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DETECTION OF ACCIDENTS USING R-CNN

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Abstract: A deals on accident detection, wherein we identify the characteristic attributes of objects in addition to detecting them as belonging to a class. More precisely, our goal is concurrently identifying the status of item class bounding boxes—safe, harmful, or crashed—and their detection on roadways. In order to accomplish this, we create a brand-new dataset and suggest a baseline technique for comparing accident detection tasks. Our Attention R-CNN accident detection network is designed with two streams: one for computing characteristic properties and the other for object detection with classes. We incorporate global contexts that are taken advantage of from the scene into the stream for object detection as an attention mechanism that gathers contextual information in the scene.

Index Terms **–Bounding Boxes, image processing, Attention RCNN, Object Detection.**

I. INTRODUCTION

Roadside accidents are a serious risk to public safety and cause a huge loss of property and human life. rapid identification of accidents and occurrences on roadways is essential for enabling rapid action, mitigating traffic jams, and preserving human life. Above the Over the years, developments in machine learning and computer vision have made it possible to develop creative solutions for this problem. Conventional accident detection techniques usually depend on human observation, manual reporting, and a small number of sensor-based devices, all of which might have delays, false alarms, and human error. Understanding the shortcomings of traditional methods, deep learning and computer vision techniques have become effective tools for enhancing accident reaction and detection. A prominent technique within this field is the Region-based Convolutional Neural.

II. OBJECTIVE

Attention R-CNN utilizes dual streams for accident detection, focusing on object appearance and characteristics, while also introducing a new dataset to alleviate imbalances and enhance model accuracy in identifying road objects. This approach shows promise in advancing accident detection through state-of-the-art computer vision techniques tailored to address specific challenges.

III. EXISTING SYSTEM

A In order to improve contextual awareness, the paper presents the novel job of accident detection using the Attention R-CNN architecture, which consists of two streams: one for object detection using classes and another for identifying object characteristic characteristics. This invention is accompanied with a carefully annotated dataset of one hundred videos, which will aid research in this emerging field. The testing results reveal that Attention R-CNN is more effective at detecting accidents than baseline techniques. The report also explores how well the method performs under different settings and suggests directions for future study, highlighting the document's thorough contribution to the advancement of accident detection.

IV. LITERATURE REVIEW

Ross Girshick, Jeff Donahue, Trevor Darrell, Jitendra Malik [1] proposed in the past few years, object detection performance as evaluated on the official PASCAL VOC dataset has stabilized. Complex ensemble systems that generally integrate several low-level picture elements with high-level context are the most effective techniques. In this study, we offer a scalable and straightforward detection technique that achieves a mean average precision (mAP) of 53.3%, over 30% better than the previous best result on VOC 2012. Our strategy integrates two crucial insights:(1) To locate and segment objects, high-capacity convolutional neural networks (CNNs) can be applied to bottom-up region proposals; (2) In situations where labeled training data is scarce, supervised pre-training for an auxiliary task combined with domain-specific fine-tuning results in a notable performance boost. Given that we mix CNNs with region proposals.

Akshit Diwan1, Vandit Gupta1, Chaitanya Chadha2 [2] Deep learning is an artificial intelligence function that mimics how the human brain processes information and forms patterns to be used as a guide for making decisions. In artificial intelligence (AI), deep learning is a subset of machine learning that uses networks to identify patterns in unstructured or unlabeled data. It goes by the names deep neural network or deep neural learning as well. Convolutional neural networks, often known as CNNs or ConvNets, are a type of neural networks that have shown to be incredibly successful in applications like image recognition and classification. ConvNets are not only used to power robot vision and autonomous vehicles, but they have also shown effective in distinguishing faces, objects, and traffic signs. Every year, a great deal of people dies in car crashes all across the world.

Ross Girshick [3] For object detection, this research suggests a Fast Region-based Convolutional Network technique (Fast R-CNN). Fast R-CNN uses deep convolutional networks to effectively classify object proposals, building on earlier research in this area. In contrast to earlier research, Fast R-CNN makes significant innovations to boost detection accuracy and expedite testing and training. Fast R-CNN obtains a higher mAP on PASCAL VOC 2012, is 213× quicker during test-time, and trains the very deep VGG16 network 9× faster than R-CNN. Fast R-CNN trains VGG16 3× quicker, tests 10× faster, and has higher accuracy than SPPnet.

