INTELLIGENT VIDEO SURVEILLANCE SYSTEM USING DEEP NEURAL NETWORK

A Synopsis
Submitted in partial fulfillment of the requirements of the
Degree of

BACHELOR OF TECHNOLOGY
in
COMPUTER SCIENCE AND ENGINEERING

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AUG-DEC 21

Related Work

Paper- 1

Real Time Face Detection and Tracking Using OpenCV Context

In this paper, we intend to Implement a real-time Face detection and tracking the head poses position from high-definition video using Haar Classifier through Raspberry Pi BCM2835 CPU processor which is a combination of SoC with GPU based Architecture. SimpleCV and OpenCV libraries are used for face detection and tracking the head poses position. The experimental result computed by using computer vision SimpleCV and OpenCV framework libraries along with above mentioned hardware results were obtained through of 30 fps under 1080p resolutions for higher accuracy and speediness for face dete ction and tracking the head poses position.

Paper- 2

Enhanced Home Security Using IOT and Raspberry PI Context

A smart home application features great help to our everyday life. This system rejuvenates facilities of a house to evolve into a smart home by adding more security features. The improvement in security aspect offers innovative and productive scope to the means of living. All these characteristics is adapted by using Internet of Things (IoT) and Raspberry Pi. The recognition problem is always questionable in smart home applications. So, a recovery is done to identify the intruder as known or unknown by the use of image processing techniques for face recognition. This tends to solve many issues in terms of authentication. This protection mechanism notifies the user accordingly, giving a clear picture of the scenario happening at the user's house. The sensor-based system highlights many features enabling it to be widely used. Fire sensor detects any temperature increase in the living room and posts its status in the URL given to the user. The gas sensor helps in detecting the presence of any gas leakage based on the intensity of the gas in air. With the help of DC motor, auto door locking mechanism is actuated. This is very useful. All the statuses are processed between the sensors and the user via IoT. Raspberry Pi connects all the components and brings forth the proper functioning of the whole package. The procedures that are used here are very simple. Hence, even novice users could understand the systems advanced features and use it with ease. The use of surveillance camera also helps in identifying the presence of flame and thus a buzzer is activated in the case of fire detection.

Paper- 3

Smart Surveillance Camera using Raspberry Pi 2 and OpenCV Context

Abstract Nowadays the need for a safe and secure system is desired by each and every individual in the society. The most commonly used system, Closed Circuit TeleVision (CCTV) is being implemented everywhere such as in hospitals, warehouses, parking lots, buildings etc... However, this very system though effective has its downside when it comes to cost. Thus, the need for a cost-effective system is required. The existing system for surveillance is a security

camera with the night vision capabilities using raspberry pi and openCV. This is a cost-effective method that uses a credit card sized chip RPI. The image is captured and each frame is processed. The image is stored and an email is sent if human is detected. The existing system has accuracy of about 83 %. In this project we propose to use an enhanced recent model-raspberry pi 2 which has operating speed 900MHz. Also, we use a pi camera. So, the image is captured via the pi camera and it is sent to the raspberry pi 2 for processing for face and human detection with the help of openCV. Then, the face detected is compared with the database, if the human detected is known (visitor) or not (stranger) and based on the output, an audio output is produced and a message is sent to the user. Thus, one can provide a low-cost security system.

Paper- 4

Survey Paper on Smart Surveillance System Context

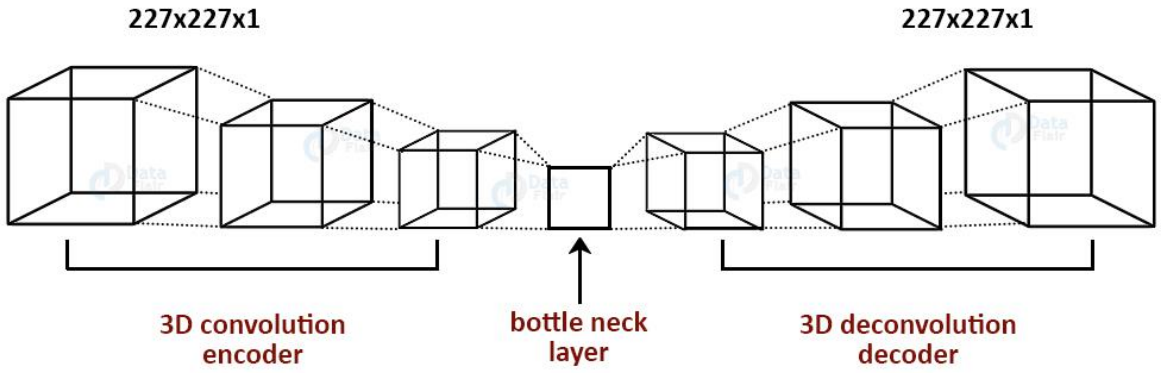
This paper deals with the survey of Smart surveillance monitoring system using Raspberry pi. Video Surveillance is important as far as security is concerned these days. Commercial spaces, schools and hospitals, warehouses and other challenging indoor and outdoor environments require high end cameras. The current technologies require RFIDs which are costly and hence the security domain in all becomes expensive and hence there was a need to work on this. This paper describes the use of low-cost single on-board computer Raspberry Pi. This new technology is less expensive and, in this project, it is used as a standalone platform for image processing. It increases the usage of mobile technology to provide essential security to our homes and for other control applications. The proposed home security system captures information and transmits it via a 3G Dongle to a Smart Phone using web application Raspberry pi.

