

VIDEO CALLING USING HAPTIC TECHNOLOGY

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Abstract - *The video calling is a process of talking between two or more users face to face. The currently available video calling is mostly based on the 2D video calling. The proposed Video calling (using Holographic Projection, Image processing, gesture recognition, video processing, SOA web services, Point source algorithm and Depth analysis algorithm) is based on the 3D video calling to provide a real like face to face communication.*

The holographic projection technique is used to store the 2D image stream of the video in holographic image frames and project the 3D holographic frames to the air. So that, the actual object in the 2D video can be projected into the air as 3D object. In the proposed video calling, the atmospheric air is considered as the obstacle to project the 3D holograms.

In this video call, the 3D depth data is read using the depth analysis algorithm. Image processing technology is used to map the 3D texture to the 3D models. Gesture recognition technology is used to identify the gestures of the user. Light Blue Optics technology is used to turn the projected screen into a touch sensitive touch screen. SOA web services are used to find the details of the things through web services. Video processing technology is used to find the exact positions of the objects in the video. The point source algorithm is used for the 3D reconstruction of the 2D image frames and real time HD video processing. The background subtraction algorithm is used to remove background from the 3D video. A projector is used to project the video and a camera is used for the video calling. The leap technology is used to do easy copy and paste process.

Key Words: *Holographic image frames, Hologram, Light Blue Optics, Projector, 3 Dimension, video frames, point source algorithms, depth analysis algorithm, image processing, video processing, gesture*

recognition, Background Subtraction Algorithm, Leap technology and SOA web services

1. INTRODUCTION

The video callings using haptic and holographic projection technology is used to video call and do many other things. That is, the sender and receiver can touch each other using the Haptic feedback. The proposed system provides a glass less holographic video call. Here, air particle is used as obstacle to hold the 3D video in air. The system also uses a glass less Haptic device to enable the force feedback. The force feedback will make the users of the system that, they are really talking to each other experience. Fig -1 shows the Architecture of the proposed system.

2. METHODS

The different methods used under the proposed system are:

2.1 Holographic Processing

In holographic processing, the 2D video is converted into 2d fames and the 2D frame is stored into 2D frame buffer. From this 2D frame buffer, the frames are converted into 3D holographic frames. This frames are used to produce the 3D holographic video.

2.2 Holographic Storage

The 3D holographic frames are stored in the frame buffer. Sequence numbers are used to identify the correct sequence of the holographic frames to combine and produce the holographic video.

2.3 Holographic Retrieval

The process of taking the 3D frames from the 3D Holographic frame buffer and combining them and producing holographic video and pass it to the output device is referred to as holographic retrieval.

2.4 Depth Data Calculation

In depth data calculation, the depth data is calculated from the 2D video. Depth data is calculated for the 3D reconstruction of the 2D video

2.5 2D to 3D conversion

Using the calculated depth, height, width parameters, the 3D model is created

2.6 3D reconstruction

In 3D reconstruction, the 3D objects of the 2D images are created.

2.7 Add Prototypes

In this, new prototypes are added to the system. Where, prototypes are used to control the activities of the system with the help of gesture

2.8 Prototype management

All the available prototypes are managed using this prototype management service. In this, an available prototype can be removed, managed. This also provides a provision to add new prototypes.

2.9 Gesture Management

In gesture management, all the predefined gestures are managed. Each gesture is associated with a prototype. That is, for each predefined gesture, a corresponding prototype should be executed.

2.10 Tracking Caller

In this, the video processing algorithm is used to identify the user using the face tracking and object tracking algorithms

2.11 Background Subtraction

Background subtraction is used to remove the background from the user object

2.12 Personal Details Tracking

The personal information of the person can be tracked using the SOA web service if the user details are available on the Google database

2.13 Depth Data Management

Using the previously calculated depth data, point source algorithm and depth analysis algorithms are used to optimize the depth data. The combination of this two depth algorithms will produce more accurate depth data calculation

2.14 Object Tracking

In object tracking, the object from the video source is tracked using object detection and face tracking techniques.

2.15 Background Identification

Using the tracked object, the system will easily identify that the portions of the video other than the object tracked are background.

2.16 Background Management

The identified Background's visibility is set to true to make the background invisible.

2.17 Mouse control Management

In mouse control management, the hand gesture is used as the mouse input to the system. The different gestures used for controlling the mouse functions were managed. The hand gesture is used with the projected screen

2.18 Keyboard Management

The keyboard typing by using the hand and projected screen. The corresponding ASCII of the character will be passed to the system using signal processing technology.

2.19 Touch Management

Touch management is used to manage the projected screen when touching it, operating it by using the hand.

2.20 Drag and Drop Management

This function enables the user to simply drag any information from any source such as news paper, drawing and etc... and drop the information to any source such as paper, computer, etc...

2.21 Copy from any and Paste to any

Similar to drag and drop, copy paste is also possible between different computers using hand gestures.

2.22 Make anything and Do anything

Using this function, we can make any surface into a computer and do any operations within the computer. That is we don't even carry our laptop or pc any time to do anything.

2.23 Force feed Detection

Force feed detection is used to detect the force of the user used to touch the holographic video.

2.24 Force Generation

The detected force will be generated using the system and the same amount of force will be given to the holographic object to produce the real touch experience.

2.25 Force processing

Force processing is used to pass the user 1 force to the user 1 holographic video and user 2 force to the user 2 holographic video.

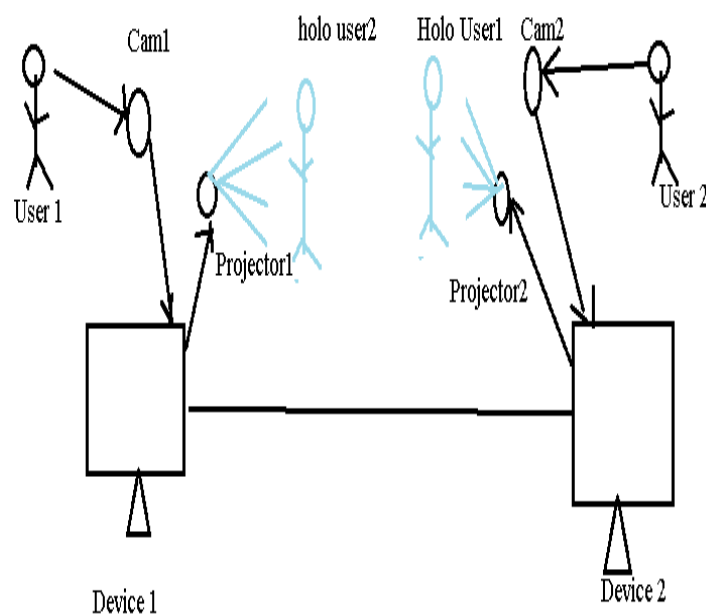


Fig -1: Architecture

3. CONCLUSIONS

The proposed video calling using Haptic and holographic technology is a multi functional video calling or also can be called as virtual physical conversation. The system uses various latest and advanced technologies to make the experience of the user better. This system will replace all the video calling service because of its features. This system will be implemented within three months.

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