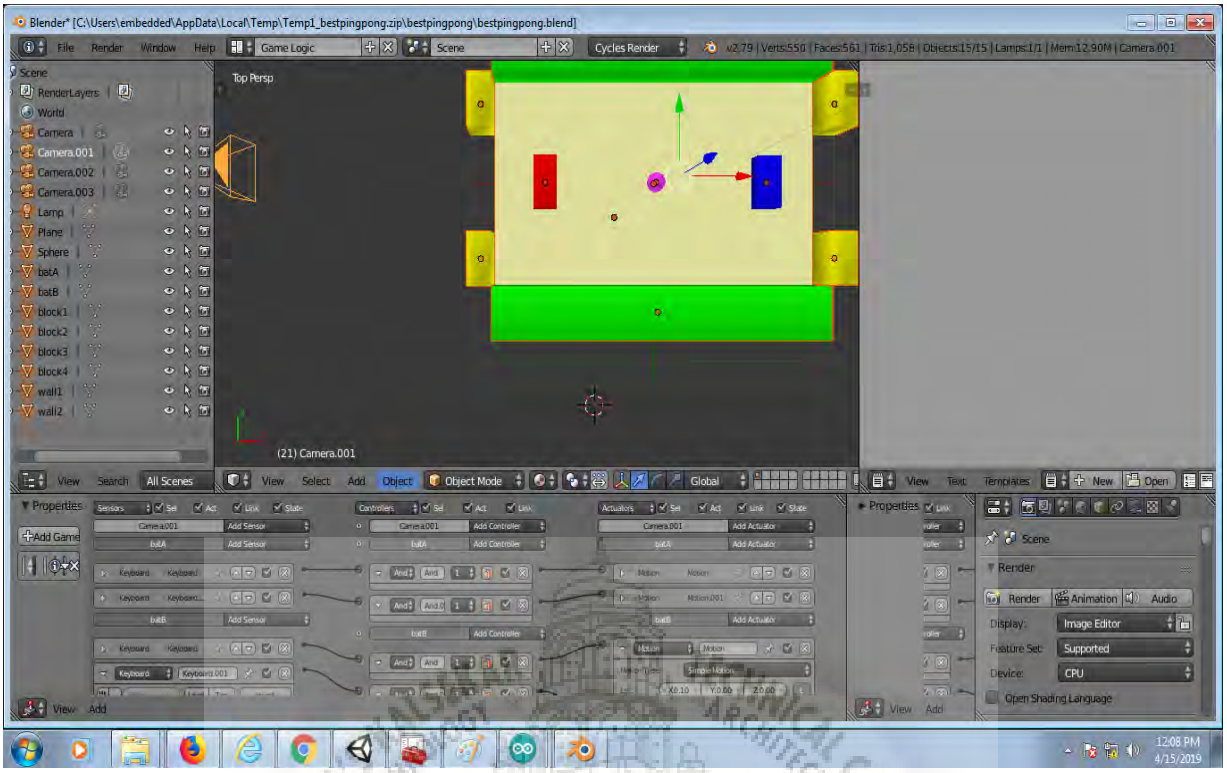



Fig 3.1.3.2

Blender is a complete game engine, allowing you to create a fully functional 3d game right inside Blender.

The game engine includes:

- Ability to port your models to any third-party game engine
- Create or code your own game logic
- Full Bullet Physics integration
- Python scripting API for advanced control and AI
- Support for all OpenGL™ dynamic lighting, toon shading, animated materials as well as Normal and Parallax Mapping
- Playback of games inside Blender without compiling or preprocessing
- 3D spatial audio using OpenAL
- Pingpong game is developed on Blender using the rigid body
- The ball output surface is made hard

