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System Interaction by Using Hand Gesture Recognition with Visual Cryptography Scheme

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ABSTRACT

 The gesture system is use in our daily life as a natural human-human interaction has inspired by the researchers to simulate and utilize this gift in human-machine interaction which is appealing and can take place the interaction ones that existed such as television, radio, and various home appliances as well as virtual reality will worth and deserve its name. This kind of interaction ensures promising and must be secured with satisfying outcomes if applied in systematic approach, Secure communication in day-to-day life while transmission of digital images is important in today image communications. Due to the increasing use of images processes, it is essential to protect the confidential assets from the unauthorized persons. This paper reviews and applies visual cryptography scheme so that it will identify a particular human gesture and convey information to the users pertaining to the individual gesture only for the authorize person or user.VCS does not need any type of decryption algorithm or computation. Its uses human visual system for decryption and it can b only applied for static images. The cryptography can be applied to a hand gesture system. Natural hand gestures are the key component to interact with the system. The method AR and the sixth sense technology is to be applied on the hand gesture recognition for robotic automation.

Keywords **-** Template Matching algorithm,AES, Visual Cryptography scheme,Augumented Reality, Sixth sense , Robotic Automation.

I. Introduction

  Cryptography is the art and science of protecting information from undesirable individuals by converting it into a form non-recognizable by its attackers while stored and transmitted . Data cryptography mainly is the scrambling of the content of data, such as text, image, audio, video to make the data is unreadable, during transmission or storage called Encryption. The main goal of cryptography is to keep data secured from unauthorized persons. The reverse of the data encryption is mainly known as data Decryption. Here we are using Visual cryptography scheme, Visual cryptography is a perfectly secure method of keeping images secret, for possible use in gesture identification and protection. Visual cryptography does not need any type of decryption algorithm or computation. It uses human visual system for decryption and it can be only applied for the fixed image. But for real time image we are using some part of visual cryptography, AES algorithm for encryption and decryption. The AES has three fixed key sizes of 128, 192 and 256 bits. Key size is unlimited, whereas the block size maximum is 256 bits. The AES design is totally based on a substitution-permutation network (SPN) and will not use the Data Encryption Standard (DES) Feistel network. This cryptography is further applied on hand gesture recognition system. **G**estures are a powerful means of communication among humans. In fact, gesturing is so deeply used in our communication that people often continue gesturing when interacting with the automation. Hand gestures provide a separate complementary modality to speech for expressing ones ideas. Information associated with the hand gestures in a conversation is the degree, the discourse structure, the spatial and temporal structure. So, a natural interaction between humans and computing devices can be achieved by

using hand gestures for communication between them. Although hand postures and gestures are often considered identical, there are distinctions between them. A hand posture is defined as a fixed movement. The main purpose of gesture recognition research with visual cryptography scheme is to identify a particular human gesture and convey information to the user pertaining to individual gesture only for authorize person or user. Template Matching Algorithm (TMA) basically consists of transforming the hand into canonical frame and comparing the image data with prestored data. Template matching, a fundamental pattern recognition technique, has been utilized in the context of both posture and gesture recognition. In the context of images, comparison of a prototype and a candidate image is to be performed by template matching algorithm. The similarity of the candidate to the prototype is proportional to the total score on the basis of preselected similarity measure. For recognizing the hand postures, the image of a detected hand forms the candidate image which is directly compared with the prototype images of hand postures. The best matching prototype is to be considered as the matching posture. Clearly, because of the pixel-by-pixel image comparison, template matching is not invariant to scaling and rotation. Template matching was one of the first. methods employed to detect

reality, in which a view of reality is modified (possibly even diminished rather than augmented) by a computer. As a result, the technology functions is by enhancing one's current perception of reality. By the other hand, virtual reality replaces the real world with a simulated one. Augmentation is conventionally in real-time and in semantic context with environmental elements, With the help of advanced AR technology the information about the surrounding real world of the user becomes interactive and digitally manipulable. Artificial information about the environment and its objects can be overlaid on the real world. Finally the hand gesture recognition, sixth sense,augmented reality is applied on robot automation

II.   Framework
The various steps in the entire problem can be divided into the following broad headings:

1. Hand detection in a cam
2.Applying cryptography for secure communication
3. Identifying the essential features such as finger tips and orientation
4. Tracking of those features in subsequent frames
5. Adequate description of gestures to be used

6. Accurate identification/recognition of those gestures in a real-time image.

hands in images. If the template will then we can say that the person is authorized person. and then these hand gesture images will operate the robotic automation. .   Application that controls the robotic automation by using hand gesture is the
- Sixth sense
- Augmented Reality

a) Sixth sense:
Our focus is to move mouse cursor on the screen without using any hardware i.e. mouse. We use the newly born technology which is to be named as Sixth Sense Technology . We implement computer mouse movement through finger by image grabbing using Sixth Sense Technology which gets processed by using gesture recognition and applied on robotic automation. Mouse is the most popular input device now-a-days used for the human interaction with the computer systems to interact with the digital world through user's hand.

b) Augmented Reality:
Augmented reality (AR) is a live, directly or indirectly, view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. It is related to a more general concept called mediated.

7.After identification apply hand images on robotic automation.

8.Two methods ie AR and Sixth sense is to be applied for robotic automation.

