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# Face Detection by Robotic Dog

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**Abstract-The field of human-robot interaction (HRI) addresses the design, understanding, and evaluation of robotic systems, which involve humans and robots interacting through communication. Artificial Intelligence Markup Language (AIML) is derived from Extensible Markup Language (XML) which is used to build up conversational agent artificially. As the field matures, education of students becomes increasingly important. Courses in HRI provide the canonical set of knowledge and core skills that represent the current state of the field and permit the evolution of knowledge and methods to be transferred from research to a broad set of students. Furthermore, HRI coursework creates a workforce willing to pass the theory of HRI to reality. However, HRI courses are mostly ad hoc, as would be anticipated for an emerging sector. This article summarizes the discussion and results from the workshop on the creation of an HRI course for computer scientists and engineers, Educating Humans About Human-Robot Interaction. A lot of work has been done to create a conversational agent. But in different applications, low cost, configuration and availability make it possible to use it. Cultural heritage, e-learning, e-government, interaction platform, humorist expert, network management, adaptive modular architecture are all related to these applications. A lot of work is being done to create a conversational agent. But low cost, configuration and availability make possible to use it in different applications. Not only do they offer helpful resources, but they also connect with clients and provide solutions to their problems. We draw a careful inference that individuals communicate with structures that reflect human-like attitudes differently, so they will interact with them in robot.**

**Keywords:- Robotic, Machine Learning, Conversation.**

## I. INTRODUCTION

The information age is quickly revolutionizing the way transactions are completed The information era is increasingly transforming the way transfers are done. Everyday acts are increasingly being handled online, rather than using pencil and paper or face to face. This rise in electronic transactions has resulted in a higher demand for quick and reliable identification and authentication of users. Access codes for buildings, bank accounts and operating networks. Face recognition technology may solve this problem since a face is undeniably connected to its owner expect in the case of identical twins. Its nontransferable.

Biometrics is a special, observable feature of a human being that can be used to instantly identify a person or to verify the identity of an individual. Biometrics can quantify both physiological and behavioral characteristics.

**1. Physiological Biometrics:**
Physiological Biometrics (based on measurements and data derived from direct measurement of a part of the human body) include:

- Facial Recognition
- Iris-scan
- Retina-scan
- Hand-scan

**2. Behavioral Biometrics:**

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This biometrics is based on measurements and data provided.

- Voice-scan
- Signature-scan
- Keystroke-scan

## III. WHY WE CHOOSE FACE RECOGNITION OVER OTHER BIOMETRIC?

There are a number of reasons to choose face recognition.

This shall include the following:

- It does not require any physical inetractio on behalf of the user.
- It is accurate and allows high enrolment and verification rates.
- It does not require an expert to interpret the result of the comparison.
- You can use your existing hardware infrastructure, existing cameras and image capture. Devices will work without any problems.
- It's the only biometric that allows you to perform passive identification in a single to. Many environments (e.g.: identification of a terrorist in a busy airport terminal.

## IV. FACE RECOGNITION THE FACE-UNIQUE PART

**1. History:**

The first semi-automated facial recognition device to locate the features on images (such as eyes, ears, nose and mouth) in the 1960s. Goldstein and Harmon used 21 unique subjective markers in the 1970s to automate identification, such as hair color and lip thickness. Kirby and Sirovich used regular linear algebra methods face recognition in 1988.

**2. Facial Recognition:**

There are two forms of comparisons for face recognition:

**2.1 Verification:** This is where the machine contrasts the person with who the person thinks they are and offers a yes or no answer.

**2.2 Identification:** This is where the system compares the person involved to all the other people in the system. Database and gives a list of matches ranked.

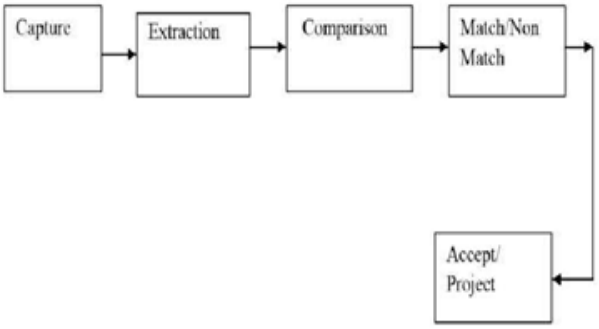


Fig 1. Face Recognition.

