KALI: A Hand Gesture Based Approach to Control PowerPoint Presentation

Tathagata Bhattacharya*, Akil Kumar Vujjini, Vinay Alsa.

Abstract—A PowerPoint presentation is an effective way of delivering a message to the audience. As a part of the presentation, using traditional devices such as a mouse, keyboard, touchscreen, or pen are common scenarios. Hand gesture is a common mean of controlling computer vision in the modern era. Using hand gestures for controlling the activities will simplify PowerPoint presentations. We developed a novel hand gesture-based application KALI, that can swiftly help the presenter to change their slides, zoom in and zoom out the contents of the slide, and draw and erase on the slide. We use machine learning algorithms and openCV to bolster our application and provide the users with a pro-interactive experience to ease their jobs and provide a high level of user satisfaction and user-friendliness. This paper presents a review of the current state of the art in hand gesture systems for PowerPoint presentations. This research discusses the different types of hand gesture systems that have been developed, as well as the advantages and disadvantages of each approach. The paper also discusses the challenges that need to be addressed in order to make hand gesture systems more widely adopted. We have surveyed the students of Auburn University at Montgomery and figured out the user needs. This survey helped us make a concrete application that will overcome the burden of using a keyboard, clicker, or mouse while teaching in class. Finally, we also discuss how we are going to add more features like video streaming, volume control, and a better auditory impact on the users and the audience to strengthen our novel gesture-based application KALI.

Hand Gesture, Machine learning algorithms, Python(IDLE), OpenCV, User Interactivity, User Convenience, Gesture Control

1 Introduction

Hand gesture control is a blessing of modern technology. Data-intensive applications are creating havoc in the world today [1], [2]. With the advent of hand gesture control, we are not only interacting with the devices but also providing ease of use for the users [3]. Hand gesture recognition systems gained significant importance with the machine learning evolution [4]. In the present business scenario, hand gesture recognition has several applications like controlling PowerPoint presentation and ensuring the audience better understand the topic. With the advancements like human-computer interaction and media technologies processing of hand gesture tasks became simplified, in medicine [5], aviation, defense, multimedia, creative expression, and generally in all interactive systems [6].

In hand gesture processing detecting the hand gesture from the real-time video is the major task to be addressed because the hand movements involve variation in the pose, orientation, location, etc. Moreover, detecting hand gestures requires considering the intensity of light and ensuring the hand movement is tracked in the webcam and thus involves multiple levels of image processing and accomplishing the task [7]. The current way of presenting the information requires touching the screen and sliding the screen in a way like physically moving the slide. But whereas hand gesture recognition does not involve touching the screen and using the mouse and keyboard. With hand gesture recognition, the system understands human movement and conveys the required information [8]. Gesture recognition technology helps to ease out the presentation with finger movement such as moving the slide to the previous slide, or moving the slide to the next slide.

1.1 Hand Posture Recognition

Hand posture recognition refers to the process of identifying and interpreting the specific positions or configurations of the hand [9]. It involves analyzing the shape, orientation, and relative positions of the fingers, palm, and other hand components to determine the specific hand posture being displayed [10].

Hand posture recognition systems typically utilize computer vision techniques, machine learning algorithms, or a combination of both to analyze and classify different hand postures. These systems can be trained on large data sets of hand images or videos to learn the distinctive features and patterns associated with specific hand postures. Once trained, the system can accurately recognize and classify hand postures in real-time, allowing for a wide range of applications and interactions [11].

1.2 Hand Recognition System

Hand recognition is achieved using OpenCV, which is a crucial and fundamental library of functions utilized for this purpose. OpenCV, short for Open Source Computer Vision Library, is an open-source software library designed for computer vision and machine learning applications [12]. OpenCV serves as a shared infrastructure for various computer vision applications. Being licensed under BSD, it allows companies to easily adopt and modify the code as needed. Some of the basic operations that can be performed on images using OpenCV include accessing image properties, retrieving and modifying pixel values, splitting and merging image channels, setting a region of interest, resizing images, and rotating images [13].

