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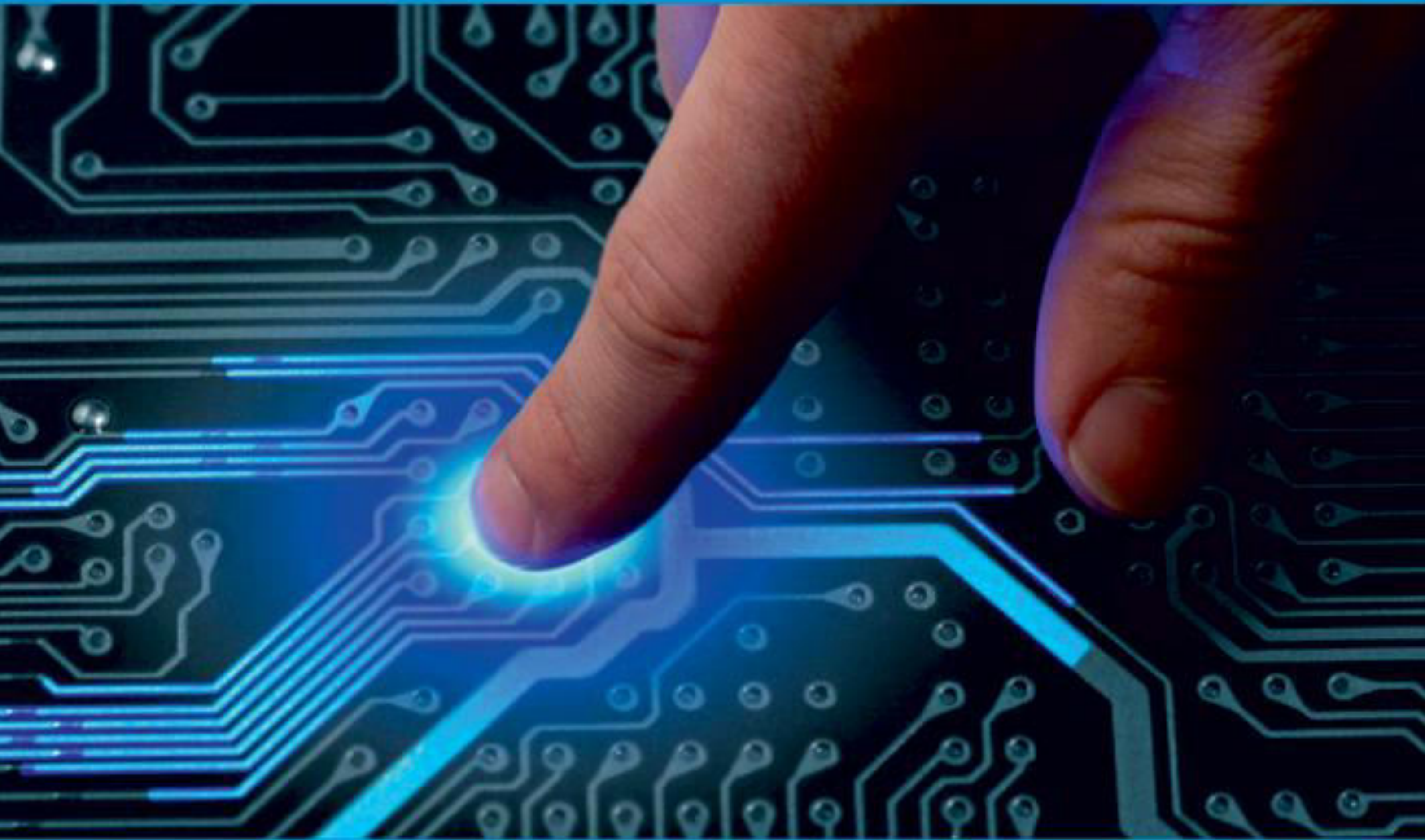

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A Deep Learning Approach For Gait Recognition in Drone Surveillance System

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ABSTRACT: Data created as a consequence of the widespread usage of video surveillance systems has grown enormously in recent years. Stride (gait) recognition is one of the desired biometrics for recognition. In order to differentiate evidence of irregular workouts, a programed ordering of a person's activity in the observation range may be used to recognise walk acknowledgment. Static-mobile reconnaissance frameworks may now cross over more easily because to developments in online computing. Modern machine learning techniques are becoming popular because of their ability to learn and adapt to new data sets. We discovered various approaches for HGR (Human gait recognition) based on deep learning by doing a literature review. The neural network with deep convolutional layers will be used instead of Additionally, the new technique is compared to current processes and outperforms them in terms of accuracy and computing time.

KEYWORDS: Human gait recognition;Deep convolution neural network; Reconnaissance framework

I. INTRODUCTION

Authorities in cities build video surveillance systems to keep tabs on everyday activities for purposes of public safety. Modern surveillance systems are designed to be portable, dependable, and cost-effective. Static and mobile video surveillance systems are the two most common kinds of systems. Robotic robots and drones equipped with onboard cameras are often used in mobile systems to expand security coverage while using a little amount of electricity. The cost of installing and maintaining a static surveillance system has grown dramatically due to the large number of cameras needed to cover a small area of view. To increase the viewing coverage, battery life, and installation costs through cloud computing services with advancements in online machine learning platforms, a hybrid static/mobile surveillance system strategy has been developed.

