COORDINATE ACCESS SYSTEM FOR LIVE VIDEO ACQUISITION

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Abstract. Biometric systems are the most advanced access technology developed so far in the 21st century. It does not even require to carry key cards or passwords in mind. Today most of the commercial and private entries are protected by biometric recognition systems like fingerprint scans facial recognition, retina scans, voice matching, etc. Even our phones, laptops, and daily access devices are equipped with biometric systems. In banks, the PCs are secured by the combination of passwords and fingerprint scans. Biometric scans are considered the most secure access technology so far. Our paper is to examine whether they are secure? Should we rely on them with our hard-earned money and social identity? Is there any way we can use these services without actually compromising our data and security? Our observation is on our digital identity. Promoting digitization in every department brings our topic in the picture. All our information is saved in our phones, our daily routine, whom we talk, what we purchase, whom we chat, where we travel, etc. Almost every smartphone has biometric fingerprint locks which means our phones have our fingerprint scans in database and with internet blend it’s tethered worldwide. Our fingerprints are connected to our bank accounts, PAN Cards, Passport, and SIM Cards using Aadhar Cards. If someone has our fingerprint they can easily reach our Aadhar Card and through that to all our personal information. Most of the phone companies are Chinese, Korean, German, and American. As per their country policies, they must share their data with the governing authorities. We aim to create a security system without actually using the biometric scans. The system is an advancement of the biometric system but with better accuracy and intelligence. We interface image acquisition tools to live track the red color things. The web camera or inbuilt system lens can be used as the acquisition system. When the red color object is moved in front of the lens it shows the corresponding coordinate of the object shown. We use these x and y coordinate of the objects as the authentication points. If the correct value grant access is 120 ≤ x ≤ 122 means the system grants permission only if the value of x=120,121 or 122 is obtained. Now, this is tricky. Even if you know the correct value also, it is very difficult to bring the correct point. Think about if you don’t know the point and it is also possible to make it much difficult by adding y coordinate so if the desired point is x=10, y=12 (10, 12) it is way more difficult. Each point is a possible password candidate and the screen of any device have megapixels where 1 Megapixel=10⁶ pixels. Each pixel is a possible key or password entry. It can keep all our
information safe and secure. We use a microcontroller and motor driver connected gate to demonstrate the result.

Index Terms: Aadhar Card, SIM, PAN, Coordinate, Megapixel

1. Introduction
There are several access systems to enter into secure facilities. Mainly they are Physical or Digital systems. Physical systems are locks/keys, latches. Digital systems are biometric and Non Biometric systems. Biometric covers fingerprint access, retina scan, face recognition, etc.

Non-Biometric Systems cover Radio Frequency Identification (RFID), Password, and OTP. Digital systems are way advanced compared to physical systems. Unlike physical, digital systems do not depend on physical security mechanisms too much extent. It uses smarter technology to allow access to authorized personals. We don’t need to carry the bunch of keys for each department of office or rooms of a house. Multiple keys can be converted into smarter RFID Tags, Password-based entry using Smart Keypads with digital authentication systems. Biometric Systems are smarter than non-biometric digital systems.

![Different Access Systems](image1.png)

Fig.1.1- Different Access Systems

It the access tools like key, tags cards are missed they can be severely misused but digital systems like password, voice command, biometric scans are either in the mind of the user or the body parts are used as the authentication access tags. Our paper is not about different access systems but it is an initiation to draw the attention of the society on many issues. Whole worlds are moving towards digital maturity day by day. Technology is greatly helpful during the current COVID-19 situation to hold the world from completely going drowned of recession. Despite several boons, technology came with a few banes as well. All our phones today are equipped with fingerprint sensors. Some very high-end digital devices are sufficiently equipped to take iris scans as well. All these foreign-made phones and biometric scans are easily available to foreign manufacturers. Most of the country has protocols that if you have a business in their country you must share your resources and database with the government. Our information like iris and fingerprints are connected with Aadhar cards and all bank accounts and financial tracks are possible with that information.

The detailed information of digital data scrambling and malpractices by different companies are in news today. We focus on creating a much efficient and reliable access system by using biometrics’ idea but without using our biometric identity. The overall process is discussed, assimilated, and demonstrated in our paper. The solution is also extensively discussed. We plan and propose to use an intelligent live tracking system to formulate a system where there is no use of any physical or biometric system to enter into the secure facility or system. In our next section, we observe several works done on the domain.

