Literature Review (Secondary Research) Template

Student Name	**M Sudhansh Narayan**
Project Topic Title	**Abnormal Event Detection on Pathway using deep learning**

Type of Variables that You Need to Search for in Each Article (Each Current Solution)			
Dependent variable	**Independent variable**	**Moderating variable**	**Mediating (Intervening) variable**
● The presumed **effect** in an experimental study. ● The values of those variable depend upon another variable that are the independent variables. ● Strictly speaking, "dependent variable" should not be used when writing about non-experimental designs. ●	● The presumed **cause** in an experimental study. ● The variables that may impact on the dependent variable ● The values of those variable are under experimenter control. ● Strictly speaking, "independent variable" should not be used when writing about non-experimental designs.	● has a strong *contingent* effect on the independent variable-dependent variable **relationship** and thus produces an interaction effect.	● It comes between the independent and dependent variables and shows the **link or mechanism** between them.
● Examples: **1. performance**. **2. Test Score**. **3. stock market. 4. performance** of the students	● Examples: **1. run time** that will impact and cause high/low performance. **2. Time Spent Studying** that will cause the high/low score. **3. New product** that will impact on the stock market price. **4. quality of library facilities**	● Example: **4.** There is a strong relationship between the quality of library facilities (X) and the performance of the students (Y). Only those students who have the **interest and inclination** to use the library will show improved performance in their studies, which moderates the strength of the association between X and Y variables.	● Example: Parents transmit their social status to their children directly, but they also do so indirectly, through education: viz. Parent's status ➛ child's education ➛ child's status ● Example: The statistical association between income and longevity needs to be explained because just having money does not make one live longer. Other variables intervene between money and long life. People with high incomes tend to have better medical care than those with low incomes. Medical care is an

			intervening variable. It mediates the relation between income and longevity.

Relationship among Variables - Correlations (Univariate, Bivariate, Multivariate)
● Once the variables relevant to the topic of research have been identified, then the researcher is interested in the relationship among them. ● A statement containing the variable is called a **proposition**. It may contain one or more than one variable. ● The proposition having one variable in it may be called as **univariate** proposition, those with two variables as **bivariate** proposition, and then of course **multivariate** containing three or more variables. ● Prior to the formulation of a proposition the researcher has to develop strong logical arguments which could help in establishing the relationship. ● For example, age at marriage and education are the two variables that could lead to a proposition: the higher the education, the higher the age at marriage . What could be the logic to reach this conclusion? All relationships have to be explained with strong logical arguments. If the relationship refers to an observable reality, then the proposition can be put to test, and any testable proposition is hypothesis.

Research Model That The Author Followed to Propose His Solution			
1. Where we are now	**2. Where are we going**	**3. How do we get there**	**4. How do we know when we are finished**
● What the author has done in the area; The constructs that the literature examine ● **What the problem is available** in this paper that has solved by the author ● The purpose of that is to avoid pursing research which has already been undertaken	● What the author **objective** of the research is to gain a clearer understanding the relationships between variables ● What is the goal of the paper ● The purpose is to know what is the plan to do before he did the research	● How the author conducted the research; **How the problem has solved** ● How he analysed the data generated by the research; A quantitative research design	● What is the value of this solution ● A series of **recommendations** which flow from the data analysis have been made

NOTE: Please you need to use YOUR OWN WORDS in writing this template.

Your Literature Review Should be in Scope and MUST Address all Your Project's Questions

Version 1.0 _ Week 1		
1		
Reference in APA format		
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.researchgate.net/publication/340909361_Abnormal_Crowd_Behavior_Detection_Using_Motion_Information_Images_and_Convolutional_Neural_Networks	Cem Direkoğlu	Crowd behavior analysis, anomaly detection, motion information image, convolutional neural network
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Motion information images (MIIs) Convolutional neural networks (CNNs)	The goal of the solution proposed in the research paper is to develop a system that can accurately and efficiently detect abnormal crowd behavior in video surveillance feeds.	Author used unsupervised learning for determining the abnormality in a crowd.
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process		
Performance of Detection of abnormal behaviour in crowds is evaluated based on different algorithms and constraints. Even though this author compared various results upon validating the test data and trained data using machine learning with all unsupervised learning algorithms .		

	Process Steps	Advantage	Disadvantage (Limitation)
1	MIIs are images that represent the motion information in a video sequence. They are generated by computing the optical flow vectors between consecutive frames in the video.	MIIs are robust to noise and variations in the data, such as changes in lighting, weather, and camera angles. This is because MIIs only represent the motion information in the video, and they are not affected by other factors such as the appearance of the individuals in the video	Generating MIIs can be computationally expensive, especially for high-resolution videos..
2	A CNN is a type of deep learning model that is well-suited for image classification tasks. The CNN is trained to classify the MIIs as either normal or abnormal	CNNs are able to learn complex patterns in data, which makes them well-suited for this task. CNNs are also robust to noise and variations in the data.	CNNs require a large amount of training data, which can be difficult and expensive to collect. CNNs can also be susceptible to overfitting, which can lead to poor performance on new data.
3	If the CNN predicts that an MII is abnormal, then the corresponding frame in the video sequence is flagged as containing abnormal crowd behavior.	This step is relatively straightforward and can be implemented efficiently	This step can lead to false positives, which are frames that are flagged as containing abnormal crowd behavior when they do not in fact contain abnormal crowd behavior.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable

Accuracy and efficiency	Use of MIIs and CNNs	Type of video footage	Features of the MIIs and CNNs that are associated with accuracy and efficiency

Relationship Among The Above 4 Variables in This article
There is a positive effect in the output.