Mirza M. Lutfe Elahi, Rahat Yasir, Minhaz Ahmed Syrus,Md. S. Q. Zulkar Nine, Ishtiaque Hossain, Nova Ahmede [4] proposed a In order to solve the serious problem of traffic accidents in Bangladesh, the article suggests a strategy that uses vision-based algorithms to track and analyze vehicle movements and roadside video footage to understand traffic patterns. The technique seeks to prevent accidents by identifying anomalies and possible mishaps. The results show that the accuracy is encouraging, with an effectiveness of about 85% in identifying unusual situations. This strategy could improve traffic safety and lower the number of accidents in Bangladesh

Unaiza Alvi, Muazzam A. Khan Khattak, Balawal Shabir, Asad Waqar Malik ,Sher Ramzan Muhammad lin [5] explains a The demand for cars has skyrocketed due to population growth, which has led to a concerning situation in terms of traffic risks and accidents. Both the percentage of traffic accidents and the number of fatalities resulting from them are increasing dramatically. However, the delay in emergency assistance is the main reason for the higher death rate. Effective rescue services could save a great deal of lives. Traffic jams or erratic communications to the medical units are the causes of the delay. In order to deliver assistance in a timely manner, autonomous traffic accident detection systems must be put in place. The literature has numerous suggestions for automatic accident detection systems. Various machine learning algorithms, GPS/GSM based systems, automobile ad hoc networks, and smartphone-based crash prediction are among the methods used.

V. METHODOLOGY

This methodology is based on object recognition and accident detection using a two-stream network called Attention R-CNN. The network consists of two streams: an appearance stream for object class recognition and a characteristic stream for object property computation. In the appearance stream, the network employs a modified Faster R-CNN to provide effective road object detection. In the meantime, an attention mechanism is used by the characteristic stream to identify the typical qualities of an object. The paper also provides an introduction to the Accident Detection Video (ADV) dataset, outlining the experiment's benchmark datasets, assessment standards, and implementation details. All things considered, the methodology leverages attention mechanisms and deep learning models to improve object identification and recognition in the context of accident detection.

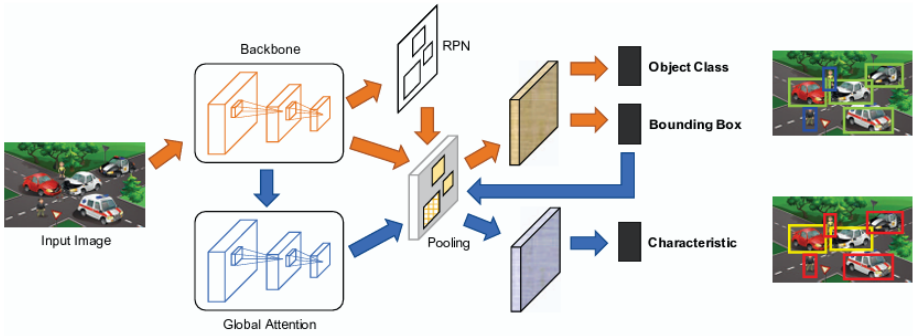

Fig: Architecture diagram

Using a neural network architecture with attention mechanisms, object detection proceeds in a methodical manner. The input image, which shows a scene that probably relates to traffic or accident analysis, comes first. After that, a backbone network—typically a deep convolutional neural network (CNN)—processes the image to extract key properties for object detection, producing feature maps. In parallel, a Region Proposal Network (RPN) predicts bounding boxes, which identify regions in the image that might contain objects. The network then predicts the object class and fine-tunes bounding box coordinates for every proposed region, accurately locating objects. In parallel, a branch uses a global attention mechanism on the feature maps to focus attention on important areas related to the task.

