

AUGMENTED REALITY KEYBOARD

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Abstract: Augmented Reality is recognized as an interactive experience provided to a user with the real world objects. Various application have been developed so far using this technology but they are not cost effective. We are introducing a much cheaper solution, keeping in mind the user experience. The proposed approach uses color segmentation and object recognition to analyze the movements of the object and apply optical mathematics on the object's properties. With this, we can imitate various devices which can create an interactive experience for the user. Considering the interest of the current tech users, we have developed an 'Augmented Reality' keyboard to let the user interact with this new technology.

I. INTRODUCTION

Superimposing a virtual image on a user's view is augmented reality, where the objects that occupy the place in the real world are "augmented" by computer-generated perpetual information. (5) We are trying to solve the problem of the technology being too costly for the interested users, curious to get a taste of augmented reality. It is generally seen in various shopping stores that sellers try catch eyes of customers to showcase their products by using augmented reality-based devices. Their major loophole is that their functionality is improper, which eventually results in bad user experience and an utter loss.

II. DIVERGENCE TRUTH OF AUGMENTED REALITY

Augmented reality is a technology, where some virtual things becomes your new reality. (6) It is the 'fusion' of physical and digital reality. For instance let us consider a feature designed by snapchat where we can see some animated characters dancing wherever our camera points. That is one of the most remarkable example of augmented reality. Therefore, it can be experience through smartphone.

Now scrutinizing about virtual reality, virtual reality is a technology where one can see himself/herself in a virtual world, which is thoroughly different from the real world.

Virtual reality may engage auditory and haptic simulation. There is a requirement of goggles, speakers and sometimes, handheld wearables. Let us take the most common example of virtual reality, we encounter various shops claiming to give us a memorable roller coaster ride just by wearing an eyeglass type of device. Most of us confuse it with augmented reality but that is pure virtual reality.

III. EXISTING IDEAS

Sixth sense technology is a defined and suitable way to augment the physical world directly without using any electronic chips. Sixth sense is a set of wearable devices that act as a gestural interface and lets the users to use hand gestures to make it interactive using digital information. Here the methodology was to use coloured caps, System's camera and MATLAB already installed in a system, just to make it interactive enough. (2) These three components of sixth sense are use in order to recognize the coloured caps that the user will bring close to the system's camera. The additional features are implemented according to the position of the colour caps being instructed by the developer. The Code is constructed in such a manner that when all 3 Colours are present in the frame, the image will be captured. Similarly further applications like Swiping, Zooming are implemented based on the position of centroids of Colours in the video stream.

Technology is not ready to step back in any of the existing fields these days, be it medical, education or arts. Our generation craves for modification and upgradation in every traditional methodology. Hence, this zeal gave the idea to the dancers of using the technology, so as a result they pulled up their socks and started matching their moves with the projected visual effects in the background.

The goal is to use projections that respond to the performers' movement. (1) For example, a performer raising her arms may trigger a projected explosion on the screen behind her. Or, the dancers may be followed by downwards streams of sand as they move across the stage. Augmented reality allows the user to experience a beautiful performance by creating an atmosphere along with the performer.

Surgeons use augmented reality to be trained for a surgery and can also be helpful to monitor the task performed in the surgical room. Surgeons can get hold of enhanced senses with the Liver Explorer app by the developer Fraunhofer MEVIS. This app provides real-time AR guides and assistance to the surgeon. The device's camera films the liver and, using AR, superimposes surgical planning data onto the organ. (8) In addition, the software can react in real time. These capabilities go beyond the MARTA (Mobile Augmented Reality Technical Assistance).

The area where technology is used to display the contents and information. Wikitude and Junaio are two leading instances of AR browsers that provide information and the software is capable of recognizing locations or objects and can also link digital information to real-world situations. Information like the nearest restaurant, petrol pump, weather and many more.

For appropriate landscape, monitoring irrigation, soil fertility and for informing our farmers of the result of the research done on their farm, also informing the buyers about the percentage of adulteration of crops. Adulteration of crops is one of the most neglected areas in agriculture, which actually needs much attention.

Augmented reality can be implemented at farmer's level so that they can make improvement in the traditional method they have been continuing for years. Most affected crops by adulteration are wheat, rice and bajra, which is consumed by 93% of the population in India. The technology can be used to recognize the percentage of adulteration in crops. (4)

IV. PROPOSED APPROACH

The proposed solution came out from the problem where people, curious about the upcoming technology are facing difficulties in finding opportunity to get a glimpse to these technologies at an easy cost. People need to buy a variety of expensive products and visit places where they can enjoy the experience of different devices based on augmented reality. Rather than spending so much time and money, it is possible to get such an experience sitting at home by using our proposed keyboard.

The proposed keyboard is developed using Python, OpenCV, PyAutoGui and is accessed by system's camera.