# 3.2 ARTIFICIAL INTELLIGENCE

## 3.2.0 ARTIFICIAL INTELLIGENCE

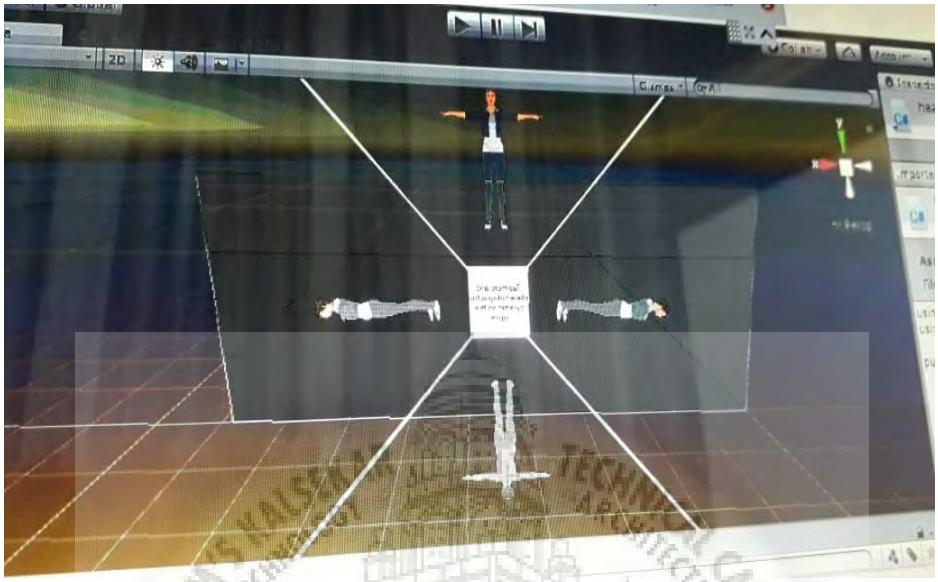


**Figure 3.2: A I**

Artificial Intelligence is the ability to think, to understand, to recognize patterns, to memorize,to make choice from alternatives and to learn from experience. Artificial Intelligence is to make replica of human brains capabilities so that the computers start doing all those activities that the human is doing and in much less time. The recent developments in AI affected politics, journalism, games and public life. In politics the use of AI helped to better use of resources, energy and time in the election campaign to reach the target audience.

The high computing power is used to analyze public opinion and the nature of voters across all

regions perfectly. There is a concern that political use of AI is increasing negative aspects in modern poli- tics by promoting wrong criticism of opposition, spreading falsehoods, raise social

anxiety and encourage racial intolerance. In journalism, bots are performing very well in converting raw data into narrative text with much speed and efficiency. In the recent US presidential elections, AI is used in journalism up to the mark. In games, AlphaGo an AI based machine developed by Google DeepMind, created a history in the recent months by defeating the world champion of Chinese ancient board game Go.

The life of people is directly or indirectly affected by AI. The smart phones now provide intelligent keyboards which are able to anticipate the next words while typing some text that reduces the burden of typing all the text. Use of machine in- telligence to capture user

interests and online behavior is very common now on the web. Information is extracted

from the data to make an intelligent guess to display advertisements of products that are of interest to the user. Similar to other products of globalization, AI in India is also a side product of globalization, which is becom- ing widely available without much political consideration.

India is lagging behind in the developments of AI as compared to other nations like US and China. The quite emergence of AI applications in India is not noticed by its policymakers in Govern- ment. To take full benefits of AI revolution there must be policies for AI innovation and adaptation in Government and public sectors. India must establish regional in- novation centers in association with universities and private start-ups for manufac- turing robotics and developing automation. A. Narrow AI Concept is based on the fact that the technology can make machines intelligent. We can make machines to think so that they can do more than just following the instructions step by step.

But these thinking features also need to be programmed in advance. A very simple In- ternational Journal of Scientific Research in Science, Engineering and Technology (ijsrset.com) 418 example is solving Tower of Hanoi problem. The problem is to move some different sized disks arranged in ascending order of size from one pole to another using temporary pole in such a way that only one disk can be moved at a time and a bigger disk cannot be placed on a smaller disk. The problem is so diffi- cult for human that as the number of disks are increased, it becomes impossible for a human to solve the problem. But when proper program (using recursive logic) is fed. into the computer, it can solve the problem in seconds and can specify all the moves from each pole to each other pole. It proves and amazing strength of programmed intelligence. Another example is chess playing with computer. Not all the moves are programmed step by step, but the programs are made in such a way that they extend their capabilities beyond what is programmed. So, Narrow AI is the capabil- ity of a machine to perform activities similar to a human but for a specific domain. In that context for which intelligence is developed, it can perform very intelligently but outside that context it is nothing. B. Broad AI Concept is based on the fact that machines could have human level intelligence and they can perfectly perform their activities like human beings. The possibility to design and develop machines in such a way that they can think, they can have reasoning ability and they can do each and every thing that human can do. It means they may be able to program themselves and others. But as expected by the program of AI, current research is far from these expectations and also it is a debate that whether it is possible.