The video surveillance system's complicated challenges may now be solved using an online machine learning platform that can grow exponentially. Detection and recognition of suspicious human behaviour via gait analysis might be learned from the feed-in movies. The term "gait" refers to the style or pattern of human mobility accomplished by the movement of human limbs. Gait may be defined as a series of spatial-temporal elements of a human movement in a digital setting. Deep learning-based visual gait recognition may be used to identify and classify people from great distances, without the need for any collaboration and with no effort. Deep learning neural networks (DNNs), such as convolutional neural networks (CNNs), are capable of classifying and recognising things in a way that is much superior to that of humans. Because they are based on biological processes, CNNs may be trained directly from sequence data, requiring only a small amount of pre-processing to extract human traits. For periodic and non-periodic action categorization, these human characteristics may be built up to form a sequence of time-variant traits. Recurrent neural networks (RNNs) learn about time-variant characteristics and correlations between features from a succession of actions in order to classify them using long short-term memory (LSTM). The machine then recognises the activities. Deep learning for gait detection is suggested in this research to allow advanced video surveillance systems, such as hybrid static-mobile drone surveillance systems, to be developed in this project When the GCP sends an alarm, the drone goes into action to keep an eye out for any anomalies that could pose a threat. Keeping an eye on a suspicious person in real time improves the surveillance system's performance.

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There are a variety of ways in which Gait Recognition Technology gathers the data, such as motion sensors or video cameras. Then, the input is processed via a series of complex recognition processes. Gait identification, processing of data, finding contours, silhouettes and separating distinct human traits are all part of the main algorithm. In order to tell one gait from another, the feature extraction method is critical.
It is possible for these algorithms to differ, as well as for their needs to change. Video signals can be processed by certain algorithms while data from sensors can be processed by others.

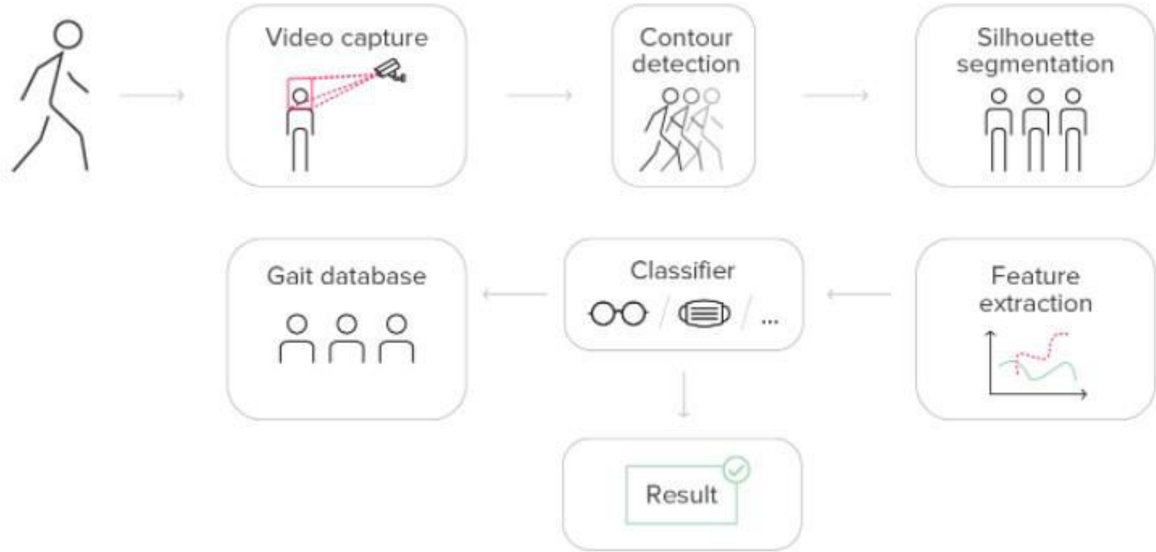

Figure : This figure shows the steps of gait recognition algorithm

II. Related work

It has been reported that three scientists have published a paper in the journal of applied physiology and therapeutics in April 2019. (JAPPT). A Deep Learning-Based Drone Surveillance System for Gait Recognition. Presented at the International Conference on Materials Science and Engineering (IOP) (Vol. 495, No. 1, p. 012031). The International Organization for Pharmaceutics [1]. A hybrid static-mobile surveillance system action detection and identification pipeline has been presented. It is possible to extract spatial information from a cropped person using a CNN-based network, for example, by stacking successively recognised persons one after the other. To characterise human behaviours, a spatial-temporal feature may be generated using an LSTM recurrent neural network. As a final recommendation, the pipeline is built on Google's Tensorflow backend and the KERAS library. While still maintaining remote capabilities and boosting the system's viability, the drone's hardware may be considerably reduced in size by using GCP-compliant models, which can be used to migrate to GCP. Accurate gait identification was shown using KTH datasets with the described workflow.

By Tsushita, HA; and Zin TT, 2018. May.. The usage of surveillance camera footage in the investigation of unusual behaviour was documented. During the International Conference on Big Data Analysis and Deep Learning (pp. 284-291). Springer Publishing Company in Singapore [2]. Every day, people are snatched in a variety of situations and locations, and a way has been presented to handle this issue. This is done with the help of three feature parameters.