2. Literature Survey
[1] Nikhil Anand, Shakshi Mishra explained briefly in their paper titled “Home Automation Using Hand Gestures” about a brief study on gesture recognition. They mentioned that there are many control systems for electrical appliances like infrared and switches. There are several possibilities to
use different techniques. They introduced the concept of gesture recognition. The live image feed was provided to the pc with the camera. The hand was being displayed in front of web camera to provide the input if the input picture of different gestures of hands matched the database image then MATLAB software was used to ON/OFF the device corresponding to different gestures. The main objective of the paper was to develop a new type of control system to help handicapped and people who were not in the reach of the switch. The here to use MATLAB as an image acquisition and processing tool was impressive. The pic microcontroller was used as the controller module to understand the MATLAB logic and control the electrical appliances. The instructions between MATLAB and pic microcontroller was processed using USB to serial converter. The corner point detection algorithm was used to detect and process the gestures. The fast Fourier transform [FFT] algorithm was used to fast processing if image matching.

[2] Deval G. Patel briefed in her paper titled “Point Pattern Matching Algorithm for Recognition of 36 ASL Gestures” about an extensive study on Point Pattern Matching. She mentioned that the researched approach to sign language decoding by efficient utilization of machine vision. The idea was to decode hand gesture variability with the help of intelligent point pattern matching. The process was for static hand gestures of American Sign Language (ASL) for numbers \([0, 9]\) and alphabets \([A-Z]\). The successful classification of alphanumeric sequence was processed in the paper. The recognition rate was provided in percentage algorithm was system reliability. The point pattern matching algorithm was used to match the database of test and train folders. After executing the algorithm is used to analyze the ASL input image by comparing the test image to its ASCII. There were certain wrong observations as C and O and P and H of ASL were recognized correctly when high-resolution images were used. The effect of environmental factors was discussed during recognition like scaling, viewpoint, and orientation.

[3] Guangqi Ye, Jason J. Corso, and Gregory D. Hager discussed briefly in their paper titled “Gesture Recognition Using 3D Appearance and Motion Features” about a brief study on 3D gesture recognition scheme. They explained that the 3D gesture recognition scheme processed in the paper. They explained that the 3D appearance of the hand and the motion of the gesture can conclude to a controlled gesture. It does not directly track the motion, instead it computes the 3D appearance using a stereo matching algorithm to the volume around the hand. Motion is considered by finding the difference in backgrounds in different frames. The 4D touchpad platform. The overall accuracy of recognition was identified by the approach.

In our next section, we discuss the detailed process and design implementation of our proposed approach.

![Circuit Diagram](image)
The block diagram represents process flow for the Software part. How the image acquisition processing takes place is presented in detailed order.

![Block Diagram Design Scheme](image)

**Fig. 1.3 – Block Diagram Design Scheme**

4. **Implementation Components**

4.1. **Power Supply**

The Module is used to provide the power supply to run the system. Rating is 12V, 1.3 AH.

![Power Supply Circuit](image)

4.2. **Arduino Nano**

It is the programmer board based on ATMEGA 328 P PU microcontroller. It acts as the brain of our system to control the access gates.
4.3. 16X2 LCD Module
The LCD module is used to display the in and around working information in display.

4.4. Gate Unit
We use the CD tray as the gate open/close system. It has an inbuilt propeller motor which can be controlled by the motor driver in different directions.

4.5. L293D Motor Driver
We use the CD tray as the gate open/close system. It has an inbuilt propeller motor which can be controlled by the motor driver in different directions.
4.6. **USB to TTL Unit**

This unit is used to provide commands from the PC to the Microcontroller. The USB side is connected to the PC and the transmitter of the USB2TTL unit is connected to the microcontroller. Now the command coming through the PC is received by the microcontrollers to perform the stipulated tasks.

4.7. **Buzzer**

The Buzzer is a DC sound producing device to alert us about gate opening or closing.

5. **Results And Outputs**

The Hardware development module is demonstrated below. The microcontroller is programmed to receive the instructions from the PC after analyzing the coordinates.
Fig. 1.4 – Implementation Hardware

Fig. 1.5 – Live Image Acquisition Coordinates
6. Conclusion And Future Enhancements

Thus we developed an automatic system of access without using biometric authentication. This makes the system much efficient and reliable for real-time implementation. The image acquisition system detects the correct coordinate and instructs the Arduino Nano which is equipped with a system of microcontroller model Atmega 328 P PU. This makes the system to allow the access to the user if the correct coordinates are accessed. Further Possible Modification plans can be an automatic door opening and closing system by showing the right coordinates and update the information online using IoT. Even it is possible to control electrical appliances like Fan and Bulb by just showing the fingers in camera and processing it for many complex tasks.

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