International Journal of Scientific Research & Engineering Trends
Volume 10, Issue 5, Sept-Oct-2024, ISSN (Online): 2395-566X

An Overview of Deep Learning Techniques for Enhanced Violence Detection in Surveillance Systems

M. Tech Scholar Dhirendra Tripathi, HoD Nagendra Patel
Department of Computer Science Engineering
Rewa Institute of Technology, Rewa, India

Abstract- This paper provides an overview of deep learning techniques aimed at enhancing violence detection in surveillance systems. As surveillance technologies advance, identifying violent activities accurately becomes critical to maintaining public safety. Traditional approaches often struggle with the complexity of video data, which includes both spatial and temporal patterns. To address this, modern deep learning methods like Convolutional Neural Networks (CNNs), InceptionV3, Long Short-Term Memory (LSTM) networks, and hybrid models have been employed to improve detection accuracy. These models effectively capture spatial features while also learning temporal dependencies, making them ideal for real-time violence detection. The review highlights preprocessing steps such as noise reduction, feature extraction, and data augmentation, which contribute to better model performance. It also examines challenges like data imbalance, scalability, and computational demands in deploying these models.

Index Terms- Deep Learning, Violence Detection, Surveillance Systems, CNNs, InceptionV3, LSTM.

I. INTRODUCTION

In a world that is becoming more urbanised and networked, the significance of guaranteeing the protection and security of the general population has never been more vital. The necessity for surveillance systems that are both effective and efficient has become of the utmost importance in light of the growing concerns over occurrences of violence that occur in public areas. The monitoring of surveillance video has traditionally been the responsibility of human operators; however, this method is not only time-consuming but also prone to errors caused by human operators. New opportunities for automating the detection and identification of violent behaviours in real time have been made available as a result of the fast growth of technology, notably in the domains of machine learning (ML) and artificial intelligence (AI). This has resulted in an increase in the capabilities of surveillance systems. The field of study known as violence recognition using machine learning is expanding rapidly. The primary objective of this research is to construct complex algorithms that are capable of effectively identifying and categorising violent behaviours based on visual data data.

The development of contemporary security systems relies heavily on it as an essential component. A broad variety of behaviours that are seen as harmful or aggressive are included in the idea of violence recognition. These behaviours include physical attacks, conflicts, and other types of violence that may take place in both public and private settings. When it comes to the development of automated systems for violence identification, the difficulty lies in the complexity of human behaviour as well as the unpredictability of contexts in which such behaviours occur. When it comes to violence detection, the system must be able to comprehend dynamic and often subtle indicators that discriminate between normal and violent activities. This is in contrast to other kinds of visual recognition, such as object or face recognition. Various lighting conditions, occlusion, various backdrops, and the presence of several persons are all elements that may dramatically effect the accuracy of identification systems. This complexity is increased by the fact that these factors can all have an impact on the accuracy of recognition systems.

One of the most effective methods for overcoming these issues is machine learning, which is a subfield of artificial intelligence. When it comes to training models to recognise patterns and make predictions based on huge datasets, machine learning approaches, especially those that include supervised learning, have shown a great deal of promise. Traditional methods of machine learning, such as support vector machines (SVM), decision trees, and k-nearest neighbours (KNN), have been used extensively in the early stages of research on violence identification. particular qualities of the data, such as motion patterns or spatial-temporal descriptors, are manually picked and utilised to train the models in these approaches. These methods depend largely on handmade features, which are the selection of particular characteristics of the data. In spite of the fact that these methods have shown some degree of effectiveness, they often struggle with the inherent variety and complexity of data that

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is collected from the actual world, which results in problems with generalisation and robustness.

The subject of violence recognition has been completely updated as a result of the introduction of deep learning. Deep learning models, in particular convolutional neural networks (CNNs) and recurrent neural networks (RNNs), have shown improved performance when it comes to recognising complicated patterns in visual data. Deep learning models, in contrast to more conventional approaches, are able to automatically learn features from raw data, hence removing the need for manually extracting individual features. Through the use of this feature, deep learning models are able to more effectively capture the subtle characteristics of violent behaviours, resulting in recognition systems that are more accurate and dependable. Furthermore, the use of sophisticated architectures, such as long short-term memory (LSTM) networks and attention processes, has further boosted the capability of these models to comprehend temporal sequences and context, both of which are essential in accurately discriminating between violent and non-violent behaviours.