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1.3 Hand Tracking System

A hand tracking system is a technology or software that is designed to track and monitor the movements and positions of the human hand in real-time. It utilizes computer vision techniques, depth sensors, or a combination of both to accurately detect and track the hand [14]. Hand tracking systems have various applications across different fields. In virtual reality, these systems enable users to interact with virtual environments using their hands, without the need for controllers or other input devices. In robotics, hand tracking systems allow robots to perceive and respond to human hand gestures and movements. They are also used in sign language recognition, where the system can track hand movements to interpret and translate sign language into text or speech [15].

Overall, hand tracking systems play a crucial role in enabling natural and intuitive interactions between humans and machines, opening up possibilities for enhanced virtual reality experiences, hand gesture-based control systems, and more immersive human-computer interfaces [16].

1.4 Hand Features

Hand features refer to the distinctive characteristics or attributes of the human hand that can be used for identification, analysis, or recognition purposes. These features can include various aspects of the hand's appearance, shape, structure, or movement. The unique patterns formed by the lines and creases on the palm, such as fingerprints, palm prints, or palm vein patterns, are commonly used for biometric identification [17]. Hand features are often utilized in biometric systems, computer vision applications, robotics, and human-computer interaction to enable accurate identification, tracking, or analysis of the hand. These features can be extracted and analyzed using various techniques, including image processing, machine learning algorithms like CNN, or depth sensing technologies [18].

1.5 Novelty of the research

The use of hand gestures to control PowerPoint presentations introduces an innovative way to interact with this form of communication. The emergence of hand gesture recognition technology represents an attempt to revolutionize how presentations are delivered. We develop a special hand gesture-based control application with computer vision and name it KALI. KALI is a Goddess who defines undefined power and strength. Similarly, our novel hand gesture recognition system KALI provides enormous strength to the presenter to present their slides without using any clicker, keyboard or mouse.This advanced system can accurately interpret hand gestures translating them into precise commands for navigating PowerPoint slides.

Another important aspect of KALI is its potential to enhance audience engagement during presentations. This innovative and interactive approach has the power to captivate the attention of the audience in a way that was previously unimaginable, providing an immersive presentation experience. By utilizing advanced computer vision algorithms and natural hand gestures this groundbreaking technology offers a presentation experience that's more engaging, customized, and inclusive.

The implications of this research go beyond controlling slides; they open possibilities where presentations can transform into captivating experiences. Moreover, this technology's impact extends beyond presentations It has the potential to revolutionize education by providing a level of interactivity and immersion in learning experiences Furthermore, we must not underestimate the accessibility benefits of controlling presentations through hand gestures. People with disabilities can now actively participate in presentations and educational activities.

To sum up, the research on using hand gestures to control PowerPoint demonstrates the power of innovation. By leveraging computer vision technology and the natural language of hand gestures this research has the potential to reshape not only how presentations are shared but also how knowledge is disseminated and accessed in our diverse world.

2 Literature Survey

Hand gesture recognition systems are categorized into different types and there are several research works ongoing. The known input from the camera is processed with computer vision and machine learning-based models [19]. The hidden hidden-based Markov method is commonly used for detecting hand movement. The process steps involved in the HMM model are feature extraction, HMM display preparation, and acknowledgment of motion. In recent years computer interaction methods have gained high importance in gesture recognition [20]. Currently, the computer vision and machine learning-based gesture recognition system works with different cameras in smartphones, laptops, and tabs. Even though the glove-based system also gained importance initially there are some limitations like discomfort in using and connecting the wire with the glove. [2] These issues are completely addressed with cost-effective and vision-based techniques and sensor technologies. Several algorithms are also developed for computer vision-based detection systems for detecting hand features which include motion, skeleton, skin color, etc. The major advantage of the computer vision-based system is the contactless communication between the computer and the hand [6]. Based on the requirement different types of cameras can also but the considerations related to complex backgrounds, and time processing the image change [21]. Fig. 1 shows the generic steps involved in the hand gesture recognition system[citation]. In the selection of a hand gesture system cost and accuracy of hand detection highly matters.