### 3.2.2 DUCK DUCK GO


**Figure 3.2.2 DUCK DUCK GO**

DuckDuckGo(DDG) is an Internetsearch enginethat emphasizes protecting searchers' privacyand avoiding thefilter bubbleof personalized search results.DuckDuckGo dis- tinguishes itself from other search engines by not profiling its users and by deliber- ately showing all users the same search results for a given search term, and empha- sizes returning the best results, rather than the most results, generating those results from over 400 individual sources, including crowdsourced sites such asWikipedia, and other search engines likeBing,Yahoo!, and Yandex In September 2018, it had 27,092,618 daily direct searches on average. The company is based inPaoli, Pennsyl- vania, inGreater Philadelphia, and has 53 employees. The company name is a refer- ence to the children's gameduck, duck, goose. Some of DuckDuckGo'ssource code- isfree softwarehosted atGitHubunder theApache 2.0 License,but the core ispropri- etary. The company registered the domain namesddg.ggon February 22, 2011, and- ddg.coon September 20, 2013, which are used as shortened URL aliases that redi- rect toduckduckgo.com. On September 18, 2014,Appleincluded DuckDuckGo its Safari browser as an optional search engineOn November 10, 2014,Mozillaadded DuckDuckGo as a search option toFirefox 33.1 On May 30, 2016,The Tor Project, Incmade DuckDuckGo the default search engine forTor Browser6.0.

Features of DuckDuckGo DuckDuckGo's results are a compilation of "over 400"

sources, includingYahoo! Search BOSS;Wikipedia;Wolfram Alpha;Bing; its ownWeb crawler(theDuckDuckBot); and others.It also uses data fromcrowdsourced- sites, including Wikipedia, to populate ”Zero-click Info” boxes grey boxes above the results that display topic summaries and related topics. DuckDuckGo positions itself as a search engine that puts privacy first and as such it does not store IP ad- dresses, does not log user information, and uses cookies only when required. Wein- berg states: ”By default, DuckDuckGo does not collect or share personal informa- tion. That is our privacy policy in a nutshell.” However, they do maintain logs of all search terms used. Weinberg has refined the quality of his search engine results by deleting search results for companies he believes arecontent mills, likeDemand Me- dia’seHow, which publishes 4000 articles per day produced by paid freelance writ- ers, which Weinberg says is, ”...low-quality content designed specifically to rank highly in Google’s search index.” DuckDuckGo also filters pages with substantial advertising. Instant Answers In addition to the indexed search results, DuckDuckGo displays relevant results, called Instant Answers, on top of the search page. These Instant Answers are collected from either 3rd party APIs or static data sources like text files. The Instant Answers are calledzeroclickinfobecause the intention behind these is to provide what the user is searching for on the search result page itself so that the user does not have to click any results to find what they are looking for. As of August 9, 2018, there are 1231 Instant Answers active. The Instant Answers are open source.They are maintained on GitHub and anyone can build or work on them. Tor hidden service In August 2010, DuckDuckGo introduced anonymous searching, including an exit enclave, for its search engine traffic usingTor networkand enabling access through aTor hidden service. This allows anonymity by routing traffic through a series of encrypted relays. Weinberg stated: ”I believe this fits right in line with our privacy policy. Using Tor and DDG, you can now be end to end anonymous with your searching. And if you use our encrypted homepage, you can be end to end encrypted as well. Voice search In 2011, DuckDuckGo introduced voice search for users of theGoogle Chromevoice searchextension.

Bangs DuckDuckGo includes ”!Bang” keywords, which give users the ability to search on specific third-party websites using the site’s own search engine if appli- cable. As of October, 2018. 11,414 ”bangs” for a diverse range of Internet sites are available. Privacy browser DuckDuckGo has a mobile app available foriOSandAn- droidthat forces websites to useHTTPS, blocks web trackers, and rates sites based on their privacy practices.The service, released in January 2018, is also available as a browser extension forGoogle Chrome,Mozilla Firefox, andApple Safari Busi- ness model DuckDuckGo earns revenue by serving ads from the YahooBing search alliance network, and through affiliate relationships with Amazon and eBay

