

The Plights of Pedestrian Crossing with its Fortifications

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Abstract:- In this paper, we present a machine for counting people on pedestrian crossing. The device consists of a single digital camera, and the captured video acquired from the camcorder to perform an set of rules to identify and to count number of people using Artificial Neural Networks (ANNs). The device is carried out by using Cpp language based totally on OpenCV. People counting is an vital element to guarantee secure as traffic time must be sufficient enough to help pedestrians to cross road. This studies is aimed to solve the problem of pedestrians during the traffic to decrease or increase the traffic time constraint.

Keywords:- Artificial Neural Network, Image Processing, Counting Human Beings.

I. INTRODUCTION

Currently, the estimation of the number of people in open or near spaces is an important and upcoming project. This action is performed by using OpenCV [1] because there are a whole lot of systems present for counting humans in transit based mainly on technologies such as infrared or ultrasound sensors. However counting people systems are available for commercial use with patents [2], Its increased price and problems to remedy the issues inside the actual-world call for an additional research inside the field.

Quite a few researches in counting human beings include the detection of and counting of humans in surveillance based applications [3], for this method, the set of rules splits a group of people into individuals. In [4], the authors suggest a method that directly estimates the number of people in pedestrian crossing. Groups of picture sensors phase foreground objects from the background, aggregate the resulting silhouettes of a community and compute a planar projection of the scene's visual background. In [5], an algorithm counts people by means of getting to know their appearance with the help of a multi-view digital camera environment. A people counting apparatus based totally on head-shoulder detection and monitoring on the surveillance video is in [6]. Counting human beings in crowd is defined in [7]. In [8], is provided a robust approach for bi-directional human counting that includes: detecting, tracking and counting humans in movement. Authors in [9] develop a counting technique for passing through a gate primarily based on region and color

analyses. A device that estimates the range of people passing via a gate in a public area inclusive of a metro or a railway station is developed in [10].

Specifically, the techniques of human counting structures in pedestrian crossing is in [11] based totally on stereo vision, in which the processing consists of several blocks committed to detection, segmentation, monitoring, and counting from unique stereoscopic photos., The machine operates basically on the facts contained in disparity maps. In [12], an actual-time counting the pedestrains is mainly based on dense stereovision. In [13], a people counting system primarily based on face detection and monitoring from a video is offered. In [14], the authors describe the fundamental scheme by setting up of a zenithal camera to detect the pedestrians to cross the road flow bi-directionally, the captured frame is split into many blocks and each block may be labeled by keeping equivalence with its motion vector. An image sequence evaluation for of counting people in the pedestrian crossing to limit the time. In [16] del Pizzo, Luca, and other methods are mentioned that present a versatile method for counting humans [17], their graft applies the usage of a single digital camera. In [18] and [19] the authors use a Kinect camera and a RGB or intensity overhead camera respectively to count people.

II. METHODS

A. Analysis

The method for counting humans in this paper is described as, by mounting a camera over the entry gate, the system consists of many blocks for image processing and 2 ANN'S. The algorithms are based on OpenCV libraries and C++ language. We select to use synthetic imaginative and prescient as opposed to barrier methods consisting of tourniquets or laser structures as they may be easily harmed or very complex to use for disabled people. This task will determine the number of people during the pedestrian crossing.

This paper is organized in 3 sections: Section 2 the processing chain is described, in Section 3 the usage of ANNs for category and route estimation is provided and Section 4 includes some take at a look on how the effects are analyzed to make sure that the stipulated procedure is functional.

III. DEVELOPMENT

A. Dynamic Variety Development

The OpenCV selected feature that plays this venture is Background subtraction. This technique assumes that the history scene is empty firstly and it is essential to analyze how a typical item (individual) gets into the scene. After that, by the usage of this technique we gain the Region of Interest (ROI) that be analyzed by means of an ANN to verify the presence of a person it also determines whether the identified person is there in pedestrian crossing or not.