FLOW DIAGRAM

Using a video preprocessor, which divides a video input into separate frames for further analysis, the system may first identify traffic incidents through video analysis. After that, these frames are run through an Extractor for Bounding Box Masks, which uses the well-known object recognition method YOLOv5 to find items inside the frames and draw bounding boxes around them. The frames are additionally processed by an Image Preprocessor module, which may scale or normalize them to achieve optimal mask production performance. The bounding box coordinates are then retrieved, and masks that correspond to these boxes are created. The previously created masks are used as input in the Detector of Traffic Accidents step, where they are encoded using a Region-based Convolutional.

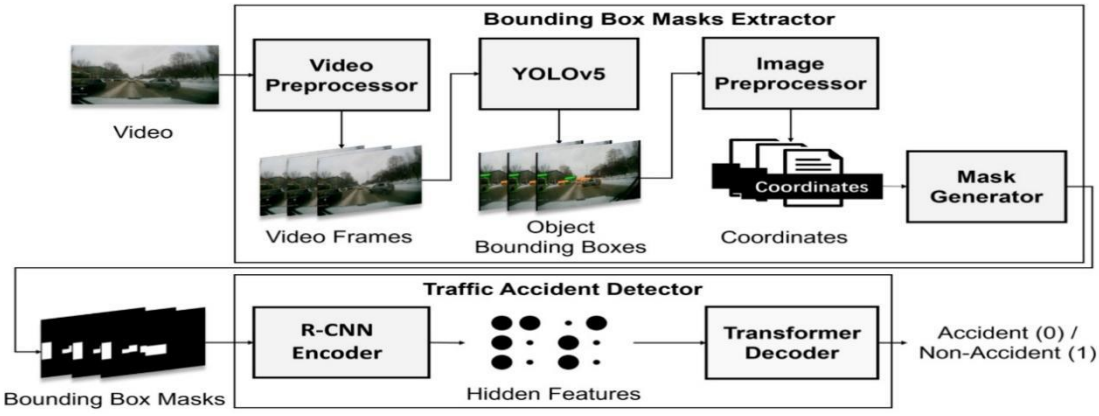

Fig: Flow diagram

VI. RESULTS AND DISCUSSION

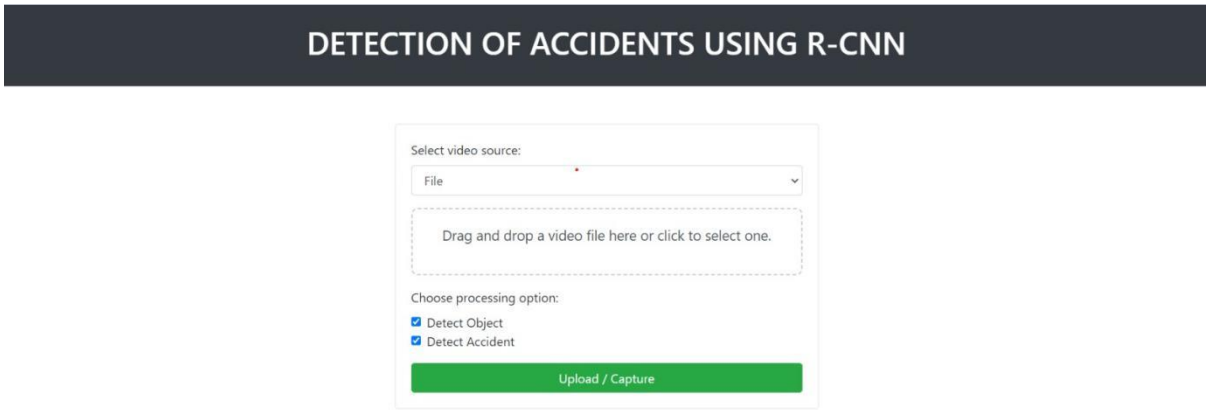

Fig: Start Page

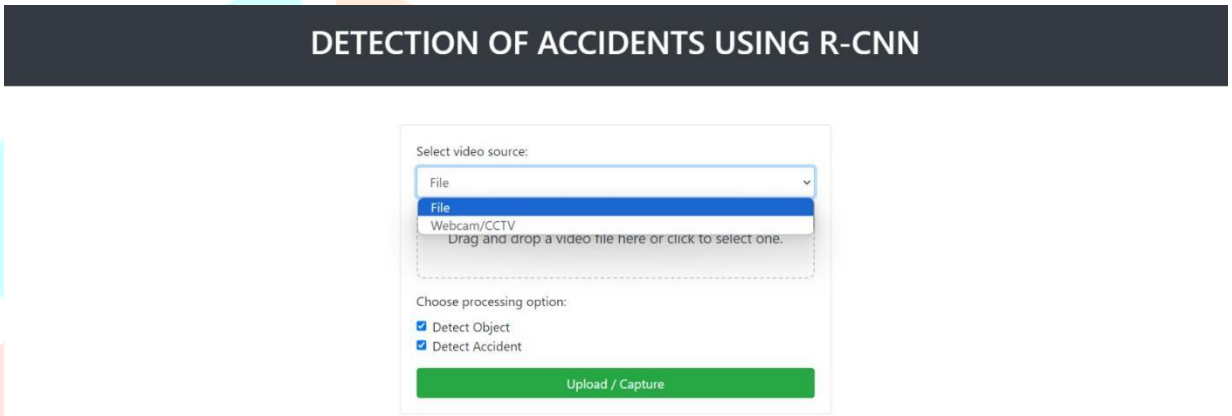

Fig: choosing type of video source