### 3.2.3 HEART SENSOR & HEALTH MONITORING

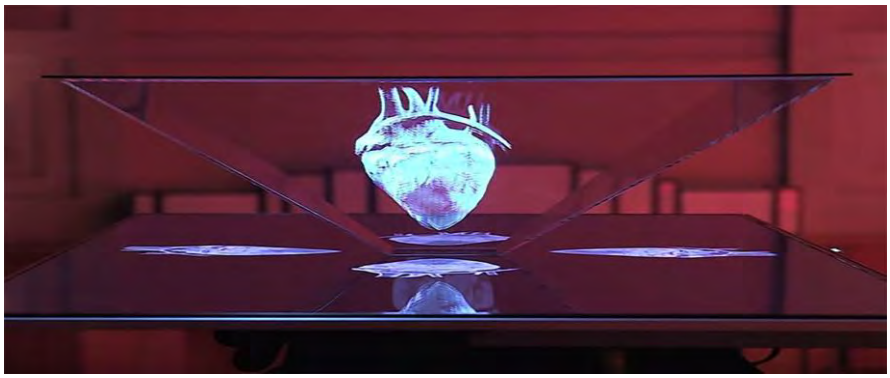


**Figure 3.3.1: Health monitor**

Due to the limits of large computer and head mounted personal display systems, augmented reality technology is applied in limited area scene. With the development of smart phone technology, augmented reality technology is applied to a broader range. Aim to application of mobile augmented reality, an implementation project based on Vuforia and Rawajali is designed. The Vuforia uses image recognition to trace and register image marker, the Rawajali manages and uses 3D model flexibly. This paper proposes an application framework, the function of system core class and application workflow. The test result shows that the project has the strong availability and applicability, at the same time, it owns good application foreground. The Heart Rate and Beat Monitor is an easy to use script that will add the heart monitor to your games and projects. This C script is very easy to use and can be implemented in just a few clicks. The script should also be compatible and performance friendly with all of the platforms supported by Unity3D.

Features

- Full support for Unity 3.5 and Unity 4+ (Free and Pro).
- Use to show your players health and damage.
- Control the heart rate.
- Activate the ”Flatline” when your player is dead.
- Heart blip and monitor line fade out nicely.
- Colour heart line depending on player health.
- Full sound effects can be turned on if required.
- Control the size and positioning.
- Clean, short and simple C code.
- No external DLLs or external resources.
- Full documentation included

## HEART SENSOR (MAX3010000

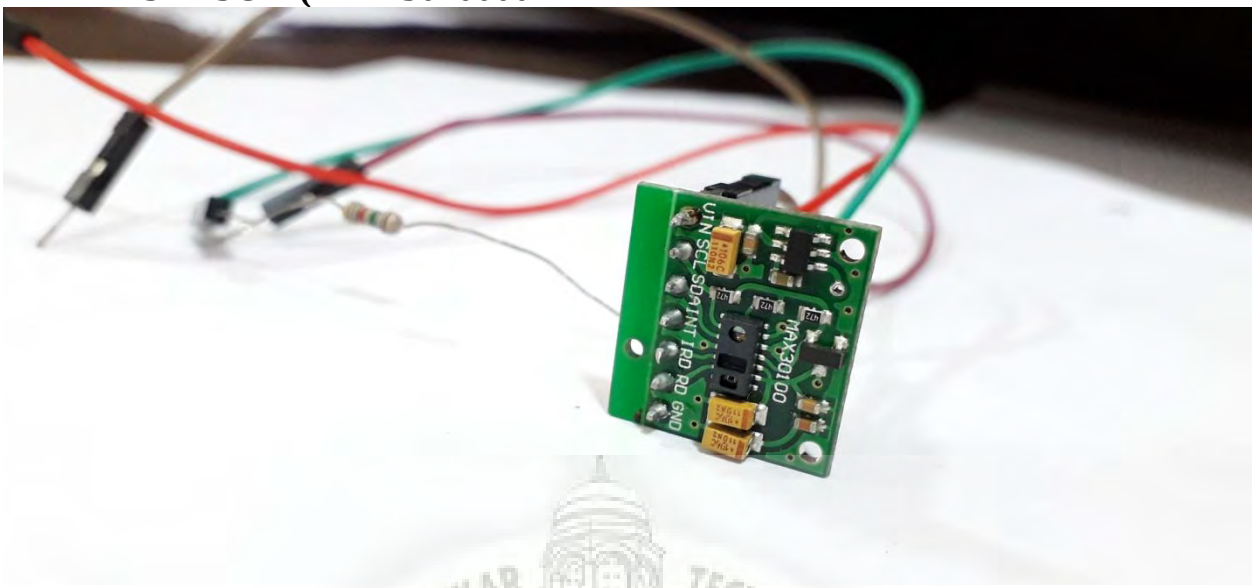



Fig3.3.2

The MAX30100 is an integrated pulse oximetry and heart-rate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals.

The MAX30100 operates from 1.8V and 3.3V power supplies and can be powered down through software with negligible standby current, permitting the power supply to remain connected at all times.

### Key Features

- Complete Pulse Oximeter and Heart-Rate Sensor Solution Simplifies Design
  - Integrated LEDs, Photo Sensor, and High-Performance Analog Front-End
  - Tiny 5.6mm x 2.8mm x 1.2mm 14-Pin Optically Enhanced System-in-Package
- Ultra-Low-Power Operation Increases Battery Life for Wearable Devices
  - Programmable Sample Rate and LED Current for Power Savings
  - Ultra-Low Shutdown Current (0.7µA, typ)
- Advanced Functionality Improves Measurement Performance
  - High SNR Provides Robust Motion Artifact Resilience
  - Integrated Ambient Light Cancellation
  - High Sample Rate Capability
  - Fast Data Output Capability