B. Background Subtraction

This function calls for a background estimation, that's gotten by way of pre-processing the usage of the Hough approach. Background subtraction separates the heritage from the main object, the heritage pixels are blackened area where as the item of interest holds its unique color pixels values. The feature simulates a pixel to pixel evaluation between the recorded picture and the present model. If the result cost from the subtraction is more than a certain calibrated value, it is taken into account that it is a piece of the prominent image.

C. Threshold

Thresholding is the method of photograph segmentation and it a means used to create binary pictures. The threshold cost is obtained by using reading the photograph's equalized histogram (Figure 1) in which the goal's brightness produced by direct daylight is decreased, at the same time as the depth assessment among pixels at the photograph is extended. Figure 2 shows the result.

The preceding level (background subtraction) gives us an idea of the ROI to carry out the evaluation to keep away from resources lost unnecessarily at some stage in the analysis degree of areas where there aren't exist viable traits. An appropriate delineation of the ROI is crucial to get a accurate filtering method, that's the bottom for the following levels.

D. Morphological Operations.

The morphological operations applied are dilation and erosion. Dilation adds pixels to the limits of items in a photograph to improve the edges via making them stable, distortion less and enhancing features that are crucial to form the edge of the selected object. In the opposite hand, erosion gets rid of susceptible pixels in the object's barriers, all of the remoted factors, delete noise, and regions that don't belong at a facet. The intention is to clarify the strains constituting the object of evaluation at the same time to eliminate the noise and vulnerable pixels present in and around the selected target image.

E. Clustering

The main operation of clustering is to condense the pixels in the areas where there is higher possibility of finding the selected target (people). The identified areas of possible presence of the targets are enclosed in arbitrary rectangles and therefore obtaining the coordinates of the corners and the middle factor of such concentrated areas,

for evaluation and analysis. The set of rules applied gets the place of all such regions and selects the most important region and develops an approach and performs an evaluation handiest in this area.

F. Counting

ROI The vicinity for counting depends on the sort of and size of video recorded by the camera established on the pedestrian crossings. The video has a decision of $640 * 480$ pixels, through which it'll be feasible to set up the region of hobby for counting human beings that are on the pedestrian crossing.

The co-ordinates for the rectangular region of interest are given by P0 (1, 1300) and P1 (640,350).

G. Artificial Neural Network

This phase defines the operation carried out by the 2 ANNs and also the roles of the sub layers on the multitorot management and operation.

The first group of ANN's determines if the analyzed object corresponds to one character. The ANN was used because it permits a strong identification of person, whereas the algorithm is successful in understanding two humans who can be very close to one other and the second network identifies the movement of people sampled into the photograph, with that it's far possible to perceive if the character is crossing the pedestrian crossing and as a function of that the rely and the general analysis of the humans in the pedestrian crossing to which the traffic signal is updated. Together these networks work in tandem to accurately identify the number of people crossing the pedestrian crossing regardless of how their appearances are i.e if they are carrying luggage that blocks their faces, or have hair obstructing the camera's vision etc. Figure four shows the schematic carried out networks.

- **First ANN:** The first ANN is able to become aware of a person who goes via the region of analysis, this method is powerful because it can discover a person in difficult scenarios, together with: from if there's a crowd of people, by the means of locating and evaluating.

The group is also able to identify the character in almost all scenarios such as: even though they are wearing a cap, hat, or hair tied etc. however, these characteristics are feasible as long as the group has a truthful and a complicated schooling.

The training of network number one is executed to pick out humans based on snap shots compared with the man or woman analyzed, the second analyses the path of the motion to establish in pedestrian crossing.

The specification of the first group of ANN's: 51200 enter neurons, 640 hidden neurons, and 720 output neurons. Inside the hidden community, all applicable facts is saved in order that this

Community can tune the factor similar to the center of mass. Besides the hidden layer has features taken from the enter layer during its schooling. This community had a complete schooling time of one hundred hours.

- **Second ANN:** For the undertaking, the 2 ANNs used are configured as serial networks, so the output of the primary network will become the input of the second group.