All technologies for identification or authentication work in the following four stages:

**2.2.1 Capture:** The device collects a physical or behavioral sample during registration and often in the process of identification or verification.

**2.2.2 Extraction:** Specific data is extracted and a prototype is generated from the sample.

**2.2.3 Comparison:** Then the template is compared to a new sample.

**2.2.4 Match/Non Match:** The device determines whether a match or a non-match are the features derived from the new samples.

**3. Components of Face Recognition Systems:**

**3.1 Enrollment Module-** An automated mechanism that scans and captures a digital or an analog image of a living personal characteristics.

**3.2 Database-** Another entity which handles compression, processing, storage and compression of the captured data with stored data.

**3.3 Identification Module-** The third interfaces with the application system.

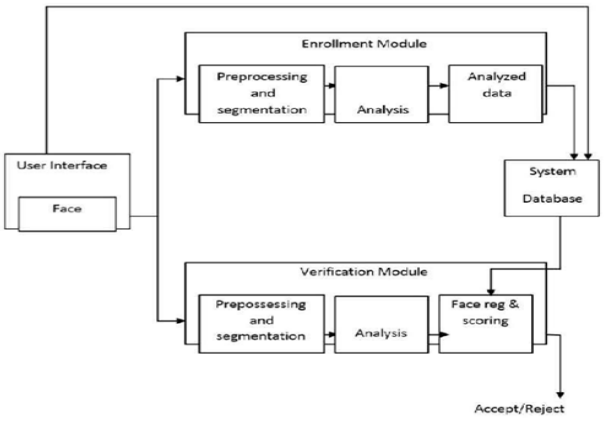


Fig 2. Face Recognition Systems.

**4. Implementation of Face Recognition Technology:**

The following three stages are included in the implementation of face recognition technology:

- Acquiring data
- Processing input
- Classification of face image and decision making

**4.1 Data Acquisition-**Video of the speaker or a still image can be recorded with the input. A sample lasting 1 sec consists of a video sequence of 25 frames. To produce a 3D representation of the face and to protect against the use of photographs to gain unauthorized access, more than one camera can be used.

**4.2 Input Processing:**

- The pre-processing module detects the shape of the eye and takes care of the ambient lighting and color variation. First a face or face detection at the scene must be obtained. When a face is found, it must be made in place.
- Some face recognition methods apply to the entire face while others focus on facial features and / or regions (such as lips, eyes, etc.). Facial expressions can change drastically during speech and because of facial expressions.

**5. Occlusion:**

Arrest is a state of restraint. In the case of facial recognition, it includes the fact that some parts of the face cannot be detected. For example, a face image taken from a surveillance camera may be hidden slightly behind the column.

The notification process can be highly dependent on full face detection. Therefore, the absence of other parts of the face can lead to improper separation.

There are also items that can include facial features-glass, hats, masks, beards, certain haircuts, etc.

**5.1 Optical Technology:** The face recognition system should know the format in which the input images are provided.There are different cameras, with different features, different weaknesses and problems.

**5.2 Expression Facial:** Description by another variety provider. However, it is not as strong as lighting or standing. However, the addition of speech fluctuations and lighting problems can be a real barrier to accurate facial recognition.

**5.3 Algorithm Evaluation:** It' s not easy to evaluate the effectiveness of a recognition algorithm. Several core factors are unavoidable:

- Error rate.
- Computational speed
- Memory usage.

**5.4 Illumination-**Many algorithms rely on color knowledge to detect faces. The elements are removed from the color illustrations, or some of them may be gray. The color we see from a given location depends not only on the surface, but also on the light on the surface. There can be a variety of lighting that is appropriate for photos taken under uncontrolled environment. Color intensity in pixels can vary greatly depending on lighting conditions.

As many extraction methods are transferred to the color / intensity variation measures between pixels to obtain the relevant data, they show an important dependence on light transition. Keep in mindthat, not only light sources can vary, but also the intensity of light can increase or decrease, with the addition of new light sources. All face regions are hidden or in the shadows, and even the removal of the output can be impossible due to the sun.

The big problem is that the same face of the same topic but with different brightness can show a greater difference between them than compared to another theme. In summary, light is one of the major challenges of automated face recognition systems., and also feature extraction can become impossible than compared to another subject.Summing up, illumination is one of the big challenges of automated face recognition systems.