## Functional Diagram

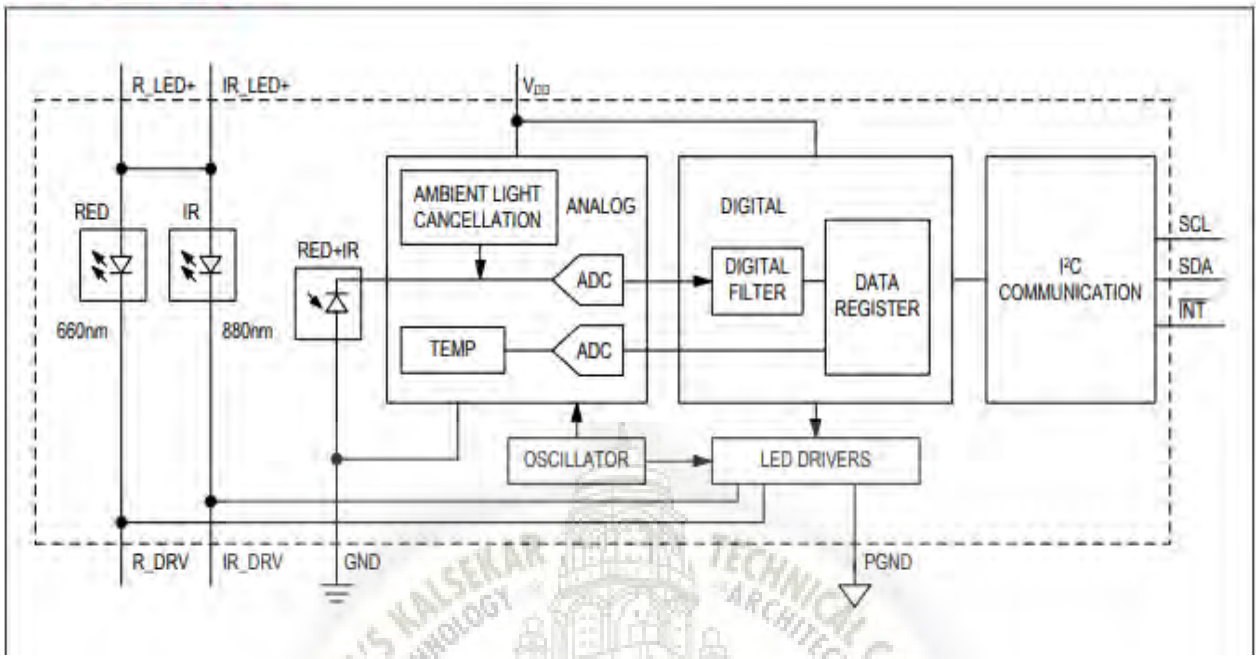



Fig 3.3.3

# Chapter 4 System Design

## 4.1 Block Diagram of HOLOGRAPH

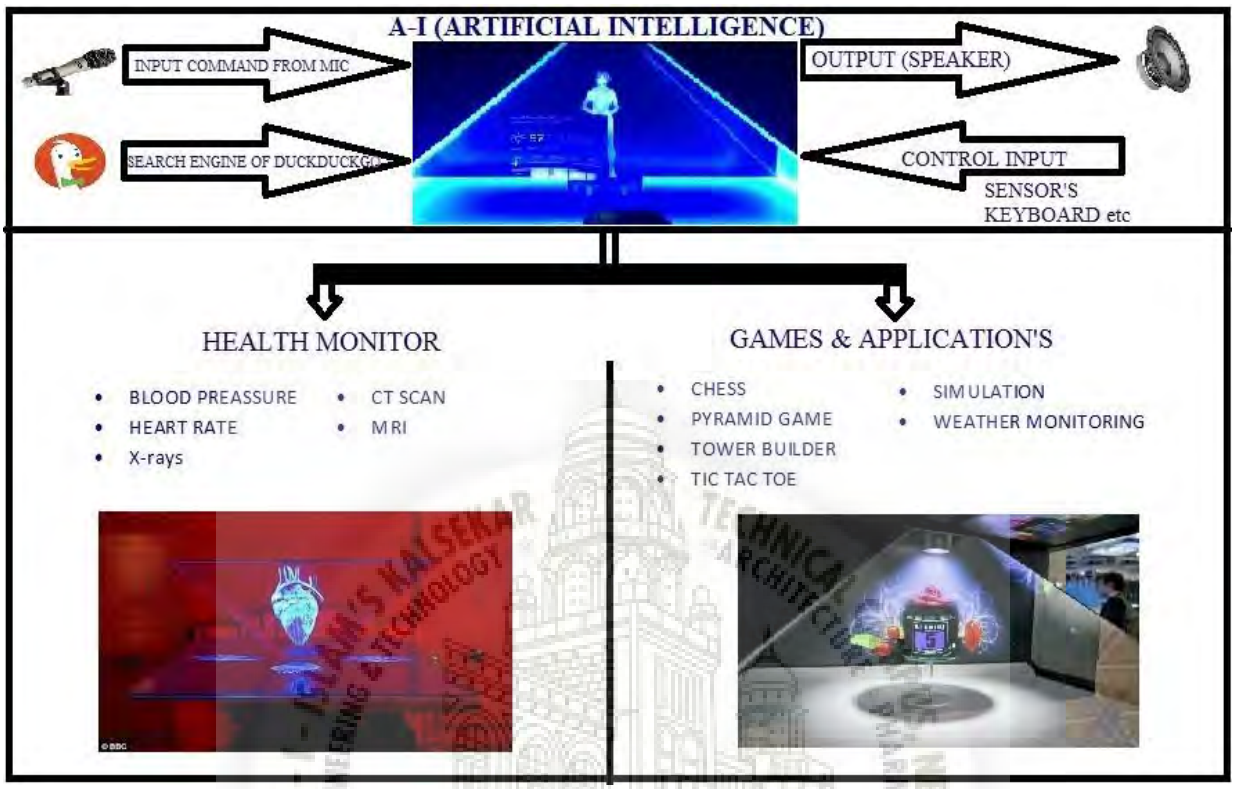



**Figure 4.1: Block Diagram**

The Above block diagram shows the basic block diagram of our Holograph where in we take the input from the microphone, keybord etc, The command from the