Perera and Chahl, J. and YW Law, 2019[3] According to "Drone-action: an outdoor-recorded drone video dataset for action recognition," hovering drones may be used to record action recognition datasets. This collection contains 240 HD videos with a total length of 44.6 minutes. Drones in 2019: 3, 82, 3, 3 In all, 13 of the 16 Drone-Action datasets were based on 13 common outdoor human activities. Because of the large variety of body sizes, camera movements, and phases in our dataset, it is difficult to discern activity. Low-flying drones were used to capture all of the footage in the collection. Researchers may now use the dataset to a broader range of topics thanks to the inclusion of action classes, large images of human subjects, and high-resolution images. An overall baseline recognition accuracy of 75.92 percent

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was achieved using HLPF and P-CNN descriptors. All of these data may be used to detect hostility and identify gait. Surveillance studies may also be carried out using this tool.

2018[4] is the year that Kumar, Mukherjee, Mukherjee & Mukherjee; Saini & Saini; Kaushik & Kaushik; Roy, P.P.; and Dogra, DP.

Using Shadow motion sensors and video sequences, the research article "Multimodal gait recognition using inertial sensor data and evolutionary algorithm" proposed a novel approach for detecting multimodal gait. They observed that an individual's walking style is affected by their present mental state and activity. As a result, they have examined four separate walks, including the regular walk, the fast walk, the walk while listening to music, and the walk while watching a movie on a mobile phone. Three sensors, including an accelerometer, gyroscope, magnetometer, and video, have provided accurate data. LSTMs, which are 3D CNNs, are then utilised to process the extracted spatial and temporal data from the videos that were analysed and extracted using CNNs. Gait recognition has also been modelled via an alternative LSTM architecture. Now, an evolutionary algorithm (GWO) has been developed to increase the accuracy of gait detection by combining all available modalities. The GWO optimizer has claimed an average accuracy of 91,3 percent on all walk sequences when trained on normal-walk data.

Alberto Montes, Santiago Pascual, Xavier Giro-i-Nieto, Amaia Salvador., 2017[5]

Temporal Activity Detection in Untrimmed Videos Using Recurrent Neural Networks provided a straightforward pipeline for the categorization and temporal localisation of activities in videos. The system performs competitively on both tasks. The sequence-to-sequence structure of the proposed network allows for its extension to more difficult video processing tasks, such as when many activities are present in the movie.

"An Analysis of Deep Neural Networks," by Alfredo Canziani, Eugenio Culurciello, and Adam Paszke.

Network models for application in the real world

Multiple state-of-the-art deep neural networks were analysed in terms of accuracy, memory footprint, parameters, operations count, inference time, and power consumption for the ImageNet challenge. ENet—or Efficient-Network—for ImageNet was created to give insights into the design choices that might lead to efficient neural networks for practical application, and optimization of the often-limited resources of real deployments. They have shown that the connection between accuracy and inference time is hyperbolic: a little increase in accuracy requires a substantial increase in computing time. They have shown that the amount of operations in a network model may accurately predict inference time. They demonstrated that an energy limitation places a precise upper limit on the highest feasible accuracy and model complexity in terms of operation counts.

Christian Szegedy, Wei Liu, Yangqing Jia, Pierre Sermanet, 2017[7]" Going deeper with convolutions"proposed a solid evidence that approximating the expected optimal sparse structure by readily available dense building blocks is a viable method for improving neural networks for computer vision. The main advantage of this method is a significant quality gain at a modest increase of computational requirements compared to shallower and less wide networks.

Geraldes, R., Goncalves, A., Lai, T., Villerabel, M., Deng, W., Salta, A. & Prendinger, H.
(2019) [8]."UAV-based situational awareness system using deep learning" .In this paper, they have presented a UAV-based situational awareness system, called Person-Action-Locator (PAL), which can be useful for tasks such as search and rescue or surveillance. The main components of the PAL system are (1) the Deep Learning component that automatically detects people and recognizes their actions, (2) the Pixel2GPS converter that estimates the GPS position of persons by image processing, and (3) the PAL interface that visualizes detected people and actions on a map.

Li, X., He, Y., & Jing, X. (2019) [9]." A survey of deep learning-based human activity recognition in radar" .Human activity recognition is one of the interesting research topics in human–computer interaction and smart surveillance. As an active system for human activity recognition, radar has many unique advantages and has attracted the attention of researchers gradually. Deep learning is able to extract deep hierarchical features automatically and has achieved desirable classification performance. In this paper, they have first surveid several state-of-the-art deep learning models. Those models have different characteristics for identifying human activities and there is a trend of combining multiple

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models to better learn the features of human activities.UWB radar has a high range resolution and is capable of distinguishing the scattering centers of the human body. Interferometry radar provides Doppler information regardless of the directions of human movement. Furthermore, by classifying radar echoes into three different forms: 1D, 2D and 3D, we discuss the development of deep learning based HAR in radar.