On the other hand, despite the tremendous gains that have been brought about by methods like as machine learning and deep learning, the job of violence identification continues to be a difficult one. Having access to datasets that are of a good quality and have been annotated is one of the most significant issues. For most violence recognition systems, it is necessary to have a substantial quantity of labelled data in order to properly train the models. Nevertheless, the process of gathering and annotating such data, especially for violent situations, is not only time-consuming but also difficult from an ethical standpoint. Furthermore, the fact that there are a variety of settings and the need that models be able to generalise across a variety of contexts combine to provide additional levels of complexity. As a consequence of this, the creation of violence recognition systems that are both resilient and scalable requires not only the use of sophisticated algorithms, but also the implementation of novel techniques to the collecting and enhancement of data.

The assessment of the functioning of the system is yet another very important part of violence recognition. The efficacy of recognition systems is often evaluated using conventional measures like as accuracy, precision, recall, and F1-score. There are however other metrics that are widely employed. In spite of this, it is possible that these measures may not adequately represent the performance of the system because of the unbalanced nature of violence detection tasks, in which violent occurrences are uncommon in comparison to non-violent ones. To give a more thorough review, it is common practice to make use of more advanced evaluation measures. Some examples of these metrics are the area under the receiver operating characteristic curve (AUC-ROC), the area under the precision-recall curve (AUC-PR), and the Matthews correlation coefficient (MCC). Furthermore, in order to guarantee the generalisability and robustness of the models that have been constructed, it is necessary to make use of cross-validation methods and to include a collection of different test sets.

One further interesting approach to improving violence identification algorithms is the incorporation of data from several sources. Although the majority of the systems that are now in use depend solely on visual input, the incorporation of other modalities, such as audio, infrared, or depth sensors, may enable a deeper and more nuanced comprehension of the scene's characteristics. The combination of video and audio data, for instance, may assist in distinguishing between behaviours that seem to be quite similar to one another, such as a heated debate and a physical fight, by analysing the sound that is associated with each of these events. In a similar vein, depth sensors have the potential to provide vital information on the spatial relationships between people, which is essential for comprehending the dynamics of a violent occurrence. In tough situations, when visual data alone may not be adequate, multimodal techniques have the potential to dramatically increase the accuracy and reliability of violence identification systems. This is especially true in situations where visualisation alone might not be enough.

In spite of the progress that has been achieved in the field of violence recognition research, there are still a number of unresolved issues and areas that need more investigation. One of these challenges is the problem of processing information in real time. It is necessary for violence recognition systems to be able to process and analyse data in real time in order for them to be useful in practical applications. Security personnel should be able to get quick warnings from these systems. In order to accomplish this degree of performance, it is necessary to not only formulate algorithms that are effective but also to optimise both the hardware and software systems in order to meet the requirements of the computations. In addition, there is a need for ongoing study on the ethical implications of automated violence recognition, especially with regard to aspects of privacy and the possibility of abuse. For the purpose of winning the confidence of the general public and avoiding unforeseen effects, it is vital to make certain that these technologies are implemented in a responsible and transparent manner.

II. REVIEW OF LITERATURE

A content analysis was carried out with the express purpose of focussing on violent entertainment available on the internet. With the use of a dataset consisting of 2,520 videos from YouTube, this study does a comparison between amateur and professional content. The films are arranged into categories according to their level of popularity, ratings from users, and

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samples that were chosen at random. A comparison was made between the violent frequencies and contexts of various YouTube video categories with studies on television violence. This comparison took into consideration a wide range of aspects, including the characteristics of the perpetrator and victim, the reasoning for the violence, and the consequences of the violence. YouTube offers a far higher level of safety compared to television. In contrast to the representation of violence on television, this incidence resulted in clear real-life ramifications and took place in a more frightening context. Comparative analysis conducted after the fact found that different video producers and genres portrayed violent content in a variety of different ways [1].