microphone is processed and searched in DUCK DUCK GO Search Engine and as per the Command Condition the Task or Reply is Perform

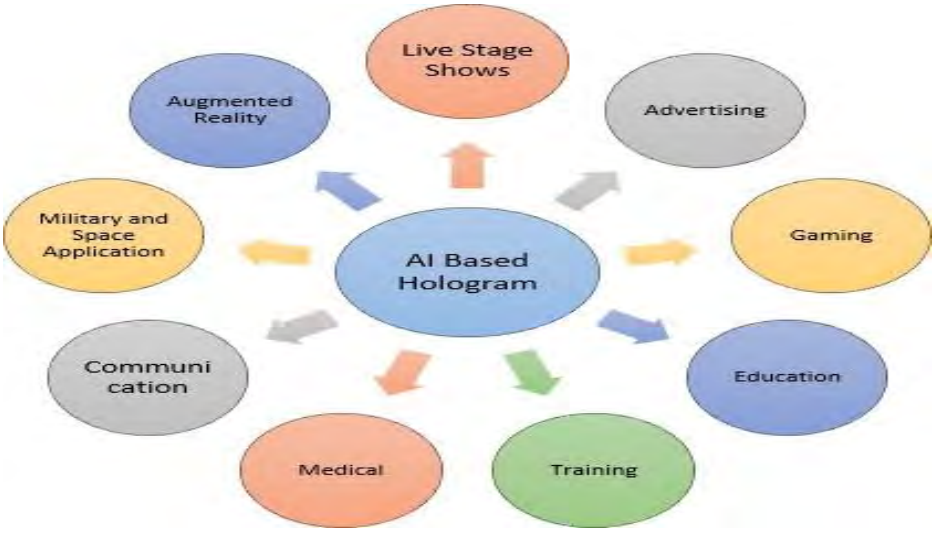



**Figure 4.2: Application of Holograph**

Applications

- Live stage shows
- Advertising
- Gaming
- Education
- Training
- Medical
- Communication
- Military and Space Applications
- Augmentd Reality