For our extensive study, we looked deep at three distinct articles and discovered various ways to recognize hand gestures and then control the PowerPoint Presentation.

2.1 General Hand Gesture Recognition Systems

Hand gesture recognition systems are categorized into different types and there are several research works ongoing [22]. The known input from the camera is processed with computer vision and machine learning-based models. Hidden based Markov method is commonly used for detecting hand movement [23]. The process steps involved in HMM model are feature extraction, HMM display preparation, and acknowledgment of motion [24].

With the computer vision-based hand gesture system, the challenges related to complex backgrounds, orientation, and

rotation issues are ever-increasing. In our novel hand gesture control application, KALI we use a simple, yet elegant MediaPieline Framework to provide ease and convenience to the user.

2.2 Computer and machine learning for gesture recognition

Currently, the computer vision and machine learning-based gesture recognition system works with different smartphones, laptops, and tabs cameras [25]. Even though the glove-based system also gained importance initially but there are some limitations like discomfort in using and connecting the wire with the glove [26]. These issues are completely addressed with cost-effective and vision-based techniques and sensor technologies [22]. Several algorithms are also developed for computer vision-based detection systems for detecting hand features, including motion, skeleton, skin color, etc [27]. shows the generic steps involved in the hand gesture recognition system. In the selection of a hand gesture system cost and accuracy of hand detection highly matters.

2.3 Hand gesture system with HCI

Human-computer interaction is an important field where gesture recognition is an important area of research. As a part of the communication between the machine and humans, gesture recognition is playing an immense role [28]. Gesture recognition with HCI can be divided into hand gestures and normal gestures [29]. In hand gestures based on skeletal features motion is detected. The gestures of humans involve high dynamism, to ensure the movements are captured appropriately interpreting the gestures requires using several technologies such as IR emitter, microphones, IR microphones, accelerator, etc which allow tracking the user's movements in detail [30]. Thus, sensor-based approaches are also not appropriate for the detection accurately, but the sensor technology created a new path for developing the gesture detection system and conducting further research in the HCI [31].

2.4 Gesture recognition system for PowerPoint presentation

Controlling the PowerPoint slides with gesture recognition gained significance in the present trend. As most organizations and educational institutions use the power point as conveying information [32]. In addition to normal operations on the PowerPoint presentation, new features like controlling the voice and keyboard functions are a major research area in recent years. As a part of the presentation, along with the slides, the voice of the presenter is also important. By using the latest libraries in the python additional features can be incorporated in the system [33].

2.5 Libraries for implementing hand gesture system

Several libraries are available to implement a hand gesture system, which helps to include various features and control the presentation with gestures [34]. The common libraries used as a part of the presentation are OpenCV2, Media Pipeline, Numpy, and OS. The inputs received from the camera as taken as input for controlling the ppt. CV2 is a widely used library where the inputs from the video are collected and then processed for the detection of hand gestures [35]. CV2 library in Python allows the loading of the image from a specific file, majorly aimed at solving computer vision-related issues. Using OpenCV2, images, and videos can be processed and thereby conduct the tasks like filtering the images, recognizing the object, and detecting the features. [36]. In the presentation process, tasks like the termination of a running process, and changing the running directory can be automated with the methods in the OS module [37].

3 Hand Gesture Control

Hand gesture recognition is widely popular today to ease human activity and enhance convenience. We focus on controlling a PowerPoint presentation with hand gestures in this novel research. We describe the hand gesture recognition procedure elaborately in this section.

3.1 Methodology

This section describes a step-by-step methodology for controlling PowerPoint presentations with hand gestures. Our application KALI is a brilliant application that efficiently detects the hand gestures and based on the hand gestures control the PowerPoint Presentation accurately.