Gao, C. Z., & Bao, W. (2020) [10]. "Research on Video Violence Detection Technology of UAV on Cloud Platform". The vision-based pedestrian counting is a relatively independent part that touches wider areas, and there exist many problems that have not been solved perfectly. In our study, a novel and robust pedestrian detection algorithm is constructed to count pedestrians. Without tracking each pedestrian, our counting algorithm is both efficient and robust. Experiments demonstrate the reliability of our algorithm and suggest that our LOI counting can efficiently dealt with crowded situations. However the stationary pedestrians still causes counting errors. In future research, we will focus on how to solve above problem, as well as large moving non-human objects.
Raza, M., Sharif, M., Yasmin, M., Khan, M. A., Saba, T., & Fernandes, S. L. (2018) [11].

"Appearance based pedestrians' gender recognition by employing stacked auto encoders in deep learning". In this work, a unique methodology ''Appearance based pedestrians' gender recognition by employing stacked auto encoders in deep learning'' is presented to recognize pedestrian gender as female or male. Classification is done using a computer vision based deep learning approach whereas deep decompositional neural network is utilized for background removal from pedestrian images. The overall accuracy rates of presented approach on MIT dataset are reported to be 82.9%, 81.8% and 82.4% corresponding to frontal, back and mixed views respectively along with the AUC value calculated as 0.90. The comparison of proposed method with existing works reveals its robustness.

P. Larsen, E. Simonsen, and N. Lynnerup(2008)[12]. "Gait analysis in forensic medicine," Journal of Forensic Sciences, vol. 53, pp. 1149–1153.Photogrammetry and recognition of gait patterns are valuable tools to help identify perpetrators based on surveillance recordings. We have found that stature but only few other measures have a satisfying reproducibility for use in forensics. Several gait variables with high recognition rates were found. Especially the variables located in the frontal plane are interesting due to large inter-individual differences in time course patterns. The variables with high recognition rates seem preferable for use in forensic gait analysis and as input variables to waveform analysis techniques such as principal component analysis resulting in marginal scores, which are difficult to interpret individually. Finally, a new gait model is presented based on functional principal component analysis with potentials for detecting individual gait patterns where time course patterns can be marginally interpreted directly in terms of the input variables. In this presentation, the above methods will be discussed exemplified with forensic cases.

Weinland, Ronfard and Boyer (2006) Computer Vision and Image Understanding, vol. 104(2-3), pp. 249–257. Human action recognition based on vision is a cutting-edge interface that has been the subject of current study. However, we must take into account a dynamic environment in our 3D living area where we may be in any posture, any direction, etc. We propose a Volume Motion Template (VMT) and a Projected Motion Template (PMT) to overcome the perspective dependence (PMT). The motion history image (MHI) technology is being extended to three-dimensional space using the VMT method. From an optimum virtual perspective, the ideal virtual viewpoint is one from which an action can be described in the most detail in 2D space, and the PMT is created by projecting the VMT onto a 2D plane that is orthogonal to that plane. Using the suggested strategy, it is possible to identify any activities conducted from distinct perspectives. The experimental findings show that the suggested VMT approach for view-independent action recognition is accurate and effective.

Journal of Chinese Medicine: Journal of Traditional Chinese Medicine, 2006, 14

Gait energy image-based individual recognition," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 28(2), pp.316–322.

Here, we provide an energy image (GEI) that may be used to define human walking qualities for the purpose of individual identification by gait in this work. We also offer a unique technique to human identification by merging statistical gait data from actual and synthetic templates to solve the absence of training templates. Using training silhouette sequences, we calculate the genuine templates directly, while modelling silhouette distortion generates the synthetic templates. Learning useful features from actual and synthetic templates is done statistically. On the USF HumanID Database, we compare the proposed GEI-based gait identification strategy to various gait recognition methods. According to experiments, the GEI described in this paper provides a useful representation of a person's gait, and the proposed methodology outperforms existing gait identification methods.

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Tan and Tan (2006a)[15]][15]

"A methodology for examining the influence of view angle, clothing and carrying condition on gait recognition," in the ICPR.

Researchers are increasingly interested in gait recognition, however there is currently no standard assessment technique for comparing the effectiveness of various gait recognition algorithms. In an effort to address this issue, a framework is presented in this study. Large gait databases, several well-designed trials, and assessment measures make up the framework. Data on gait was collected from 11 perspectives of 124 individuals in the database. View angle, clothes, and carrying condition are all taken into account in the database. In terms of database size, this is one of the biggest. There are 363 experiments in the framework, which includes three sets of trials. The evaluation of gait recognition algorithms may make use of several measures.

