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Social Distance Monitoring In Video Datasets Using Deep Learning Techniques

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ABSTRACT: To limit the spread of an infectious disease, for instance, Covid-19 is to practice social distancing. This is not a new concept, as most societies have been aware of the value of keeping away from people who are suffering from an infection for many generations. The objective is to reduce transmission, delaying the epidemic peak, reducing the size of the epidemic peak, and spreading cases over a longer time to relieve pressure on the healthcare system. It is an action taken to minimize contact with other individuals. In the fight against the COVID-19, social distancing has proven to be a very effective measure to slow down the spread of the disease. People are asked to limit their interactions with each other, reducing the chances of the virus being spread with physical or close contact. The World Health Organization (WHO) states that "COVID-19 is transmitted via droplets and fomites during close unprotected contact between an infector and infected. A fomite is an object or material which is likely to carry infection, such as clothes, utensils, and furniture. Therefore, transmission of the infection can be avoided by staying away from other people as well as from touching infected fomites. In past also AI/Deep Learning has shown promising results on a number of daily life problems.

I. INTRODUCTION

Deep Learning

Deep learning (also known as deep structured learning) is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised or unsupervised. Deep-learning architectures such as deep neural networks, deep belief networks, recurrent neural networks and convolutional neural networks have been applied to fields including computer vision, machine vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design, medical image analysis, material inspection and board game programs, where they have produced results comparable to and in some cases surpassing human expert performance. Artificial neural networks (ANNs) were inspired by information processing and distributed communication nodes in biological systems. ANNs have various differences from biological brains. Specifically, neural networks tend to be static and symbolic, while the biological brain of most living organisms is dynamic (plastic) and analogue.

II. LITERATURE SURVEY

2.1 Title: Camera As The Instrument: The Rising Trend Of Vision Based Measurement Author: Shervin Shirmohammadi And Alessandro Ferrero

Due to continuing and rapid advances of both hardware and software technologies in camera and computing systems, we continue to have access to cheaper, faster, higher quality, and smaller cameras and computing units. As a result, vision based methods consisting of image processing and computational intelligence can be implemented more easily and affordably than ever using a camera and its associated operations units. Among their various applications, such systems are also being used more and more by researchers and practitioners as generic instruments to measure and/or monitor physical phenomena. In this article, we take a look at this rising trend and how cameras and vision are being used for instrumentation and measurement, and we also cast a glance at the metrological gauntlet thrown down by vision based instruments. The operations unit receives the image acquired by the visual sensor and performs the necessary operations to obtain the desired measurements. This unit can be implemented in either software or hardware; i.e., it can either be programmed into a generic microprocessor based system, such as the processing unit of a smart camera, or it can be implemented in dedicated hardware, such as Field Programmable Gate Array

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(FPGA) or Application-Specific Integrated Circuit (ASIC). In addition, it might not be in the form required by ensuing operations.

TECHNIQUES

- Vision Based Measurement (VBM)

ADVANTAGES

- Increased computational efficiency

DISADVANTAGES

- Accuracy is less

2.2 TITLE: ORB-SLAM: A VERSATILE AND ACCURATE MONOCULAR SLAM SYSTEM AUTHOR: RAUL MUR-ARTAL

This paper presents ORB-SLAM, a feature-based monocular SLAM system that operates in real time, in small and large, indoor and outdoor environments. The system is robust to severe motion clutter, allows wide baseline loop closing and relocalization, and includes full automatic initialization. Building on excellent algorithms of recent years, we designed from scratch a novel system that uses the same features for all SLAM tasks: tracking, mapping, relocalization, and loop closing. A survival of the fittest strategy that selects the points and keyframes of the reconstruction leads to excellent robustness and generates a compact and trackable map that only grows if the scene content changes, allowing lifelong operation. We present an exhaustive evaluation in 27 sequences from the most popular datasets. ORBSLAM achieves unprecedented performance with respect to other state-of-the-art monocular SLAM approaches. The loop closing and relocalization methods here presented are based on our previous work. A preliminary version of the system was presented. In the current paper we add the initialization method, the Essential Graph, and perfect all methods involved. We also describe in detail all building blocks and perform an exhaustive experimental validation. One of the main design ideas in our system is that the same features used by the mapping and tracking are used for place recognition to perform frame-rate relocalization and loop detection. This makes our system efficient and avoids the need to interpolate the depth of the recognition features from near SLAM features as in previous works.