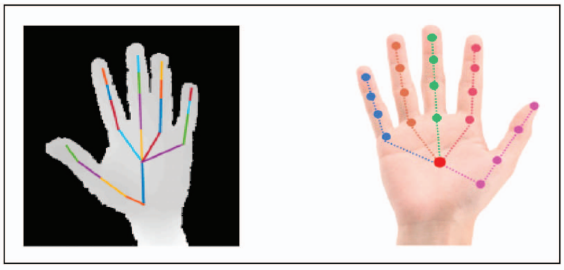

Fig. 1. This image describes different hand gestures for controlling the PowerPoint presentation

Fig.1 describes various joints that are recognized by the workstation camera.

Fig. 1 illustrates various hand gestures used to manage a PowerPoint presentation. 1) The pink dotted line shows that raising your thumb to the camera allows you to go back to the previous slide. 2) The red dotted line shows that lifting your index finger to the camera enables you to display the pointer. 3) The green dotted line shows that raising your middle finger to the camera lets you remove content. 4) The orange dotted line shows that lifting your ring finger to the camera also allows you to erase content. 5) The blue dotted line shows that raising your pinky finger to the camera lets you proceed to the next slide.

- To execute hand gesture control a computer needs a webcam to detect certain hand gestures which serves as the most crucial input for the whole procedure.
- Next, the Media Pipe framework recognizes hand landmarks that are used to produce an array of finger gestures for detecting hand motions (please note Fig. 1).
- The array of finger gestures describes each finger's position, especially if it is elevated or lowered.

- The application that we have developed now detects the hand joints as described in Fig. 1
- Conditional statements are used to check if a recognized gesture matches a particular finger pattern before doing performing actions [38].
- Finally, we could control our presentation by simply using various hand gestures.

3.2 ALGORITHMS

Step 1 Project Design: Initialize hand detector, video capture, and import presentation images.
Step 2 In this step, our application will detect the image and the finger joints. These finger joints will be recognized and based on a particular finger gesture, we will follow the following conditions.
Enter the main loop While True:

- Prepare webcam feed.
- Get Current slide image
- Detect hands and process gestures:
  Step 3
  If hand gestures are detected :
  Process hand gestures for control. -
  If hand gestures are not detected, follow the next step.
  Step 4 - If hand's y-coordinate $<$ threshold:
- Gesture 1: If the Thumb(Pink color) is UP in front of the Laptop/PC Camera (between 5CM to 25CM) for a small duration and move your hand away from the Camera/PC. This gesture will accessed as Previous Slide. If detected fingers = [1, 0, 0, 0, 0]:
  Move slide left
- Gesture 2: If the Pinky finger (Blue color) is UP in front of the Laptop/PC Camera (between 5CM to 25CM) for a small duration and move your hand away from the Camera/PC. This gesture will be accessed on the Next Slide. If detected fingers = [0, 0, 0, 0, 1]:
  Move the slide Right
- Gesture 3: If the Index Finger(Red color) and Middle Finger(Green color) are UP in front of the Laptop/PC Camera (between 5CM to 25CM) for a small duration and move your hand away from the Camera/Pc. This gesture will accessed as Show/Display Pointer. If detected fingers = [0, 1, 1, 0, 0]: -
  Display pointer
- Gesture 4: If the Index Finger(Red color) is UP in front of the Laptop/PC Camera (between 5CM to 25CM) for a small duration and move your hand away from the Camera/Pc. This gesture will accessed as Draw Pointer. If detected fingers = [0, 1, 0, 0, 0]:
  Draw pointer
  Else, annotation toggle = False
- Gesture 5: If the Index(Red color), Middle(Green color) and Ring(Orange color) Fingers are UP in front of the Laptop/PC Camera (between 5CM to 25CM) for a small duration and move your hand away from the Camera/Pc. This gesture will accessed as Erase Pointer. If detected fingers = [0, 1, 1, 1, 0]: -
  Erase content
- Gesture 6: If the Thumb(Pink color) and Index(Red color) Fingers are UP in front of the Laptop/PC Camera (between 5CM to 25CM) for a small duration and move your hand away from the Camera/Pc. This gesture will accessed as Zoom in and Out Pointer. If detected fingers = [0, 0, 1, 1, 1]: -
  Zoom content