Fig below shows the overall framework
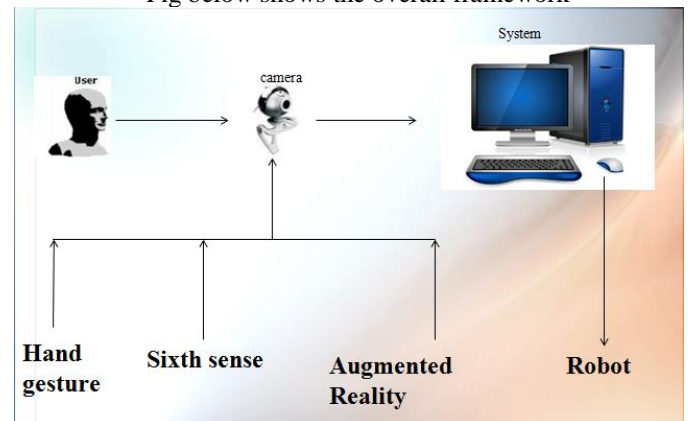
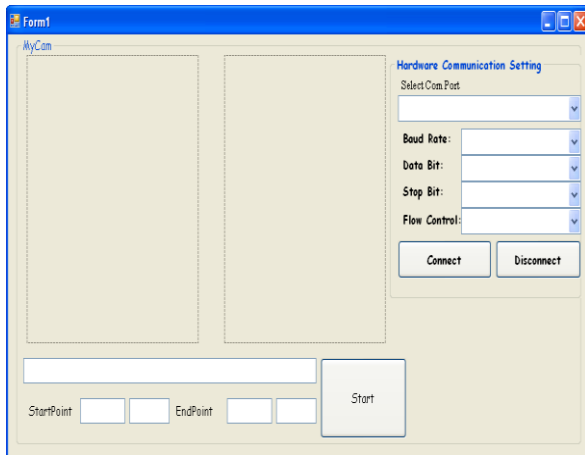**STEPS TO PERFORM OPERATION:**

a) HAND GESTURE RECOGNITION:

Fig 2. The finger images will be captured by using camera

Fig 3. Finger image is captured now and it will be recognized

b) VISUAL CRYPTOGRAPHY:

Visual Cryptography Schema is the one which is used in order to divide the secret image and verification image into shares which each participant holds. Cryptography is a method of protecting confidential information. The visual cryptography is a branch of secret sharing images to machine using cell phone with any wireless media . A secret image is encoded form into trans-parencies, and the content of each transparency is noise reduce -like so that the secret information cannot be retrieved from any one transparency via human visual observation or signal analysis techniques.

Classification:
1. Images capturing
2. Frame (query)
3. Processing

4. Hand Tracking
- Skin detection
- Remove noise
- Temporary save in database

c) SIXTH SENSE:

Sixth Sense is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information

1. The object in view and tracks the user's hand gestures.
2. There are colour markers placed at the tip of users' finger. Marking the user's fingers with red, yellow, green and blue coloredtape helps the webcam to recognize the hand gestures. The movements and arrangement of these markers are interpreted into gestures that act as a interaction instruction for the projected application
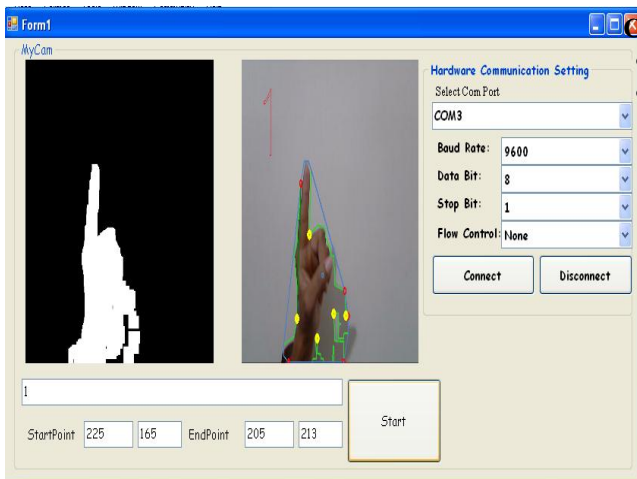
Classification:-
- Camera.
- Coloured Marker.
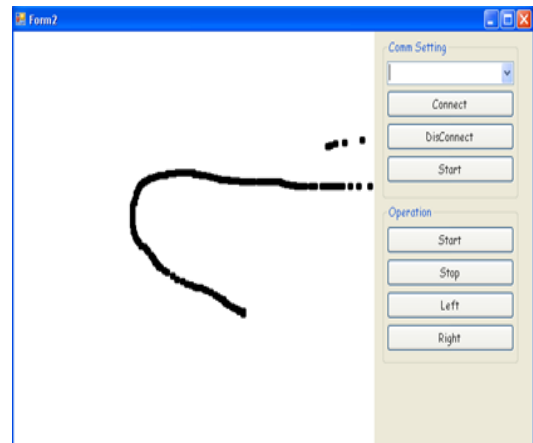
fig 4. By using finger the images are captured according to the images robot moves in different direction

III. CONCLUSION

Controlling a robot arm in real time, through hand gesture with visual cryptography scheme is a novel approach. This technique proposed here was tested under the proper lighting conditions. A gesture database consisting of binary image is prestored,so it takes less time and memory space during pattern recognition. Due to the use of cropped image of gesture, our database become more effective as one image is sufficient for one type of gesture presentation. So neither we need to store more than one image for same gesture at different position of images, nor have to worry about positions of hand in

front of camera and according to the gesture the robotic perform his operation.

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