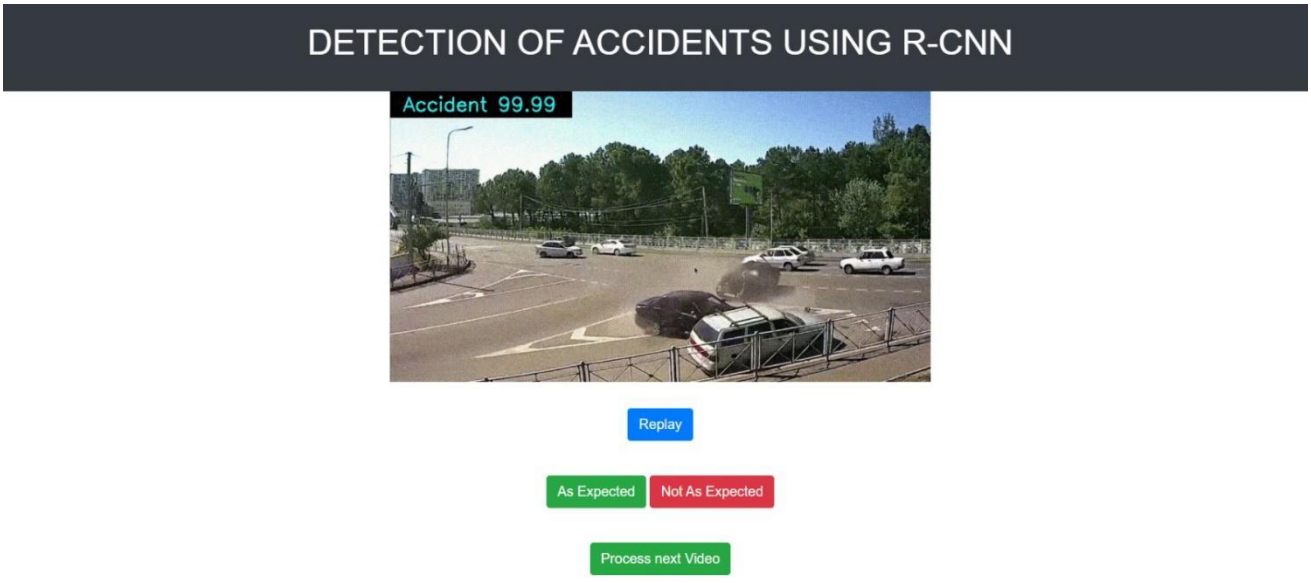

Fig: Detecting accident after uploading video

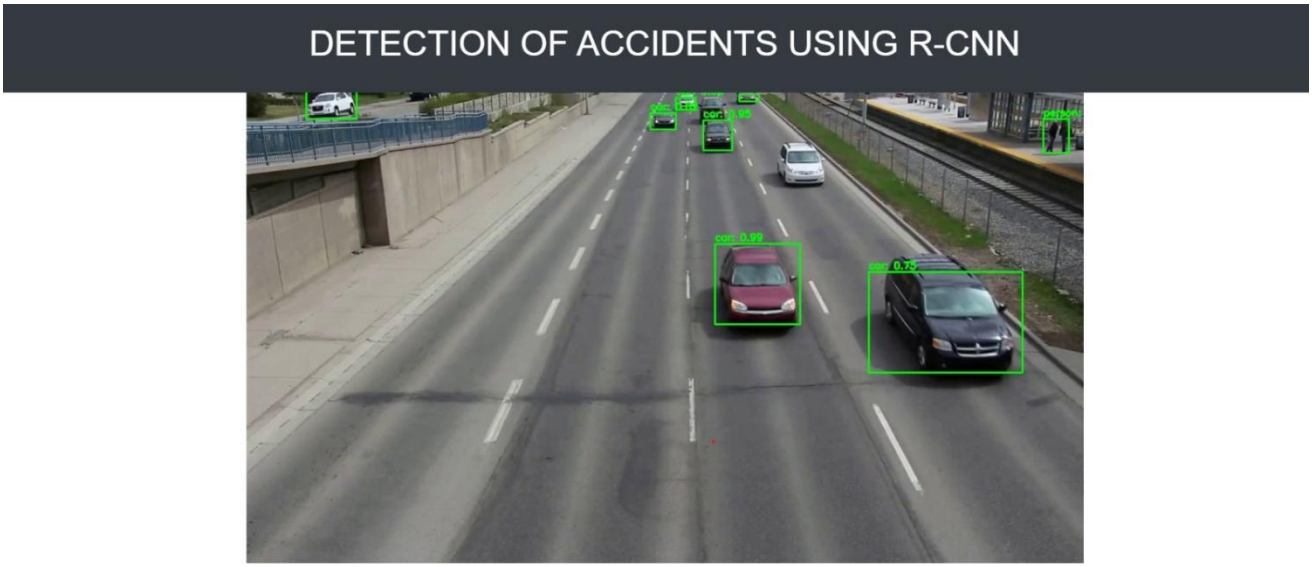

Fig: Bounding Boxes

First, the page will ask you to choose the type of video source , after choosing , we have to upload the video.Through bounding boxes it will detect and categorize the objects , then it will detect the accident .

VII. CONCLUSION

In conclusion, by developing the Attention R-CNN network and producing the ADV dataset, the paper makes a substantial addition to the field of accident detection. The network exhibits potential in enhancing object class and characteristic detection through the integration of object detection and recognition streams, in addition to an attention mechanism. The ADV dataset is a useful tool for developing and testing accident detection models because of its thorough annotation and semi-supervised development. The report also emphasizes the necessity of more study on how to use temporal information from videos to improve system performance in the future. All things considered, this work highlights the potential for further advancement in this crucial field of research and establishes a solid foundation for the advancement of accident detection technologies.

REFERENCES

[1] G.-P. Corcoran and J. Clark. Traffic risk assessment: A two-stream approach using dynamic-attention. In Conference on Computer and Robot Vision, 2019.

[2] J. Dai, Y. Li, K. He, and J. Sun. R-fcn: Object detection via region based fully convolutional networks. In Advances in Neural Information Processing Systems, 2016.F.-H. Chan, Y.-T. Chen, Y. Xiang, and M. Sun. Anticipating accidents in dashcam videos, 2016.

[3] J. Fu, J. Liu, H. Tian, Y. Li, Y. Bao, Z. Fang, and H. Lu. Dual attention network for scene segmentation. In CVPR, June 2019.

[4] J. Redmon, S. Divvala, R. Girshick, and A. Farhadi. You only look once: Unified, real-time object detection,2016.

[5] R. Girshick, J. Donahue, T. Darrell, and J. Malik. Rich feature hierarchies for accurate object detection and semantic segmentation,June 2014.