Summary of Literature Survey

In human–computer interaction and smart surveillance, the recognition of human movement is one of the most intriguing topics. Investigation of anomalous conduct in surveillance images by Tsushita H and Zin T-T, 2018. Currently, the year 2019 An action recognition dataset for a hovering drone in the air has been suggested by the authors. One of the biggest issues we discovered in drone surveillance was the difficulty in recognising human activity that occurs distant from the drone. This was done utilising data from three sensors, including an accelerometer, gyroscope and a magnetic field sensor (also known as a magnetometer). 3D CNNs were used to analyse the movies and extract spatial and temporal information, which were subsequently processed using LSTMs architecture. We've also developed a new gait recognition system that incorporates an evolutionary algorithm (GWO). Simple and versatile recurrent neural network that may be used to classify and locate activities. In order to get the most out of the video collection, a variety of different architectures and settings have been evaluated. System components include (1) Deep Learning that identifies people and their behaviours, (2) Pixel2GPS, which predicts the GPS location of humans by image processing, (3) PAL, which visualises identified people and actions on a map. PeopleAction-Locator (PAL) system performed well even though the UAV's low computational power was thought to be a major restriction for the Deep Learning model. It is thus not necessary to have robust communication infrastructure, which is not always available in catastrophe or surveillance scenarios. Hardware upgrades will help us enhance our product in the future. The human body's diffusing centres may be detected by UWB radar, which has a wide range of resolution. However, even if radar-based HAR methods have yet to take off, we should remain optimistic because of radar's unique preferences, such as its environment insensitivity and better security security. In any event, persons who are immobile on their feet are still prone to tally errors. Consider how to comprehend the challenge and vast moving non-human items in future research.

II. EXISTING SYSTEM

Some current static or mobile surveillance systems do not have adequate human detection and localization for complicated backdrops and environments to make use of existing technologies. In the contemporary metropolis, authorities use video surveillance devices to keep tabs on everyday activities for security reasons.

III. PROBLEM STATEMENT

In today's world, safety is a top priority in every industry, from the military and defence to congested public spaces. It's almost impossible to keep an eye out for any unusual activity in these locales. Some current static or mobile surveillance systems do not have adequate human detection and localization for complicated backdrops and environments to make use of existing technologies. For example, if the camera is moving, a static surveillance system using a backdrop subtraction technique would fail. Because the object viewpoint changes from frame to frame in a mobile surveillance system, it is difficult to achieve reliable detection, and some current solutions in action recognition do not include human localization when performing action identification in a continuous video stream. The enforcement of public safety necessitates the use of a reliable and efficient tool like gait recognition. Complexity in the backdrop and surroundings might make it difficult to locate people.

IV. PROPOSED SOLUTION

Individuals may be identified by their walking manner using gait recognition, a biometric modality that is attractive. Since their inception, deep learning-based gait detection algorithms have taken the lead in the area and found several

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practical applications. Deep Convolution Neural Network is used to extract the gait properties of a person by training the neural network architecture using Gait energy images. The specialised component of the visual cortex that performs the process of identifying attributes as the function of neuronal cells serves as the foundation for the Convolution neural network. A rapid feed forward artificial neural network is a convolutional neural network. Proposed systems allow legal processes to discover and locate people in a single deep learning pipeline. A video stream may be processed by the network.

Objectives

- To acquire the required dataset.
- To apply efficient pre-processing techniques.
- To instigate and apply segmentation.
- To identify and extract gait features.
- To develop a deep learning model that identifies the person's gait.

IV. PROPOSED METHODOLOGY

A. *System Design:*

Deep Convolutional Neural Networks (DCNs) are used in this study to develop an effective system for recognising human gait. Gait is characterised by a gait signature generated directly from the series of silhouettes in the proposed gait detection system. As a general-purpose pattern recognizer, the system is made up of three primary parts, namely,

i. Human detection and tracking.

ii. Training using CNN.

iii. Human recognition.

Initial segmentation and tracking of moving objects (humans) is done in each frame of the video stream (tracking module). It is then used to train and validate the retrieved feature vectors to identify an individual (pattern recognition module). Proposed Gait Recognition System Block Diagram Fig.

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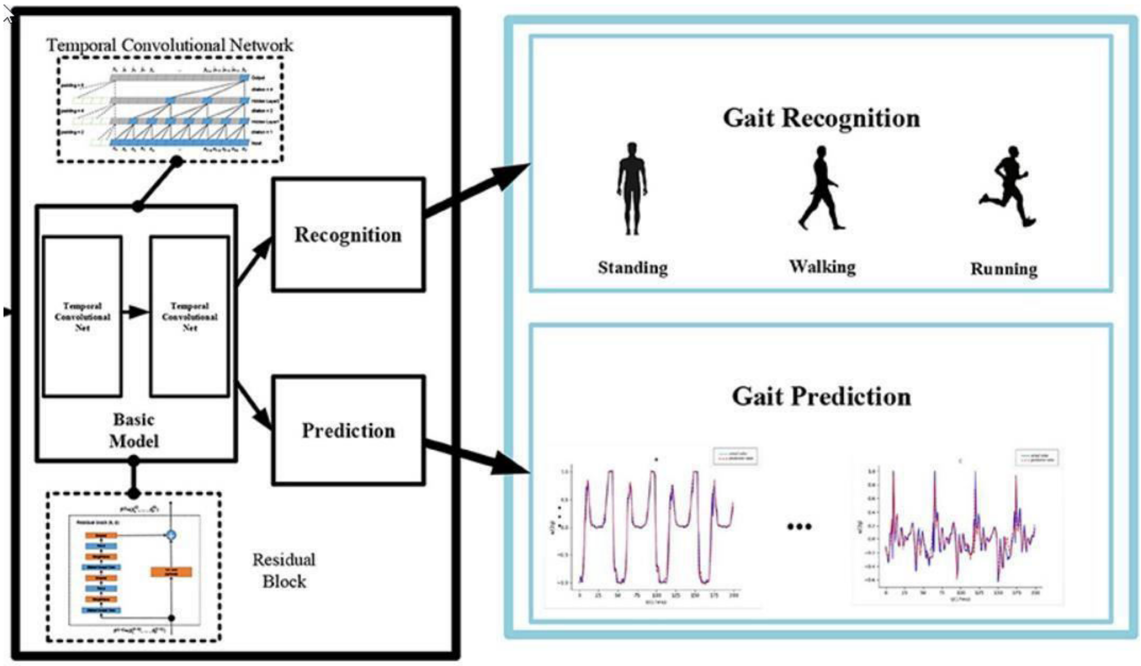