TECHNIQUES

- Loop closing and relocalization method

ADVANTAGES

- Enable real time accurate tracking and mapping

III. SYSTEM ANALYSIS

EXISTING SYSTEM

The most widely recognized manifestations of COVID are dry hack, fever, windedness, discomfort and migraine. The quick send of COVID produce serious muscle torments and empower the individuals with debilitate invulnerable framework got tainted by it without any problem. The outrageous phase of COVID-19 prompts demise of numerous people groups with extreme failing of lung and different organs of the body. Different examples of medicines are dealing with by the doctors everywhere on the world to find an effective method of restricting the infection being communicated to most exceedingly terrible stage. Object detection is one of the great challenges of computer vision, having received continuous attention since the birth of the field. Recent works are adopting a more holistic approach by combining the output of multiple vision tasks and are reminiscent of some of the earliest work in computer vision. However, these recent works use a different representation for each subtask, forcing information sharing to be done through awkward feature mappings. Another difficulty with these approaches is that the subtask representations can be inconsistent. For example, a bounding-box based object detector includes many pixels within each candidate detection window that are not part of the object itself. Furthermore, multiple overlapping candidate detections contain many pixels in common. How these pixels should be treated is ambiguous in such approaches. A model that uniquely identifies each pixel is not only more elegant, but is also more likely to produce reliable results since it encodes a bias of the true world (i.e., a visible pixel belongs to only one object).

DISADVANTAGES

- Classification accuracy is less
- Time and Computational complexity is high
- Irrelevant features are extracted
- There is no proper segment to detect the objects
- Need manual monitor the peoples to predict social distancing

IV. PROPOSED SYSTEM

Social Distancing – the term that has taken the world by storm and is transforming the way we live. Social distancing has become a mantra around the world, transcending languages and cultures. This way of living has been forced upon us by the fastest growing pandemic the world has ever seen –

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COVID-19. As per the World Health Organization (WHO), COVID-19 has so far infected almost 4 million people and claimed over 230K lives globally. Around 213 countries have been affected so far by the deadly virus. The biggest cause of concern is that COVID-19 spreads from person to person through contact or if you're within close proximity of an infected person. Given how densely populated some areas are, this has been quite a challenge.

To limit the spread of an infectious disease, for instance, Covid-19, is to practice social distancing. This is not a new concept, as most societies have been aware of the value of keeping away from people who are suffering from an infection for many generations. The objective is to reduce transmission, delaying the epidemic peak, reducing the size of the epidemic peak, and spreading cases over a longer time to relieve pressure on the healthcare system. It is an action taken to minimize contact with other individuals. It has been suggested that maintaining a distance of approximately 2 meters from another individual result in a marked reduction in transmission of most flu virus strains, including COVID19. In proposed system, we can implement Harris corner detection system to detect and track the objects. And also find out the distance using deep learning algorithm named as Convolutional neural network algorithm. Finally classify risk and provide alert to the admin in video datasets.

ADVANTAGES

- High level classification accuracy
- Automated approach
- Alert system
- Reduce time and computational complexity

V. SYSTEM IMPLEMENTATION

MODULES

1. VIDEO ACQUISITION

Object detection systems place a bounding box around the objects and associate the correct object's category with each bounding box. Deep learning is an effective method to perform object detection. For camera setup, the camera is captured at fixed angle as the video frame, and the video frame was treated as perspective view are transformed into a twodimensional top down view for more accurate estimation of distance measurement. In this module, it is assumed that the pedestrians in the video frame are walking on the same flat plane. Captured video frames are input to system and convert the videos into frames at 0.5 seconds

2. MOVING OBJECT DETECTION

In this module, moving object detected based on features extraction. Harris' corner detector takes the differential of the corner score into account with reference to direction directly. A corner is a point whose local neighborhood stands in two dominant and different edge directions. In other words, a corner can be interpreted as the junction of two edges, where an edge is a sudden change in image brightness. Based on corner points, bounding box values are calculated. After detection, the bounding box information, mainly centroid information, is used to compute each bounding box centroid distance. We used Euclidean distance and calculated the distance between each detected bounding box of peoples. Following computing centroid distance, a predefined threshold is used to check either the distance among any two bounding box centroids is less than the configured number of pixels or not. If two people are close to each other and the distance value violates the minimum social distance threshold

3. TRACKING AND MONITORING

The next step to detect pedestrians and draw a bounding box around each pedestrian. To clean up the output bounding boxes, we apply deep learning and various rule-based heuristics, so as to minimize the risk of over fitting. Bounding box are tracked and monitored continuously. A threshold value is defined that process the high confidence values and discards the low confidence values. Using non-maximal suppression, the final location parameters are derived for the detected bounding box. At last, loss function is calculated, for detected bounding box.

4. DISTANCE CALCULATION

In this step of the pipeline, the location of the bounding box for each person (x, y, w, h) in the perspective view is detected and transformed into a top-down view. For each pedestrian, the position in the top-down view is estimated based on the bottom-center point of the bounding box. The distance between every pedestrian pair can be computed from the top-down view and the distances are scaled by the scaling factor estimated from camera view calibration.