### 4.1.1 Hardware Model

drive 1.png

**Figure 4.3: Hardware**

The above figure shows the Hardware Model of Holograph

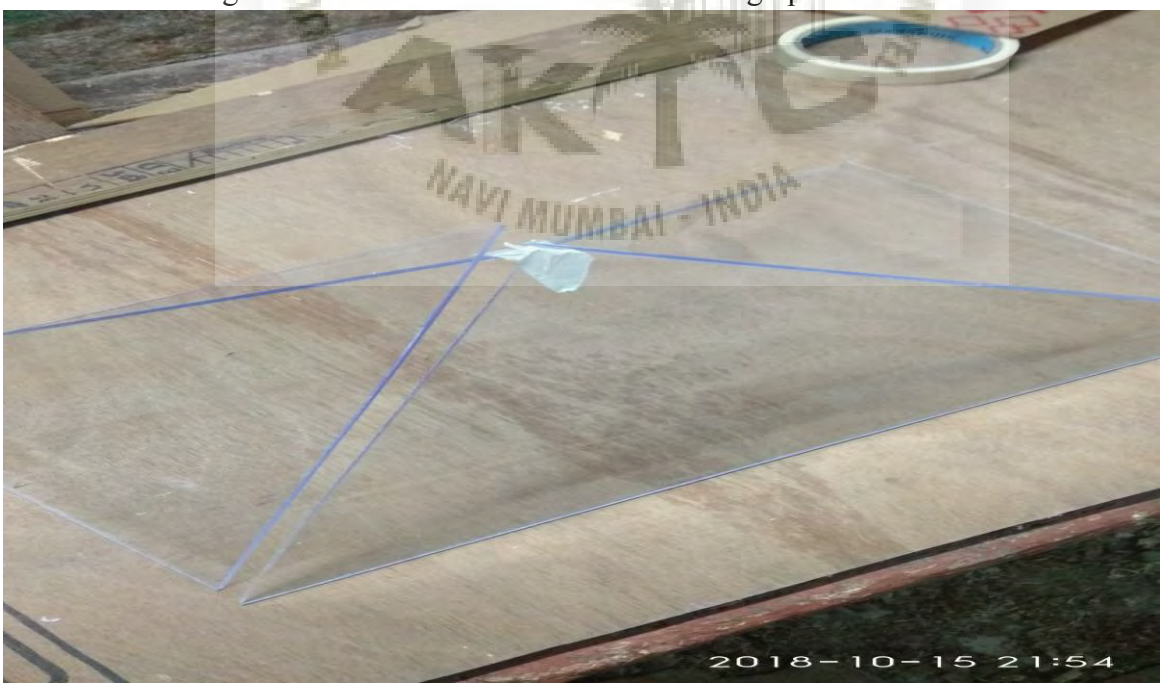



**Figure 4.4: glass**

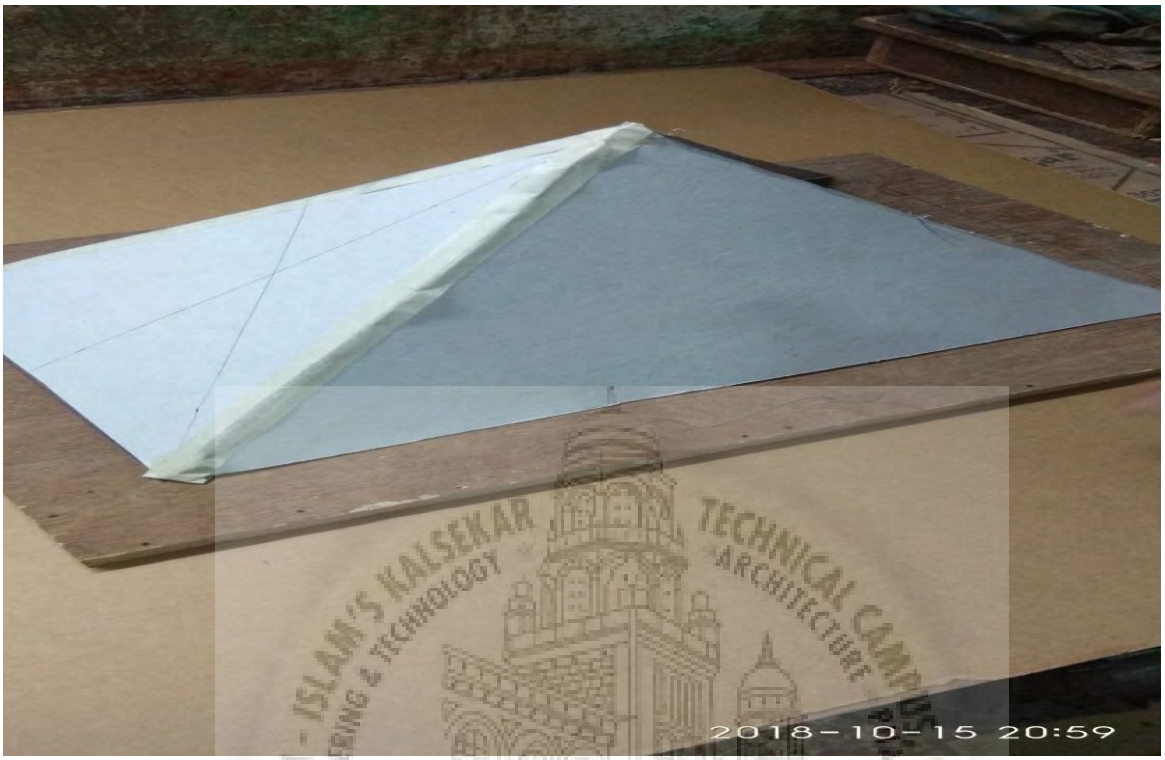



**Figure 4.5: cardboard cut**

Building the Top Frame First we built the top of the frame which holds the monitor that projects the image. We used a computer monitor with a 24" screen that was about 13.38" x 21.88" overall. You will probably need to adjust the size of your frame according to the size of your monitor. The top frame is simply a rectangle with a lip on the inside of the frame for the edges of the monitor to sit on. We made the frame using 1.5" x 0.5" wood, and used 0.75" x 0.75" wood for the inner lip.