Fig: System Architecture overview

B. *Proposed Methodology:*

1) Data Acquisition, Pre-processing and Standardisation Dataset:

All videos are captured from DJI Mavic mini Drone with video capture resolution 2.7K 1530P. Later all the videos are edited and trimmed. The video format is changed into .avi format or any other formats supported by Matlab. Dataset is created with different individuals in different illusions, different positions, different situations and different conditions. All the videos are stored in a single folder where the main code of the program is stored.

Fig Standard Dataset

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Frame Conversion:

The selected input video will be converted into number of frames based on length of the video and stored in separate folder named Frames for future use. For the code to get run only required number of frames are considered.

Resizing Frames:

Each and every converted frames in the folder will be of different sizes,which makes image processing difficult. Hence all the frames will be resized into default size to make the opertions such as multiplying,comparision etc., easier in programming.

Background Subtraction:

Image processing and computer vision use a method known as "background subtraction," or "foreground detection," to identify an image's most important features. For the most part, an image's focus is on the foreground. Background subtraction is a common method for recognising moving objects in films taken by stationary cameras. Using the difference between the current frame and a reference frame, known as the background picture or background model, as the basis for recognising moving objects, the strategy works.
The first step in video surveillance is to remove the background. It is these higher-level procedures in video surveillance that will use background removal as an input. The background subtraction approach is critical because of the need of real-time calculations in surveillance systems. One of these difficult tasks is removing the background from moving images in a dynamic setting. Applied image analysis and computer vision researchers are working on it. TTD for BGS can handle hard conditions including abrupt or gradual illumination changes, slow lighting changes, long-term scene changes, periodic movements from a cluttered backdrop, repeated motions in the clutter, and so on. Tests in a variety of testing conditions have shown that the suggested approaches are efficient and resilient in a dynamic environment and may achieve excellent accuracy. Background subtraction results.
Detection of moving objects in video surveillance may be performed by developing a background model, and any significant change in the backdrop model indicates to an item in motion. Background subtraction is often performed using an open model of the environment. The difference between the current frame and this background model is used to identify foreground items. To create a binary foreground mask, a pixel with distinction greater than a threshold will be classified as coming from a foreground item. Pixels are categorised as either background or foreground based on the difference in colour between the background picture and this one.

Frame Filtrations:

Noise may be present in the images or frames in the folder. That noise might cause a snag in the workflow. So, the converted frames should be free of such noise. Matlab offers a variety of filter types, including median, salt & pepper, and the Gaussian filter, among others. The optimum filter for decreasing noise in frames and pictures was determined to be the Gaussian filter.
Filtering using the Gaussian method is linear. Edges will be blurred and contrast will be reduced only by the Gaussian filter. In general, Gaussian filters are isotropic, meaning that their standard deviation is the same in all directions. By giving a scalar value for sigma, an isotropic Gaussian filter may be applied to a picture. Low-pass filter: Gaussian blur reduces high-frequency components of a picture by applying a Gaussian transform. Due to the fact that multiplication and adding are both quicker than sorting, the Gaussian filter has an edge over other filters in terms of speed.

Binary Conversion:

The filtered frames will be then converted into binary images. The entire images will be converted in form of 0's and 1's. All the binary images will be stored in separate folder named Binary where the main running code is present. Once the entire code is executed the binary images get stored and then get refreshed.

DCT Frames Conversion:

In a separate subdirectory, photos are transformed into Discrete Cosine Transform frames and saved. Using a sum of cosine functions oscillating at various frequencies, the discrete cosine transform (DCT) represents a finite series of data points. Multiple scientific and engineering applications depend on discrete cosine transform, from lossy audio compression (MP3) and picture compression (JPEG) to spectral approaches for solving partial differential equations. Cosine functions rather than sine functions are crucial for compression since it turns out that fewer cosine functions are required to approximate a typical signal, but for differential equations the cosines describe a specific choice of boundary conditions.

It is a Fourier-related transform, however unlike the discrete Fourier transform (DFT), the Discrete Cosine transform uses only real values. Since the Fourier series of an extended, periodic sequence is more closely connected to the discrete cosine transforms than the Fourier series of a continuously extended sequence, this is a more significant distinction. It is possible to use Discrete Cosine transforms in the same way as Discrete Fourier transforms, however in certain cases the input and/or output data are moved by half a sample in some instances. Standard discrete cosine transform variations include eight, with four being the most frequent.