In light of the significant increase in the number of infants and toddlers who use YouTube, it is very necessary to carefully examine the information that these age groups consume on the platform. Due to the fact that parents and teachers were the ones who established the YouTube channel indexes, it is far more difficult to identify the information that toddlers and newborns are seeing. The studies were conducted with the purpose of examining the cognitive, emotional, and social development of neonates via the use of films from YouTube. For the purpose of evaluating language impairment, verbal and physical aggressiveness, emotional expression, empathy, emotional control, representation of prosocial and antisocial behaviour, and prosocial communication, the research conducted an individual analysis of the cognitive, emotional, and social elements. As a consequence of this, the score for physical violence was relatively low, whereas the score for mental anguish was rather high. It is more beneficial for the development of young children to demonstrate emotional expressiveness, emotional awareness, and prosocial behaviour [2]. This is because participating in destructive language, verbal aggressiveness, or physical violence is not beneficial to the development of young children.

Careful attention must be paid to both the physical and online aspects of security. Cameras that are used for surveillance are an efficient way that may be used to guarantee the safety of potentially dangerous regions. They have the capacity to gather large amounts of video material and offer continuous monitoring, which is not something that people are capable of doing. It is possible to conduct a rapid examination of this material in order to discover any irregularities and put any corrective steps into effect. When it comes to tackling the modern security issues, the use of automatic video and picture identification is very necessary. Through the use of machine learning (ML) or deep learning (DL) approaches, it is feasible to instantly recognise and react to questionable behaviours that are shown in photographs and videos taken by individuals. Data and effort are both necessary components for action recognition, which is an essential component of violence detection. War, rioting, stone throwing, and general animosity are the only things that my artwork acknowledges [3].

Video analysis has been substantially improved because to the implementation of computer vision technology and the automation of surveillance systems, which has resulted in considerable enhancements to both public and industrial security. In the areas of human activity identification, behavioural analysis, and the detection of violent behaviour, this is very accurate. Because of their limited processing capabilities, real-time surveillance systems continue to have difficulty identifying and evaluating violent situations, despite the recent breakthroughs that have been made in this area. AI technology that is enabled by the Internet of Things (IoT) and is called VD-Net (Violence Detection Network) is able to recognise hostile behaviour in both public and private settings. In order to precisely handle important aspects of the input sequence, the model makes use of lightweight ST-TCN blocks and bottleneck layers. On the basis of the characteristics they have acquired, classifiers differentiate between actions that are aggressive and those that are peaceful. In the event that our method identifies any sort of violent behaviour, it ought to immediately notify the appropriate authorities. Using both surveillance and non-surveillance datasets, we conducted an exhaustive evaluation of our technique and shown that it offers an improvement in accuracy of between one and four percentage points compared to the current state of the art [4].
During the course of the COVID-19 outbreak, there has been a notable rise in the number of instances of violent dating. The purpose of this article is to investigate the effects that the normalisation of dating violence in social media environments has had on young people. Through an examination of the "pretend to punch your girlfriend" fad on TikTok, the purpose of this study is to investigate the ways in which young people interpret the violence that occurs in online dating. In what ways does their emotional response show that they have changed their perspective on the equality of partnerships and the existence of violence in dating relationship? The purpose of this study was to investigate the ways in which young people's "feeling rules" are affected by violent dating situations. The research used a mixed-method approach. In conclusion, this study concludes by offering several ideas for the design of platforms that are targeted at reducing the number of cases of violent dating that occur on social media [5].

A topic that is commonly addressed in rational choice theories and has been the subject of substantial research is the interaction that occurs between the government and individuals who are opposed to it. For the purpose of gaining a full grasp of dissident ideology, this research employs computational tools to analyse ethnographic interviews. According to research, dissidents have a tendency to react with violence when they are met with violent persecution, and they prefer to respond with peaceful means when they are

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confronted with opposition that is not violent. Before participating in demonstrations, the vast majority of people would rather have the government intervene or ensure their safety. In addition to providing more evidence of the reciprocal connection that exists between governments and dissidents, these findings also shed light on the cognitive similarities that exist between political dissent and cooperation, which is often associated with tit-for-tat processes. Furthermore, these studies suggest that the fundamental factor that motivates resistance is governmental repression, rather than social contagion or perceived relative hardship. This is the core of the phenomenon. It is possible that dissidents are more receptive to government change and cooperation than authoritarian regimes portray them to be [6]. Heuristic thinking tendencies make this hypothesis possible.