**Figure 4.6: Dimention**

Using a hand drill, we attached the inner lip to the frame one piece at a time using two 6 wood screws each, then arranged each of these combined pieces into a rectan- gle and assembled them together by screwing the ends together


**Figure 4.7: Box cut**

Building the Bottom Frame

The bottom frame is similar to the top frame, except without the inner lip. We made the bottom frame using 1"x2"s, (really 1.5" x 0.75") wood planks to the same outer dimensions as the top frame. Although the outer dimensions were the same, the lengths of the pieces were slightly different due to the difference in thickness of the wood planks. We arranged the pieces into a rectangle and screwed

them together as shown in the picture below.

We then screwed two additional vertical pieces to the back side of the bottom frame. These pieces are the columns that hold up the top frame. The height of this piece will also depend on your monitor size since the acrylic frustum we are going to make runs from the top frame to the bottom frame at a 45 degree angle, and your monitor will no longer project onto parts of the frustum if it is too tall and wide.

**Figure 4.8: Drill**

Of course, the assembly wouldn't look good if it was just unfinished wood. Before attaching the top and bottom frames together, we sprayed it with some black semi-gloss spray paint.

**Figure 4.9: Paint**

Cutting the Acrylic Frustum

Making the frustum is one of the more challenging parts of the build. The frustum is three pieces of acrylic sheet brought together to form a three-sided pyramid with a 45 degree slope. This is called the frustum. We had to score and break off pieces of acrylic sheets to exact dimensions. If not done properly, the acrylic sheet can break in unintended ways, the edges may not be straight, and the frustum may not go together well. The dimensions are also highly dependent on you monitor size.

The dimensions are also tricky to get right if you are not building a 3D model to get the exact dimensions you need. We recommend either modeling it on your com- puter, or building a cardboard mockup to make sure it will come together correctly. We posted a schematic of our frustum dimensions for you to use as a guideline, but

you can also use the following formulas to determine your dimensions:

Equations coming soon

Trace out the shape on the acrylic sheet with a pen or marker, trying to be as precise as possible. Then, use a scoring tool to to score the acrylic anywhere between 20 - 50 times. Use a straight edge, like a long piece of wood to guide your scoring tool straight. It is better to place the guiding straight edge on the side of the part you are cutting out to prevent the scoring tool from inadvertently going off the intended path and over the surface of your piece.

It is important to start with multiple light, very straight strokes at first until a definite score line has been established. After a definite grove has been formed and you are confident that the tool will not jump out of the grove as you are scoring with more pressure, then you can apply more force. If you accidentally make a different score line, then it is very difficult to get the sheet to break off straight. So be very careful and patient.

**Figure 4.11: Plexi glass cutting**

After you are confident the score/grove is deep enough, place the score over the edge of a table and use quick, gentle pulses to push down on the sheet and break off the acrylic along your score line. This step can be difficult to get right as the acrylic sometimes does not break along your score line. It helps to use long pieces of wood to evenly distribute your force.

Assembly

Now that most of the parts are made, we can start assembling the device together. Because there will be a heavy monitor sitting on the top of the frame, we 3D printed some support brackets to put in the corners. We attached the 3D files for you to print, but you can also get brackets from a hardware store as well.

We're going to need a few more 3D printed parts to finish the rest of the build. The 3D .stl files are attached. If you don't have your own 3D printer, try your university or local library. There are also online services that accept .stl files and can print

In the center of the top frame, we attached a 3D-printed frustum joint to hold the three pieces of acrylic together at the proper angles. We also used some 3D printed brackets to hold the monitor into the top frame and center it.

Finally, we are now ready to assemble the frustum. Slide the three pieces of acrylic into the slots of the frustum joint.

**Fig 4.12 fixing**

# Chapter 5

# Conclusion and Future Scope

## 5.1 Conclusion

After implementation of this project we conclude that not only Holograph is able to display all the view of3D object also it is able to interact with user with the help of AI and vuforia the 3D object is been view in the AR manner.
Holographic Technology has endless applications as far as the human mind can imagine Will become a very integral part of human societies and civilizations in the future In future, holographic displays will be replacing all present displays in all sizes, from small phone screen to large projectors

## 5.2 Future Scope

According to us the future scope might be

- Implementing AI AR in our project on hardware.
- Adding multiple sensors.

# References

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