Type-II Discrete cosine transforms are often referred to as discrete cosine transforms, whereas type-III Discrete cosine transformations are referred to as the inverse discrete cosine transform or the discrete cosine transform, depending on how they are used. The discrete sine transform and the modified discrete cosine transform are two related transformations. When working with multidimensional signals, it is necessary to expand the discrete cosine transform notion to include several dimensions. It is possible to calculate the Multidimensional Discrete Cosine Transform using a variety of methods. The computing difficulty of performing discrete cosine transforms is being reduced by the development of new fast techniques.

Feature Identification and Feature Extraction

Human gait contains many features like walking speed, distance between two legs etc. all these features are identified, extracted and stored in Matlab file format. For extracting the human gait features we use LBP (Local Binary Patterns) technique.

Local Binary Patterns:

- Mainly designed for monochrome still images – Have been extended for color Videos.
- A comparative study of texture measures with classification based on feature distributions, Pattern Recognition.
- The local binary pattern operator is an image operator which transforms an image into an array or image of integer labels describing small-scale appearance of the image.
- These labels directly or their statistics are used for further analysis.
- It is assumed that a texture has locally two complementary aspects, a pattern and its strength .
- Generally local binary pattern operator works in a 3×3 pixel.

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V. SIMULATION RESULTS

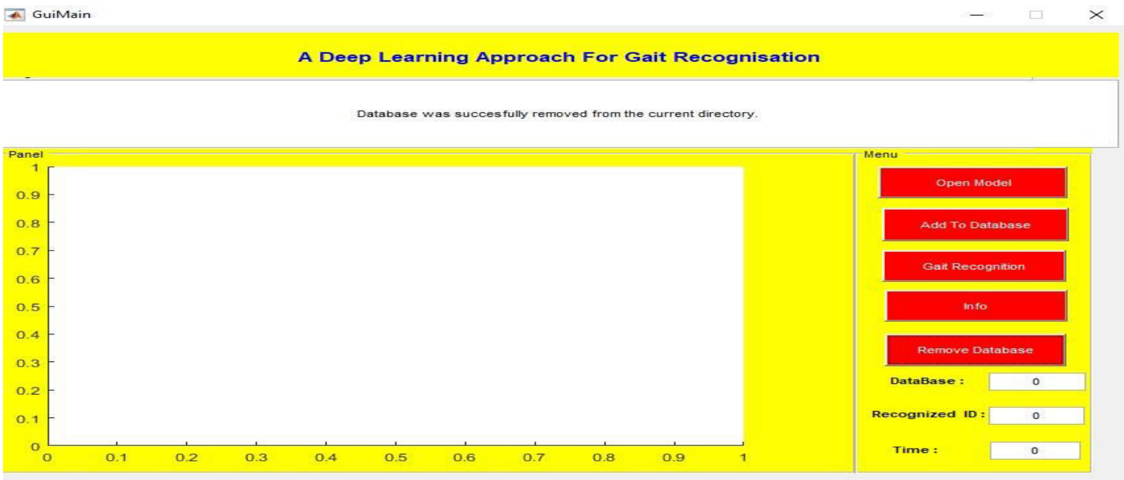

Fig : UI design of model

Description: This is the UI design of Gait Recognition model, it contains Open Model, Add to database, Gait recognition, info and Remove database. It displays number of database added, Recognized Id and Time taken to identify human gait.

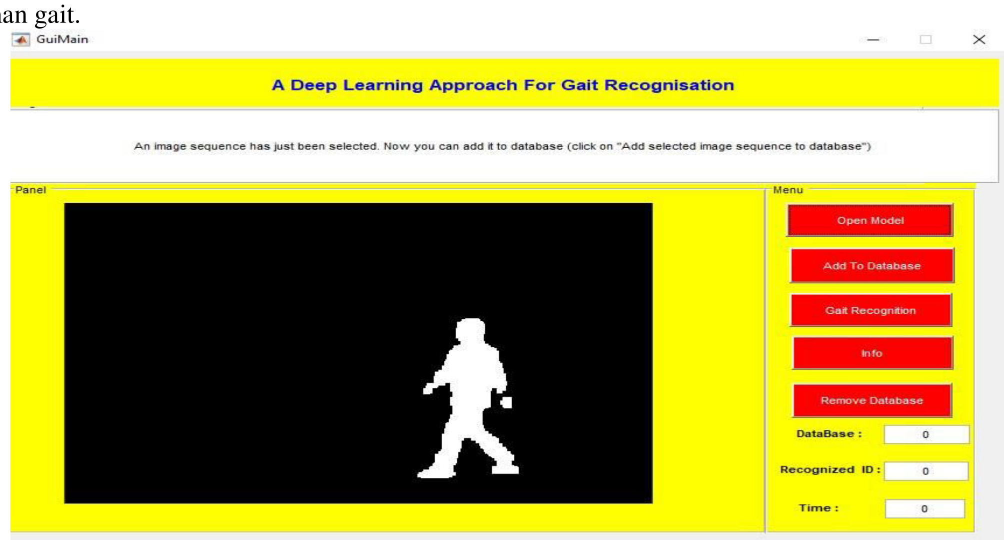

Fig : Silhouette of person is displayed

Description: An image sequence has just been selected and then it can be added to the database by giving the respective class label.