A number of applications exist for the detection of human aggression, and one of these applications is in video surveillance systems. It is possible that the capacity to identify violent situations in real time might lead to a reduction in the number of crimes committed and the prevention of potential fatalities. When it comes to ideas and research, the majority of the time, correctness is believed to be more significant than both effectiveness and practicability. As a result of its ability to identify aggressive human behaviour in real time, our technology is both highly effective and very accurate. The proposed model is made up of three different modules: the Spatial Motion Extractor (SME), which is responsible for extracting regions at the frame level; the Short Temporal Extractor (STE), which is responsible for extracting temporal features of fast movements at the frame level; and the Global Temporal Extractor (GTE), which is responsible for extracting long-lasting temporal features at the frame level and for fine-tuning the model. We carried out a real-time evaluation of the strategy in order to determine how successful and efficient it was. The excellent performance of the technique is shown by the outcomes that were acquired from the RWF-2000, Movies, and Hockey datasets. Using recordings from Peruvian video surveillance cameras, the VioPeru dataset was created. These recordings included both violent and non-aggressive episodes. The purpose of this dataset was to evaluate the real-time capabilities of the model. In the process of utilising this dataset, our model provided the best possible results. Video Violence Detection (VVD) is a crucial component of video surveillance; yet, it becomes more challenging in crowded locations due to the complexity and diversity of violent incidents. Activities that include violence are often characterised by a trajectory that is rapid, chaotic, and disorganised. An innovative method that we provide, which we term Angle-level Co-occurrence, is used for the purpose of analysing violent video footage. This approach makes use of a matrix that is capable of successfully capturing the pertinent parts of these clips when applied. A rank-3 tensor is included in our video volume model, and it is comprised of a fibre that is limited to a single plane. In a single plane of the rank 3 tensor, the ALCM algorithm has the ability to capture the distribution of fibre pairs that have specific characteristics. It determines the frequency with which two different quantised angle values occur simultaneously between fibres and the fibres that are next to them. We compute three ALCMs for three planes that are mutually perpendicular to one another in order to produce a comprehensive TOP-ALCM that offers a complete description of volume violence. As an additional service, we provide a traditional VVD framework that makes direct use of CNN, in addition to a DL-based framework that makes use of TOP-ALCM features for classification, such as entropy, homogeneity, and energy. When used in experimental circumstances, the TOP-ALCM achieves better results than the most advanced VVD algorithms [8].

This report offers a complete review of the most recent occurrences of violence against minors (those under the age of 17) that have been shown on primetime television. For the purpose of classifying 765 primetime television episodes that were shown on 21 different broadcast and cable networks throughout the 2016–2017 period, we used the same sample process and codebook as was utilised for the first National Television Violence Study. For the purpose of analysing and contrasting the frequency of violent material as well as the type of the content, we separated television programming that was aimed at children from programming that was aimed at adults. Over the course of the last two decades, there has been a notable reduction in the percentage of violent material that is included in programming aimed for children, but this percentage continues to be higher than that of programs aimed at adults. To a certain extent, the depiction of violence on children's television is idealised; yet, it is presented in a manner that is more sanitised and trivialised, which is comparable to the way that it is displayed in adult programming. Before teaching youngsters about animosity, there are a few things to keep in mind [9].

In order to establish the degree to which the representation of violence in the media is in line with the scientific knowledge of the influence that it has on viewers' aggression, we carried out an exhaustive examination of 540 news items. A association between the prevalence of violent news material and the occurrence of violent acts has been shown over the course of the last three decades. Since the year 2000, the tone has quickly reverted to a neutral condition because of the situation. The gender of the journalist, the number of independent sources that were used, and the kind of media that was being investigated (for example, television as opposed to video games) are all potential variables that might have contributed to this development. An analysis of the potential effects that being exposed to this news article may have on readers [10].

The method in which crimes are portrayed in the media has a significant impact on how the general public views crime

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victims and the demographic categories that they belong to. This group already has considerable challenges, but the news media has the ability to perpetuate harmful stereotypes and minimise incidents of violence against transgender persons, therefore compounding the difficulties that they already face. Within the scope of this research, 316 news articles that reported on 27 transgender fatalities in the United States in 2016 are analysed. The representation of transgender identities, both positive and negative, the use of language that either supports or undermines these identities, and the systematic organisation of transphobia are the primary focusses of this study. A wide range of topics, conclusions, and potential avenues for additional inquiry are discussed in this article [11].