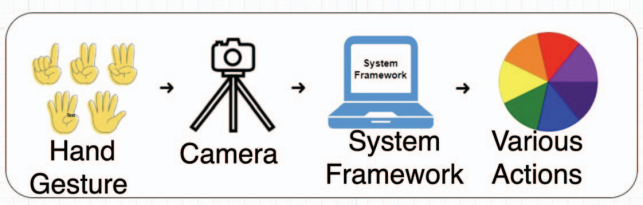

Fig. 2. Steps in the gesture recognition system .

Fig. 2 describes each and every step of hand gesture control mentioned in the algorithm 3.2.
To make a computer respond to your hand movements, it needs a webcam to see what you're doing with your hands. Once it can see your hands, a special system called Media Pipe figures out where your fingers are and how they're positioned. It then describes this information using different finger gestures, like if your fingers are up or down.
Our application can now find the joints in your hand. It uses rules(please refer to the algorithm 3.2 to see if the hand gesture it recognizes matches a specific finger pattern before it carries out any actions. So, you can control a presentation just by making different hand movements.

3.3 Auxiliary Requirements

In this section, we are going to provide insight into the quality and ease of using our application and the required software for coordination with our application.

3.3.1 Motion Recognition

The MediaPipe framework's finger array is used in the project to easily incorporate motions. The system can properly recognize and interpret user motions; thanks to the mapping between finger patterns and gestures, which then causes the relevant actions to be taken for managing the PowerPoint presentation. This integration offers a thorough and simple control system.

3.3.2 Convenience of the Presenter

The solution offers a broad variety of use cases in the area of PowerPoint presentation control. Users may quickly switch between slides, gracefully transition to the next or previous presentation, and use a pointer to draw attention to important details or features on the slide. Additionally, the technology allows for interactive sketching sessions, giving presenters the ability to add

notes or pictures as needed to keep the audience interested. To provide a flawless presentation, the presenter can quickly erase any annotations or drawings made on the slide if necessary. Users may also utilize the zoom capability to highlight particular aspects and draw the audience's attention.

3.3.3 *Integration of speech and writing*

The system uses PyAudio and Kaldi Recognizer in addition to gesture-based control to improve the presenter's voice. The presenter's spoken remarks are translated into written text transcripts using this sophisticated technique.
The overall goal of this project is to enable smooth and natural control over a PowerPoint presentation using finger tracking and hand gesture recognition. The system improves the presenter's capacity to engage with the presentation, resulting in a more engaging and dynamic experience. It does this by merging gestures, speech recognition, and sophisticated technology.

4 Results and Evaluation

In this section, we are going to elaborate and shed light on the results and evaluations of our hand gesture control system KALI. We evaluated our hand gesture recognition system through several measures. We checked the detection efficiency. We surveyed the gesture control accuracy. In the end, we performed a survey of our hand gesture recognition system with approximately 500 students in the university. We describe each and every evaluation in the following subsections.

TABLE 1. Demographics of the evaluators

Criteria	Value
age	15-40
sex	55%Male, 45%Female
awareness	65%
education level	undergraduate-15%,graduate 85%

4.1 Preliminary Survey of Hand Detection and Hand Recognition

Hand detection and recognition are crucial aspects of our hand gesture control system KALI. Landmarks on the hand, detected through computer vision techniques, help identify and track hand movements. These landmarks are used to build a model for gesture recognition using algorithms like hidden Markov models or deep learning. We provide insight into the accuracy and efficiency of our hand gesture control system KALI in the following subsections with proof.

In the Preliminary session, we gather the basic information like age, sex, and level of technical awareness of the users in table 1. To present a comprehensive overview, we present the gender of the users in Fig. 3. The survey was conducted among 65% male and 35% women. Fig. 4 describes the racial background of the evaluators. Turns out that a massive chunk(approximately 90%) of students from South Asia took part in this survey.