5. ALERT SYSTEM

Object detection and tracking goes hand in hand for computer vision applications. Object detection is identifying object or locating the instance of interest in-group of suspected frames. Object tracking is identifying trajectory or path; object takes in the concurrent frames. Image obtained from dataset is, collection of frames. If the distance can be calculated between bounding

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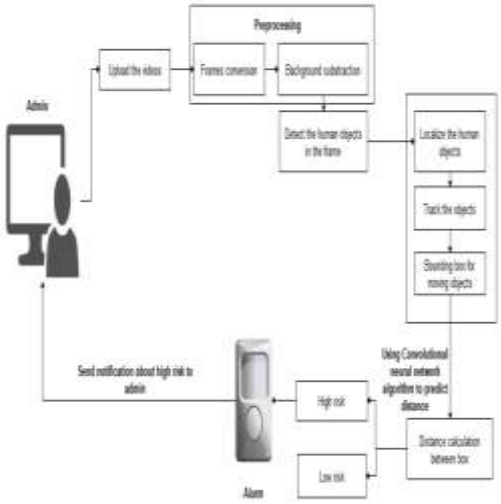
boxes. The distance is low means, identify the high risk and provide alert to admin, then provide alarm

VI. SYSTEM DESIGN

SYSTEM ARCHITECTURE

System architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. In this architecture, admin can upload videos and perform preprocessing steps to convert the videos into frames. Then extract the foreground from dynamic background environments. Then extract the human objects and track the person continuously. Finally predict the distance and classify the risk using convolution neural network algorithm.



VII. SOFTWARE DESCRIPTION

FRONT END: PYTHON

Python is an interpreted high-level programming language for general-purpose programming. Created by Guido van Rossum and first released in 1991, Python has a design philosophy that emphasizes code readability, notably using significant whitespace. It provides constructs that enable clear programming on both small and large scales. In July 2018, Van Rossum stepped down as the leader in the language community. Python features a dynamic type system and automatic memory management. It supports multiple programming paradigms, including object-oriented, imperative, functional and procedural, and has a large and comprehensive standard library. Python interpreters are available for many operating systems. C Python, the reference implementation of Python, is open source software and has a community based development model, as do nearly all of Python's other implementations. Python and CPython are managed by the non-profit Python Software Foundation. Rather than having all of its functionality built into its core, Python was designed to be highly extensible.

VIII. SYSTEM TESTING

TESTING PROCESS

Software testing is a method of assessing the functionality of a software program. There are many different types of software testing but the two main categories are dynamic testing and static testing. Dynamic testing is an assessment that is conducted while the program is executed; static testing, on the other hand, is an examination of the program's code and associated documentation. Dynamic and static methods are often used together. Testing is a set activity that can be planned and conducted systematically. Testing begins at the module level and work towards the integration of entire computers based system. Nothing is complete without testing, as it is vital success of the system.

Testing Objectives:

There are several rules that can serve as testing objectives, they are;

1. Testing is a process of executing a program with the intent of finding an error
2. A good test case is one that has high probability of finding an undiscovered error.
3. A successful test is one that uncovers an undiscovered error.

IX. CONCLUSION AND FUTURE ENHANCEMENT

CONCLUSION

Detection and tracking moving objects have many applications in the field of machine vision like video compression, monitoring systems, industrial control, and gesture-based computer interaction. Human activity recognition (HAR) aims to recognize activities from a series of observations on the actions of subjects and the environmental conditions. The vision-based HAR research is the basis of many applications including video surveillance, health care, and human computer interaction (HCI). This review highlights the advances of state-of-the-art activity recognition approaches, especially for the activity representation and classification methods. For the representation methods, we sort out a chronological research trajectory from global representations to local representations, and recent depth-based representations. The method of multiple pedestrian detection in video sequences is proposed in this

paper. Feature points in each and every frame are detected and then classified as foreground and background features.

FUTURE ENHANCEMENTS

While statistical methods can still be useful for medium to large-sized data, they rely on well-defined questions and models to make inference and prediction. It appears inadequate for analyzing very large datasets and diverse types of structured and unstructured data where an algorithmic approach. In future, we can extend the framework to implement various deep learning algorithms and various datasets to improve the accuracy rate.

REFERENCES

[1]. Shirmohammadi, Shervin, and Alessandro Ferrero. "Camera as the instrument: The rising trend of vision based measurement." IEEE Instrumentation & Measurement Magazine 17.3 (2014): 41-47.

[2]. Mur-Artal, Raul, Jose Maria Martinez Montiel, and Juan D. Tardos. "ORB-SLAM: a versatile and accurate monocular SLAM system." IEEE transactions on robotics 31.5 (2015): 1147-1163.

[3]. Sun, Yuxiang, Ming Liu, and Max Q-H. Meng. "Improving RGB-D SLAM in dynamic environments: A motion removal approach." Robotics and Autonomous Systems 89 (2017): 110- 122.

[4]. Sun, Yuxiang, Ming Liu, and Max Q-H. Meng. "Motion removal for reliable RGB-D SLAM in dynamic environments." Robotics and Autonomous Systems 108 (2018): 115-128.