The 2nd neural network is the one in charge of classifying the motion from the reference point that is it determines the number of people wanting to cross the traffic.

The second neural network has the following specifications for operation: three layers with 720 neurons in the front layer, 48 inside the hidden layer and a couple of in the output layer.

The 720 neurons of the first community are the inputs of the second one network in this device, when the movement begins inside the ROI, the second one network can be activated by way of developing a sweep to decide the pattern of movement. If the sample has the identical course as the pre calibrated notion that if a person is coming inside then he's moving along the positive Y-direction of the co-ordinate system or else vice versa. This determines if a character is going to cross the pedestrian crossing, if it's far on the other course or if the character is going to cross. The hidden layer has forty eight neurons, it is made from a compression of 15:1. The output layer carries 2 neurons, certainly one of them will be activated to finish if someone is going to cross the crossing.

The number of people in the pedestrian crossing can be determined in this manner, the people count goes up every time a pedestrian crosses and goes down when pedestrian are not present..

An analysis is made after ROI Identification, humans are identified as a particle to estimate in the event that they input or cross the traffic, the result is given via the secondary group, then an area of study is installed for counting and the person is checked upon. Finally, the set of rules counts how many people have entered, and left, and establishes if the pedestrians outnumber the total capability of the road.

The drawbacks of this procedure are that it uses a processing unit that makes the setup costly. On the bright side a bonus is that the device does not require mechanical components such as a tourniquet that makes it tough to apply by disabled human beings.

The consequences of this system are proven in Table 1. Column 2 and three suggests human beings crossing the traffic on the time corresponds to the primary column, respectively. It is based totally on a video of 40 minutes. The effects of the test done show an effectiveness of ninety

four % and a margin of errors of 6% on the time of counting individuals in the pedestrian crossing.

At the primary implementation, a few errors have been recorded:

- The target stayed immobile throughout the journey.
- Background and character clothing colorations had been similar.
- Due to noise and extra brightness, the system was not able to extract the selected target efficiently.

To conquer those demanding situations the parameters of the threshold have been modified as well as pixels colorings of the video body with pleasant outcomes.

While examining the number of people crossing, the same video of forty mins was changed into and used, the coordinates of the region of hobby or rely were then defined. The consequences had been acquired which can be proven in Table 2. The overall performance showed ninety% effectiveness and a 10% margin of error while counting people there during the pedestrian crossing which is taken into consideration as a suitable end result of the counting device.\

IV. CONCLUSIONS

The main purpose for this paper is to solve the problem faced by pedestrians as well as for the cars during traffic.

This paper proposes a model for decreasing the time or increasing the time constraint based on number of people are there for pedestrian crossing. We use image processing to implement the model for this problem.

This study elaborates and solves a problem that is a gift throughout the USA. In ever day application, that is, non-compliance traffic suggestions regarding to the pedestrian crossing the limit the constraint of the traffic time.

The algorithm came to be implemented in C ++ Programming Language and makes use of the OpenCV library for processing of snap shots. If the ANN isn't nicely skilled, the device could not have a first rate category and now not carry out the be counting efficaciously.

The outcomes of the research are high end quality, the set of rules is successful to artwork in changing conditions of environment lighting fixtures because of the degree of equalization of pictures allows us to improve the image. The benefit to use ANN is the potential of artificial networks to discover if the person is going to cross the road no matter that the background subtraction degree offers you a noised photo. Another benefit of this device is, it's whole lot extra reachable nature for disabled customers compared with traditional techniques.

This research Project is to be the first section of many projects aiming to exchange physical strategies to others that use artificial imaginative and prescient intelligence to keep in mind pedestrians in public transportation. The new counting strategies should not constitute bodily impediment to clients because the conventional ones do. Besides that, the character of this generation makes them reliable and offers additional advantages like to be used as a safety video backup in case of emergencies or incidents where a video proof is crucial. Looking at the completed system shows an effectiveness of ninety four% and a margin of mistakes of 6% at the time of counting personnel who cross the road, that is considered an acceptable end result for the counting machine.

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