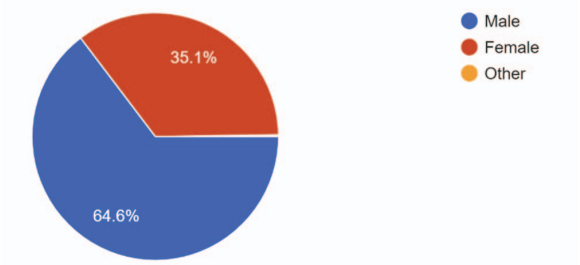

Fig. 3. Gender demographics of the evaluators

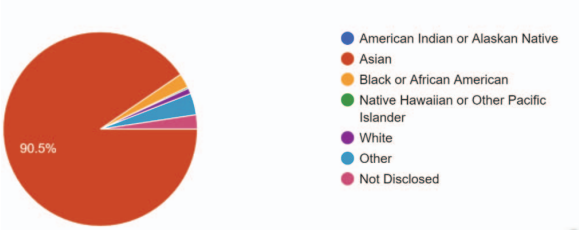

Fig. 4. Racial demographics of the evaluators

4.2 Technical Evaluation of Hand Gesture Recognition System

We describe the various aspects of gesture control in the following subsections with screenshots of our hand gesture recognition system while controlling PowerPoint.

4.2.1 *Zooming in and out*

Zooming in and Zooming out the content of the presentation is a significant feature of our application. This feature enables the user to enhance the visibility of the content of the slides better to the audience. To evaluate the accuracy to zoom in and zoom out the contents of the PowerPoint presentation, we conduct several testing sessions. We provide the screenshot of zoom in and zoom out in the following screenshots to signify the efficiency of our hand gesture control system (refer Fig. 5).

Fig 5 signifies the efficiency about Zooming contents of the slides as a part of the PowerPoint presentation. So, if we show right or left hand in front of the camera, the camera detects the hand then, for zoom out we have to hold and enlarge thumb and index finger together at a time and for zoom in we have to hold and compress thumb and index finger together at a time.

4.2.2 *Forward Slide Switching*

Forwarding the slide of the presentation is one of the features of our system. It can allow the user to move slide one to the next slide of the PowerPoint presentation to avoid the manual changing of slides(like the keyboard right arrow switch). following screenshots to signify the efficiency of our hand gesture control system.(refer Fig. 6)

Fig 6 signifies switching the slides from one to the next as a part of the PowerPoint presentation. So, when we show the right or left hand in front of the camera, the camera detects the hand, and then, if we raise our Pinky finger, the application goes to the next slide.

Fig. 5. Zoom in and out using KALI

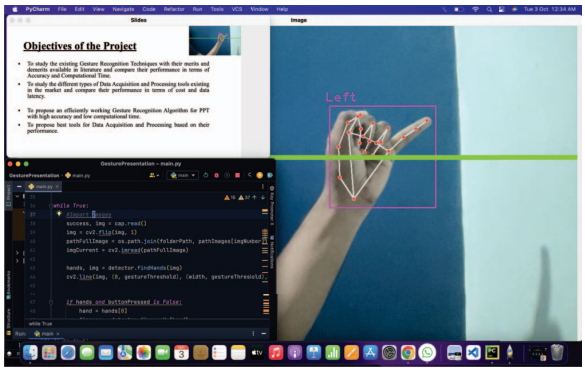

Fig. 6. Forward Slide Switching using KALI

4.2.3 Backward Slide Switching

Backward sliding is the method required in the presentation requires switching from one slide to another previous slide as a part of the PowerPoint presentation to avoid the manual changing of slides(like the keyboard left arrow switch). following screenshots to signify the efficiency of our hand gesture control system.(refer Fig. 7).