There has been a notable increase in the amount of scholarly interest there is in monitoring systems. It is possible to employ security cameras that are installed in public places like schools, hospitals, businesses, and roadways to anticipate problems, monitor actions that take place online, analyse data with particular goals in mind, and identify intrusions by recording noteworthy movements and occurrences. Through the use of video surveillance, this research contributed to the development of deep learning architectures that allow real-time detection of violent criminal scenarios. Using Deep Recurrent Neural Networks (DRNN) and spatio-temporal (ST) classification, the objective is to collect video data from live surveillance systems at crime scenes and then analyse the properties of the film. Following the process of converting the raw information into video frames, the characteristics were extracted and put in proper order. Real-time detection of aggressive and violent behaviour, as well as the identification of anomalies that depart from regular patterns, are both characteristics that it has. In order to carry out both the training and the testing of our methodology, we make use of the vast UCF Crime anomaly dataset. A high level of performance is shown by the technique that is advised on real-time datasets, with an accuracy of 98%, precision of 96%, recall of 80%, and an F-1 score of 78% [12].

The use of content screening procedures ensures that people of all ages are able to access the internet without experiencing any anxiety. Throughout the moderation process, human moderators manually determine whether or not a piece of content will be considered violent or nonviolent. Content moderators are often confronted with graphic violence, which has the potential to have a significant effect on their emotional and psychological well-being. The purpose of this research is to propose a machine learning algorithm that is capable of properly categorising films as violent or non-violent upon the basis of the violent material that they include. Both aural and visual information are used in its operation. Beginning with the separation of audio and visual components is the first step in the process. The ability to differentiate between sounds that are characterised by high volume and those that are characterised by low volume is one of the capabilities of an intelligent audio classifier. Based on the results of an audio classifier that classifies the sounds as calm, a video classifier determines the amount of violence that is present in a film by depending on the category of the noises [13].

Despite the fact that many scholars, practitioners, and policymakers are worried about the online posting behaviours of violent extremists prior to participating in offline violence, there is a lack of empirical understanding about violent extremists and how they vary from peaceful extremists. The engagement of right-wing extremists, both violent and nonviolent, on the most prominent website for white supremacists was divided into five separate groups: super-posters, dedicated persons, engaged individuals, dabblers, and non-posters. They were categorised according to their level of activity. For the purpose of this categorisation, a distinct group of persons served as the basis. In the course of our investigation into cybercriminals, we have discovered a great number of posting patterns that might prove to be of great use to intelligence and law enforcement agencies [14].

There is a lack of understanding about the posting patterns of violent extremists on the internet and how these patterns vary from those of non-violent extremists who have the same ideologies. Despite the fact that intelligence and law enforcement organisations have a duty to detect and evaluate the activities of such extremists online before they engage in violent acts offline, this is the situation that has arisen. In compared to radicals in general, there is a little amount of information available about their activities on the internet. The purpose of this study is to address the knowledge gap that currently exists by conducting an analysis of postings from a particular sub-forum on Stormfront, which is the most prominent online venue for white supremacists. In addition to this, it investigates a distinct group of right-wing extremists who use both violent and peaceful rhetoric in their discussions. On the basis of their violent extremist mobilisation, personal grievances, and extreme ideologies, each of the three organisations was rated. Intelligence organisations and law enforcement agencies are worried about the impact that significant differences in posting patterns between samples might have on risk factor frameworks for serious threats that are posed online. Specifically, the implications for analysis, limitations, and future potential for research are all included in the conclusion of the study [15].