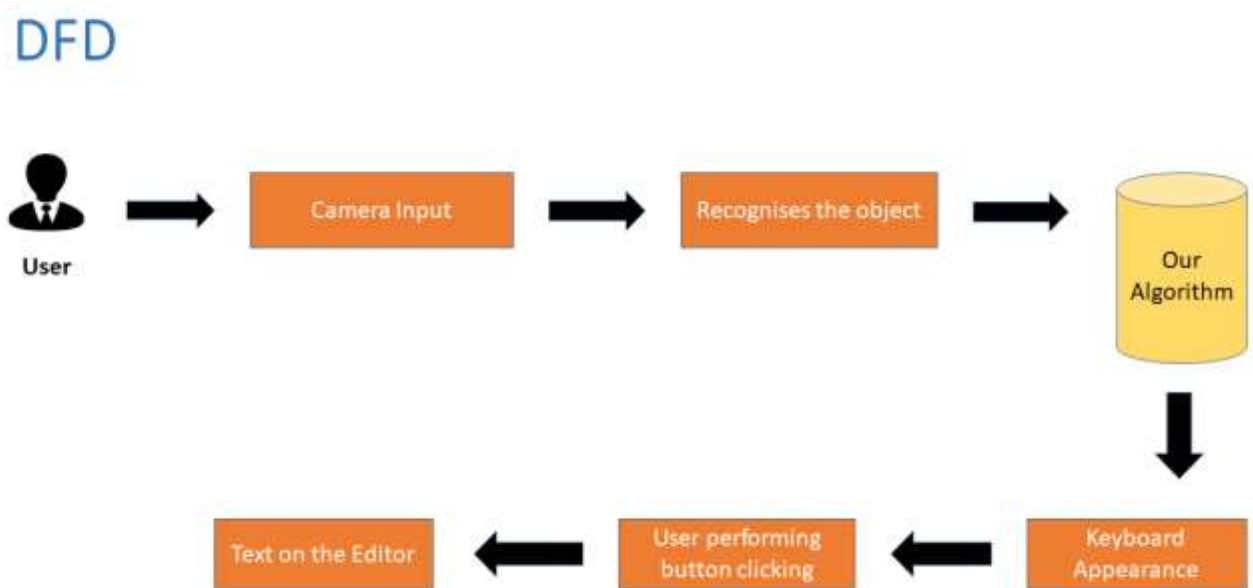


Fig-1 Flow of the project

4.1 Prerequisite:

- Laptop with decent camera
- Python installed with libraries – numpy, pyautoGUI and OpenCV.

4.2 Object Recognition and color segmentation:

Object recognition is done by OpenCV which uses color segmentation. By analyzing the object's movements mathematically (7), the proposed algorithm will trigger several tasks.

Mathematical tasks are handled with the help of Numpy and the rest, that is, operational tasks are handled with the use of PyAutoGui.

4.3 Keyboard Designing:

Open cv's rectangle() function is used to specify the coordinates of top left corner, bottom right corner and centre coordinate of the keyboard.

We are developing a keyboard having four lines of keys, first line containing eleven keys plus a backspace key, second row having nine keys, third row with seven keys, and fourth one with five keys which is nothing but a space bar. The end result will be a complete keyboard with q, w, e, r, t, y, u, i, o, p and backspace on the first row and so on.

The maths behind it is pretty logical, to calculate the width of a row first we divide each key by number of keys i.e 11 and then multiply it with the number of keys. In our algorithm it will be $1/11 * 11 = 1$, so one is the width of one row. After that taking the coordinates we can estimate as to what should be the dimension for the keyboard.

4.4 Button clicking event:

When the user brings the object close to the camera sensor and pulls it back (crossing a certain threshold limit), click event is performed. The position of the click determines the pressing of a certain key that is to be simulated virtually.

If we consider the key we are clicking as the sensor and observe, optically it will feel like the object (finger) becomes bigger in size when it comes near to touching the key and becomes comparatively smaller as it goes back.

Hence, we used the difference in the size as a capital approach in our approach.

V. RESULT



Fig-2 Object Recognition

Object recognition was done as an initial part of our project to identify the color of the object.

Hsv_upper and hsv_lower are automatically initialized if we use the range-detector.py. For example if the user wants to identify a yellow color object, (3) The easiest way is to put the object in front of the camera and then start slowly by increasing the lower parameters(H_MIN, V_MIN, S_MIN) one by one and then by decreasing the upper parameters (H_MAX, V_MAX, S_MAX). When the adjustment has been done, the user will find that only the yellow colored object will have a white patch and rest of the image will be dark.



Fig-3 Keyboard Implementation

At the final stage, by incorporating our proposed approach, we successfully designed a keyboard with 11 keys in the first row, followed by 10 in the second, 9 in third, 7 key in the fourth row and a space bar at last row. By using a text editor, we can see which key is pressed and can write anything meaningful, anytime.

VI. CONCLUSION

Our development have done justice with its main and most important significance as It is a practical thing that if we have money we can buy whatever we wish for, but in case we are lacking economically we have to adjust to what is existing in the market, so, our project is fulfilling and satisfying the need and search of all the tech maniacs.

The successful termination of the project resulted in a great invention which is both interactive and free to its users.

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