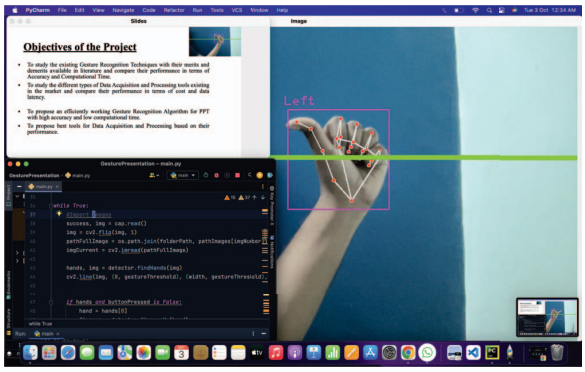

Fig. 7. Backward Slide Switching using KALI

Fig 7 describes switching the slide to the Previous slide as a part of the PowerPoint presentation. So, when we show the right or left hand in front of the camera, the camera detects the hand, and then, if we raise our thumb finger, the application goes to the previous slide.

4.2.4 Drawing using the Pointer

In the presentation, drawings are commonly used for the effective delivery of information and also pointing out the content of the presentation for better understanding of the user.We incorporate this feature in our application to make our application more user-friendly and interactive. We provide the screenshot for effective drawing on slides in Fig. 8

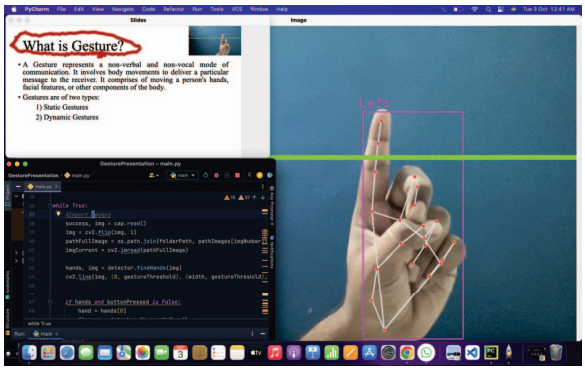

Fig. 8. Drawing on the slides with KALI

Fig 8 reveals the mechanism of drawing on the slides using the index finger as a part of the PowerPoint presentation. If we notice Fig 8, one can understand that with our application KALI, the presenter draws a small red circle on ”What is a Gesture” on the screen to highlight his point.

4.2.5 Erase the drawing

Erasing the content is one of the best features of our system, In the presentation erasing the content is another aspect that provides more user interactivity for our application. We describe this feature in Fig. 9

Fig. 9. Erase the drawing with KALI

Fig 9 describes erasing the data on the slides using index, middle, and ring fingers as a part of the PowerPoint presentation. So, if we show our hand in front of the camera, the camera detects the hand, and then, when we raise our index, middle, and ring finger, we can erase the data on the slides. Fig 9 depicts that the small red circle that we drew previously on ”What is Gesture?” has been successfully erased using our hand gesture-based application KALI.

4.3 Post-Conclusive Survey

Post conclusive survey describes the evaluators' experience, feedback and interactivity with the application.

4.3.1 User Interactivity

In this section we reveal the evaluators' experience while using the application's hand gesture control system. We conducted a survey among 500 university students and figured out the interactivity of our application. The survey has helped us to understand the user experience and modify our application accordingly.

Fig. 10 describes the evaluators' reaction on user interactivity and user-friendliness of our application. This graph advocates that our application is quite user-interactive and user-friendly. Around 80% people claim that the application is user interactive and user friendly.

Fig. 11 elaborates the user's choice of the aspect of our application. 62% people exclaimed that they loved the various features like forward and backward slide switching, drawing on slides very effective and essential for their work. 37% people mentioned that they loved the user interface that we created in our application. They exclaimed that the user interface is easy to use and they can interact a lot with the application through the interface. Some people also mentioned that they loved how the application helps them not to worry about using clickers or keyboard switches.