Through the course of its history, research on peace has traditionally focused on the utilisation of written materials, numerical data, and symbolic representations. Based on the findings of this study, it is recommended that the analytical toolbox of Peace Research include Video Data Analysis (VDA) in order to properly analyse the huge number of important films that relate to conflict and peace research that are available online and offline. The article offers an

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explanation as well as a demonstration of how VDA might be of assistance in grasping the complex processes of violence, conflict, mediation, and peacebuilding. From the convenience of their couches, researchers are able to witness the development of events via recordings, demonstrating the same degree of awareness to interaction and surroundings as ethnographers. When an ethnographer is not physically present at an event, they are unable to accurately record the complex timing, interaction, and impact dynamics that occur throughout that event. The ethnographer's capacity to chronicle these particulars is hindered by the lack of direct observation, in contrast to video recordings, which allow researchers to replay occurrences in slow motion. Within the context of peace research, the study investigates the difficulties associated with the acquisition of knowledge, the ethical conundrums that may arise, and the potential future benefits of using Virtual Data Analysis (VDA). In the article, real examples are provided that illustrate how the evaluation of emotions via body language and facial expressions, as well as the research of social relationships through the dynamics and substance of interactions, may be beneficial [16].

In order to manage the ever-increasing volume of video data produced by security camera networks, artificial intelligence systems that are capable of scaling are necessary. A substantial amount of attention has been drawn to video violence identification, which is a method that is commonly employed in surveillance research techniques. Due to the fact that the bulk of research has focused on improving existing systems via the use of supervised techniques, there is a limited amount of understanding about semi-supervised learning processes. The purpose of this research is to provide an improved semi-supervised reinforcement learning model.

A semi-supervised hard attention mechanism is presented by the approach, which is the most important component of the implementation. When rigorous attention is applied, the main goal is to differentiate between video parts that provide important information and those that do not include any information at all. Through the elimination of unnecessary data and the prioritisation of essential visual information with increased precision, the accuracy of the model may be improved substantially. The use of hard attention approaches that make use of semi-supervised reinforcement learning algorithms has the potential to effectively minimise the need for attention annotations, hence improving the usability of video violence datasets. Through the use of a pre-trained I3D backbone, the process of training the model is sped up and made more stable. With a level of accuracy of 90.4% on the RWF dataset and 98.7% on the Hockey dataset, the model that has been recommended achieves the maximum degree of accuracy that is presently available [17].

It is possible that the amazing development that has been made in digital video capture, storage, and processing is the reason for the widespread usage of security cameras. Because of the vast amounts of video data, even when utilising manual approaches, the identification of events may be delayed. This makes it impossible to conduct analysis in real time. As a direct result of this, there has been a substantial rise in the amount of scholarly interest in the development of methods that can automatically identify instances of violence in surveillance recordings. It is now feasible to do automated video identification tasks, such as the detection of violent acts, thanks to the development of machine learning algorithms.

The purpose of this research is to investigate intelligent networks that make use of three-dimensional convolutions to capture the geographical and temporal organisation of data. This allows for the depiction of the dynamic interactions that occur between people and things. We employ a pre-trained algorithm for action detection in order to improve the efficiency and accuracy of recognising acts of violence in CCTV footage.

This allows us to detect aggressive behaviour more accurately. In order to evaluate the efficacy of our approaches, we conduct an analysis on a broad variety of datasets that are available to the public. These datasets contain video content that is both complicated and diverse. We have developed a method that not only uses fewer model parameters but also displays a 2% boost in accuracy when compared to the most advanced approaches currently available. Furthermore, the findings of our study indicate that our method is able to withstand compression distortions in situations that include the processing of data sent to a remote server [18].

III. CONCLUSION

The use of machine learning to the identification of violent acts is an area that is quickly developing and shows enormous potential for the improvement of public safety and security. Significant gains have been made in the capability of systems to effectively identify and categorise violent behaviours as a result of the incorporation of machine learning methods, notably deep learning.

However, in order to construct successful violence identification systems, it is necessary to overcome a number of obstacles. These issues include the availability of datasets of a high quality, the need for assessment criteria that are robust, and the incorporation of data from several sources. By continuing to investigate these areas and improving upon the approaches that are already in place, researchers have the potential to make a contribution to the development of violence recognition systems that are more dependable and scalable, eventually leading to an improvement in the capabilities of automated surveillance systems in the areas of public safety, security, and law enforcement.