Proposed Method

We have generally seen deep neural networks for computer vision, image classification, and object detection tasks. In this project, we have to extend deep neural networks to 3-dimensional for learning Spatio-temporal features of the video feed.

For this video surveillance project, we will introduce a Spatio-temporal autoencoder, which is based on a 3D convolution network. The encoder part extracts the spatial and temporal information, and then the decoder reconstructs the frames. The abnormal events are identified by computing the reconstruction loss using the Euclidean distance between the original and reconstructed batch.

We will use spatial-temporal encoders to identify abnormal activities.



Feasibility Study

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential. Three key considerations involved in the feasibility analysis are

- Operational Feasibility
- Economic Feasibility
- Technical Feasibility
- Social Feasibility

OPERATIONAL FEASIBILITY:

Operational feasibility is a measure of how well a proposed system solves the problems, and takes advantage of the opportunities identified during scope definition and how it satisfies the requirements identified in the requirement analysis phase of system development. As the operation of the existing signature pads and their relevant software's are user friendly and do not require any expertise, the proposed system also supports user friendly approach and less necessity for expertise in technology and operation of the system. The feasibility of implementing a face recognition system in an FPGA device based on Gabor filters for feature extraction and the nearest neighbor technique for classification have been investigated. The resulting face-recognition design can be used in a door access control system. In this study, a Xilinx system generator and an ISE project navigator were used to design the required simulation and to produce the hardware implementation reports. The distributive arithmetic FIR filter was used in the feature extraction stage to compute the convolution operation between the input image (three region images) and each of the 40 Gabor matrices (filter coefficients). In the classification stage, the simulation design of the nearest neighbor technique was attempted based on the City Block distance. The results obtained using the simulations confirmed the feasibility of implementing a face recognition system on an FPGA device with minimum hardware.

ECONOMIC FEASIBILITY:

Economic feasibility analysis is the most frequently used method for evaluating the effectiveness of a new or proposed system. More commonly known as cost/benefit analysis, the procedure is to determine the benefits and savings that are expected from a candidate system and compare them with the costs needed to be spending for implementation and operation. In case, the benefits outweigh costs, the decision is made to design and implement the system. The determination of economic feasibility requires an identification of the potential costs associated with the implementation of the proposed system. When multiple layers are added to the existing devices, the cost may be increased by 50 percent to 100 percent, which is still a feasible price for a high security authentication device. This study is carried out to check the economic impact that the system will have on the organization. The

amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus, the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.
Our device is a combination of both hardware and software. The hardware components are easily available in the market at a very cheap rate. Also, the software used in this project is a free source software.

TECHNICAL FEASIBILITY:
This study is carried out to check the technical feasibility, that is, the technical requirements of the system. The proposed model with proven results through the prototype shows that the system is technically feasible to be implemented as an independent authentication system. The camera system is compact and can be implemented with low cost. The implemented face detection algorithm (Haar like cascade classifier) is very effective, with an accuracy of 88.9 percent which can be increased further by effectively improving the illumination of the area. However, this system is connected with the help of an Ethernet cable to the laptop to communicate with the raspberry pi. This can be overcome by making the system wireless.

SOCIAL FEASIBILITY:
The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity. The level of The aspect of study is to check the level of acceptance of the system by the user. This includes the process of training the user to use the system efficiently. The user must not feel threatened by the system, instead must accept it as a necessity.

HARDWARE REQUIREMENTS:
- 8 GB RAM
- 4 GB free disk space
- Inter Core i5 processor or above

SOFTWARE REQUIREMENTS:
- Windows 7 or above
- Browser (Chrome, firefox, Internet Explorer)
- Pillow Library
- OpenCV
- Keras
- Tensorflow
- Jupyter Notebook
- Python 3.8 (64-bit) or above

NON-FUNCTIONAL REQUIREMENTS:

These are basically the quality constraints that the system must satisfy according to the project contract. The priority or extent to which these factors are implemented varies from one project to other. They are also called non-behavioral requirements.

- **Portability and compatibility:** The software can work on different OS (windows, MAC) and browsers like chrome, Firefox, safari.
- **Security:** No unauthorized access to database.
- **Availability:** Our system can be accessed 24*7 with good internet connection.
- **Usability:** System should have User-friendly interface