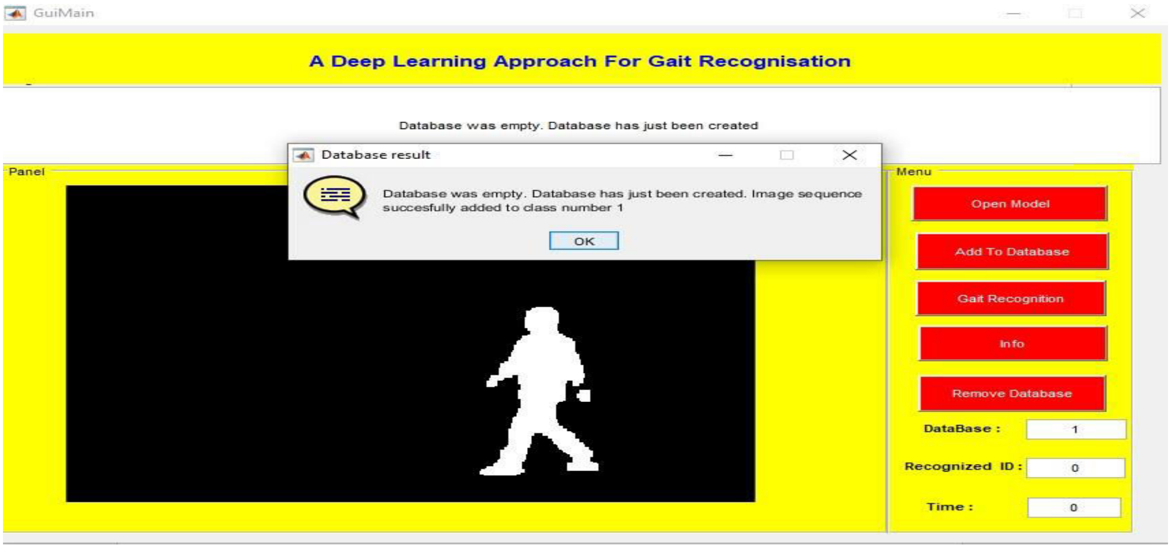

Fig : Database created

Description: Earlier database was empty. By clicking on add to database button, image sequence gets added to the database with respective class label successfully.

Fig : Setup Recognition Terminated window

Description: Above window pops up when testing is completed and displays recognition ID of the human gait.

VI. CONCLUSION AND FUTURE WORK

Drone surveillance may be used to accurately mimic human gait, as shown in this study. Human gait identification using deep CNNs was better understood after doing a literature study. Drone surveillance systems, deep learning, convolutional neural networks and biometrics and image processing are introduced in this phase.

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REFERENCES

[1] Sien, J.P.T., Lim, K.H. and Au, P.I., 2019, April. "Deep Learning in Gait Recognition for Drone Surveillance System".In IOP Conference Series: Materials Science and Engineering (Vol. 495, No. 1, p. 012031). IOP Publishing.

[2] Tsushita, H. and Zin, T.T., 2018, May." A study on detection of abnormal behaviour by a surveillance camera image".

[3] Perera, A.G., Law, Y.W. and Chahl, J., 2019 "Drone-action: An outdoor recorded drone video dataset for action recognition".

[4] Kumar, P., Mukherjee, S., Saini, R., Kaushik, P., Roy, P.P. and Dogra, D.P., 2018
"Multimodal gait recognition with inertial sensor data and video using evolutionary algorithm".

[5] Alberto Montes, Santiago Pascual, Xavier Giro-i-Nieto, Amaia Salvador., 2017 "
Temporal Activity Detection in Untrimmed Videos with Recurrent Neural Networks". [6] Alfredo Canziani, Eugenio Culurciello, Adam Paszke., 2017 "An Analysis of Deep Neural Network models for practical applications".

[7] Christian Szegedy, Wei Liu, Yangqing Jia, Pierre Sermanet, 2017 "Going deeper with convolutions".

[8] Geraldes, R., Goncalves, A., Lai, T., Villerabel, M., Deng, W., Salta, A., & Prendinger,
H. (2019). "UAV-based situational awareness system using deep learning".

[9] Li, X., He, Y., & Jing, X. (2019). "A survey of deep learning-based human activity recognition in radar".

[10] Gao, C. Z., & Bao, W. (2020). "Research on Video Violence Detection Technology of
UAV on Cloud Platform".

[11] Raza, M., Sharif, M., Yasmin, M., Khan, M. A., Saba, T., & Fernandes, S. L. (2018).
"Appearance based pedestrians' gender recognition by employing stacked auto encoders in deep learning".

[12] P. Larsen, E. Simonsen, and N. Lynnerup(2008). "Gait analysis in forensic medicine," Journal of Forensic Sciences, vol. 53, pp. 1149–1153.

[13] D. Weinland, R. Ronfard, and E. Boyer, (2006)"Free viewpoint action recognition using motion history volumes," Computer Vision and Image Understanding, vol. 104(2-3), pp. 249–257.

[14] J. Han and B. Bhanu, (2006) "Individual recognition using gait energy image," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 28(2), pp. 316–322.

[15] S. Yu, D. Tan, and T. Tan,(2006)"A framework for evaluating the effect of view angle, clothing and carrying condition on gait recognition."

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