**5.5 Pose/View:**Facial images vary due to related camera faces (front, 45°, profile, face down), and other facial features such as eyes or nose may be completely or completely closed. In fact, the change in pose affects the recognition process due to the introduction of visual impairment and self-regulation. Therefore, pose tolerance is very important for facial recognition systems based on a single topic view.

**5.6 Aging and Wrinkles:**Aging can be both natural (due to age) and artificial (using artificial tools). In both cases, the aging process can adversely affect the function of the facial recognition system. In

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general, the effect of age variation or age factor is rarely considered in visual studies.

One of the main reasons for the small number of studies regarding facial recognition obtained in the age-old context is the lack of representative public images containing images of people of different ages and low quality of old photographs as documented. As it is very difficult to collect a database of facial images that contain images of the same person taken at different ages in his life.

**5.7 Cyber Security Issues:**Software applications or devices that can be accessed wirelessly may result in an additional risk of data breach. Also, smart devices and computer-controlled devices to manage or perform a wide range of their tasks and workflow can often be an attraction.

**6. Face image classification and decision making:** Synergetic computer is used to distinguish visual and audio features, respectively. Computer synergetic is a collection of algorithm that mimics synergetic events. In the training phase BIOID creates a specific type called face print for each individual. The newly recorded pattern is processed and compared to each face print stored in a database. As a comparison is made, the system assigns a value to a comparison using one to ten scales. If the school exceeds the pre- determined threshold, a match is announced.

When you look in the mirror, you see that your face has some distinctive features. These peaks and valleys form a variety of facial features. The software defines these landmarks as pull points. There are about " 80 head points" on a person's face.

- Distance between the eyes
- Width of the nose
- Depth of the eye socket
- Cheekbones
- Jaw line
- Chin

**6.1 Face Bunch Graph:**

- The bunch graph was created from " 70 nodal points" to get a typical representation of the face.
- As given the image the face is matched with the facial group graph to get the same point.
- These nodal points are measured to create a numerical code, a series of numbers representing faces in the database. This code is called face print.
- Only 14 to 22 points are required on face software to complete the recognition process.

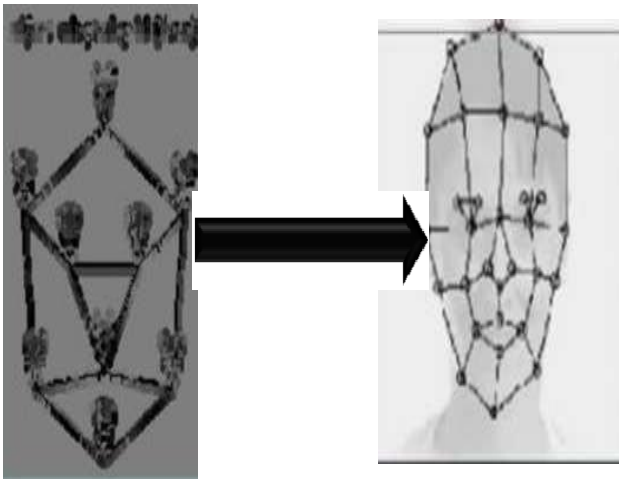

Fig 3. software to complete the recognition process.

## V. ADVANTAGES AND DISADVANTAGES

**1. Advantages:**

- Are There are many benefits to dealing with recognition programs such as its acceptance and social acceptance. all you need is your photo taken to work.
- Face recognition is easy to use and in most cases can be done without Person and knowledge
- Recognition Face recognition is also one of the cheapest biometric on the market and Its price should continue to decline.

**2. Disadvantages:**

- Systems Facial systems cannot distinguish between identical twins.

## VI. APPLICATIONS

The natural use of face recognition technology is a PIN change.

- Government Useage:
- Commercial Use:
- Homeland Security: Warn homeowners.
- Banking using ATM: Software is able to quickly verify the face of the customer.
- Control Physical access control for building areas, doors, cars or network access.

## VII. CONCLUSION

Face recognition technology is often associated with high- end secure applications. Today the basic

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technology has evolved and the cost of equipment has dropped dramatically due to the deviation and growing processing power. Some face recognition applications are now more expensive, reliable, and more accurate. As a result there are no technical or financial constraints to go down from the pilot project to the general deployment.

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