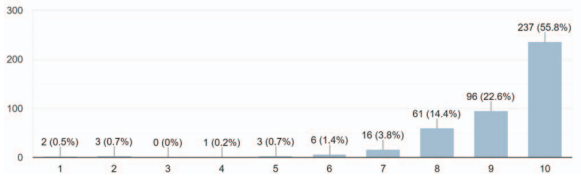

Fig. 10. User interactivity and user Friendliness of KALI

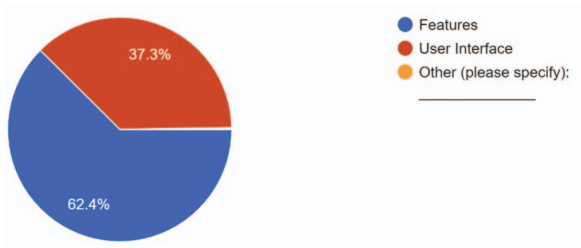

Fig. 11. User comfort with KALI .

4.3.2 Application usage

In this section we describe user's experience while using various features of our application. Our application has multiple features like slide zoom in and zoom out, slide switching, painting on slide etc. We conducted a survey after the user's interacted with our application to figure out which of the applications were easier to use and needed in their day to day life. We explain these feature feed backs in Fig 12.

Fig. 12 describes user experience while playing with the features of KALI. The graph explains that users feel most comfortable while using the feature zoom in and zoom out. Whereas only 11% users feel that backward slide witching is

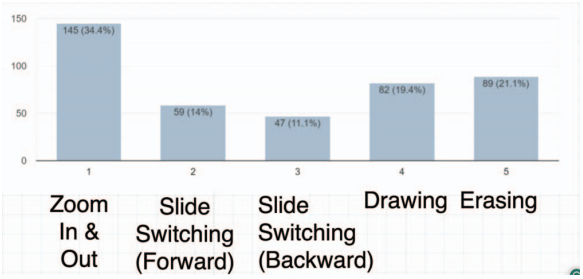

Fig. 12. This graph describes usage of hand gestures for controlling the PowerPoint presentation

user friendly. These feedback gave us an essential idea as what a user likes while controlling their PowerPoint Presentation. Also we can strongly argue that our hand gesture control system KALI is 96% effective in controlling the PowerPoint presentation using hand gesture control system.

5 Conclusion and Future Scope

PowerPoint presentation is an effective way of conveying information to the users. As a part of the presentation, the presenter needs to go from one slide to another slide, zoom the content, and slide the presentation. The traditional way of presentation involves lots of activities like touching the screen and using input devices like a keyboard and mouse. Instead of a manual way of controlling the slide, a PowerPoint presentation with hand gestures is an effective way. This technique is implemented with human-computer interaction, augmented reality, and other technologies in our hand gesture-based control system KALI. The potential advantage of using KALI is the elimination of manual intervention by automating the majority of the activities involved in the presentation. Based on the analysis of hand gesture PowerPoint presentations, the major advantage is presenter can focus on delivering the content to the audience. In the presentation process, the activities of creating drawing the pointer writing the content, and erasing content are completely automated with finger movement. In the gesture recognition system KALI, machine learning and computer vision techniques are highly helpful for converting the hand and finger movements captured from the camera to control the presentation. As a part of the hand gesture system different gestures like showing thumbs up, index finger up, and ring finger up can be represented in the program and then translated to perform specific actions on the PowerPoint. Our hand gesture recognition technology KALI helps in improving the user experience in various aspects and based on the specific needs further refinement can be done to include more options that prefer more intuitiveness and effectively deliver the presentation for the audience.

The future of presentations is set to become more dynamic and interactive incorporating features. Users will be able to zoom in and out on parts of a slide allowing for a closer examination of important details. Access, to multimedia files will enhance the auditory experience making presentations more engaging and impactful. The pause/resume feature will offer flexibility enabling users to control the flow of information and connect with their audience at their own pace. The forward/rewind options will make it easy to navigate through the presentation ensuring that key points can be revisited or

skipped as needed. Users will also have the freedom to adjust the volume of the videos embedded in the slide according to settings and personal preferences. Lastly including hyperlinks will provide access, to resources enhancing the depth and credibility of presentations. With these advancements, future presentations promise to be more immersive, interactive, and captivating. We determined to add all these aforementioned features to our novel gesture-based application KALI in the future.

6 Acknowledgement

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