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REFERENCES

1. Weaver, Andrew J., Asta Zelenkauskaite, and Lelia Samson. "The (non) violent world of YouTube: Content trends in web video." Journal of Communication 62, no. 6 (2012): 1065-1083.
2. Choi, Yun Jung, and Changsook Kim. "A content analysis of cognitive, emotional, and social development in popular kid's YouTube." International Journal of Behavioral Development (2024): 01650254241239964.
3. Jain, Mahaveer, and Mukesh Kumar. "A Review of Violence Detection Techniques." In 2024 2nd International Conference on Computer, Communication and Control (IC4), pp. 1-6. IEEE, 2024.
4. Khan, Mustaqeem, Abdulmotaleb El Saddik, Wail Gueaieb, Giulia De Masi, and Fakhri Karray. "VD-Net: An Edge Vision-Based Surveillance System for Violence Detection." IEEE Access 12 (2024): 43796-43808.
5. Maddocks, Sophie, and Fallon Parfaite. "'"Watch me pretend to punch my girlfriend": exploring youth responses to viral dating violence." Feminist Media Studies 24, no. 1 (2024): 103-118.
6. Dornschneider-Elkink, Stephanie, and Nick Henderson. "Repression and dissent: How tit-for-tat leads to violent and nonviolent resistance." Journal of Conflict Resolution 68, no. 4 (2024): 756-785.
7. Huillcen Baca, Herwin Alayn, Flor de Luz Palomino Valdivia, and Juan Carlos Gutierrez Caceres. "Efficient human violence recognition for surveillance in real time." Sensors 24, no. 2 (2024): 668.
8. Hu, Xing, Zhe Fan, Linhua Jiang, Jiawei Xu, Guoqiang Li, Wenming Chen, Xinhua Zeng, Genke Yang, and Dawei Zhang. "TOP-ALCM: A novel video analysis method for violence detection in crowded scenes." Information Sciences 606 (2022): 313-327.
9. Martins, Nicole, and Karyn Riddle. "Reassessing the risks: An updated content analysis of violence on US children's primetime television." Journal of Children and Media 16, no. 3 (2022): 368-386.
10. Ferguson, Christopher J., Anastasiia Gryshyna, Jung Soo Kim, Emma Knowles, Zainab Nadeem, Izabela Cardozo, Carolin Esser, Victoria Trebbi, and Emily Willis. "Video games, frustration, violence, and virtual reality: Two studies." British journal of social psychology 61, no. 1 (2022): 83-99.
11. Osborn, Max. "US news coverage of transgender victims of fatal violence: An exploratory content analysis." Violence against women 28, no. 9 (2022): 2033-2056.
12. Sahay, Kishan Bhushan, Bhuvaneswari Balachander, B. Jagadeesh, G. Anand Kumar, Ravi Kumar, and L. Rama Parvathy. "A real time crime scene intelligent video surveillance systems in violence detection framework using deep learning techniques." Computers and Electrical Engineering 103 (2022): 108319.
13. Rishab, K. S., P. Mayuravarsha, Yashwal S. Kanchan, M. R. Pranav, and Roopa Ravish. "Detection of Violent Content in Videos using Audio Visual Features." In 2023 International Conference on Advances in Electronics, Communication, Computing and Intelligent Information Systems (ICAECIS), pp. 600-605. IEEE, 2023.
14. Scrivens, Ryan, Garth Davies, Tiana Gaudette, and Richard Frank. "Comparing online posting typologies among violent and nonviolent right-wing extremists." Studies in Conflict & Terrorism (2022): 1-23.
15. Scrivens, Ryan. "Examining online indicators of extremism among violent and non-violent right-wing extremists." Terrorism and political violence 35, no. 6 (2023): 1389-1409.
16. Bramsen, Isabel, and Jonathan Luke Austin. "Affects, emotions and interaction: the methodological promise of video data analysis in peace research." Conflict, Security & Development 22, no. 5 (2022): 457-473.
17. Mohammadi, Hamid, and Ehsan Nazerfard. "Video violence recognition and localization using a semi-supervised hard attention model." Expert Systems with Applications 212 (2023): 118791.
18. Huszar, Viktor Denes, Vamsi Kiran Adhikarla, Imre Négyesi, and Csaba Krasznay. "Toward fast and accurate violence detection for automated video surveillance applications." IEEE Access 11 (2023): 18772-18793.
19. Cheng, Ming, Kunjing Cai, and Ming Li. "RWF-2000: an open large scale video database for violence detection." In 2020 25th International Conference on Pattern Recognition (ICPR), pp. 4183-4190. IEEE, 2021.

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