Input and Output	Feature of This Solution	Contribution & The Value of This Work
Input: Video Surveillance Feed **Output**: It is a flag that indicates whether or not abnormal crowd behavior has been detected .	Developing a model which is robust to noise and weather conditions and also capable of detecting a wide variety of crowds .	By this paper we get to know how several algorithms can be used in any extreme conditions and the potential to alarm the crowd from the possible threat .

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
Increased early detection of abnormal crowd behavior can help to prevent crime and other incidents by providing early warning to security personnel.	The system could be used to track and monitor individuals without their consent**.**

Analyse This Work By Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
Overall, the proposed method is a promising new approach , though the author does not give a detailed comparison with other state of methods by which we get to know the accuracy level.	Sensitivity analysis	Abstract I. Introduction II. Motion Information Image Generation III. CNN Training and Classification IV. Evaluation and Results V. Conclusion

Diagram/Flowchart

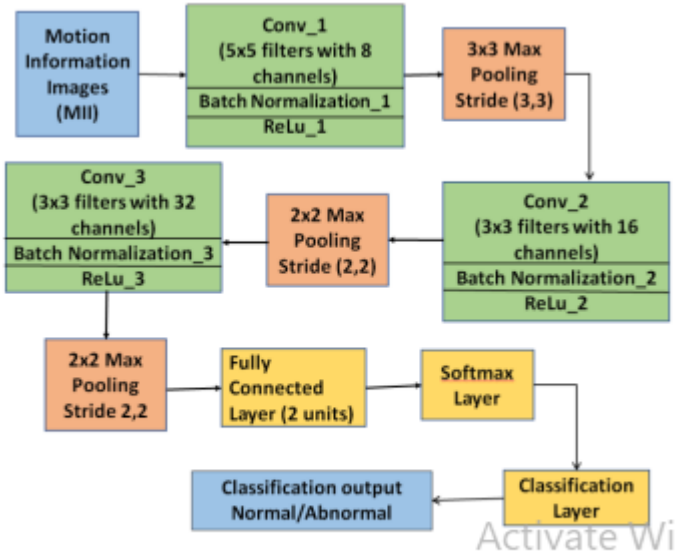

FIGURE 3. The CNN Structure

---End of Paper 1-

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Reference in APA format		
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.researchgate.net/publication/346030452_Abnormal_Event_Detection_in_Urban_Surveillance_Videos_Using_GAN_and_Transfer_Learning	Ali Atghaei, Soroush Ziaeinejad, and Mohammad Rahmati	Deep learning, event detection, generative adversarial network, machine learning, neural networks, transfer learning
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Generative Adversarial Network(GAN) Transfer Learning(TL)	The goal is to develop an accurate and efficient model that can be used for a variety of applications such as crowd analysis, subway stations and urban pathways surveillance, summarization of surveillance videos, and smart home monitoring.	Appearance features are features that describe the visual appearance of objects and scenes in a video Motion features are features that describe the movement of objects and scenes in a video

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1	The proposed method uses a pre-trained CNN (to extract spatio-temporal features from videos. Spatio-temporal features are features that describe the visual appearance and movement of objects and scenes in a vide	This step allows the model to learn features automatically and in an unsupervised manner. This is important because it is difficult and time-consuming to hand-craft features for abnormal event detection.	This step may be computationally expensive, especially when using a large pre-trained CN
2	The proposed method transfers the knowledge of a pre-trained CNN to its discriminator CNN. This allows the discriminator CNN to learn to distinguish between normal and abnormal events more efficiently.	This step improves the efficiency of the model	This step may require a large amount of training data, especially when using a large pre-trained CNN
3	The proposed method uses a CNN to classify videos as normal or abnormal	This step allows the model to detect abnormal events in videos accurately and efficiently..	This step may be sensitive to noise in the data.
4	The model is evaluated and found to be satisfactory, and can be deployed to production.	This step makes the model available to users so that they can benefit from its capabilities	This step may require additional infrastructure, such as servers and storage

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable

Relationship Among The Above 4 Variables in This article

Input and Output	Feature of This Solution	Contribution in This Work
<table><tr><th>Input</th><th>Output</th></tr><tr><td>Video Feed</td><td>Classification of the video as normal or abnormal</td></tr></table>	With this system there is a automatic feature learning using GAN and with transfer learning the accuracy and efficiency of the required output.	Designing hybrid classifier is a good thought, where two different features working together to resolve individual issues.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
Ability to learn features automatically and in an unsupervised manner.	Potential for overfitting, especially when using a large pre-trained CNN.

Analyse This Work By Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper

The performance of GANs is sensitive to the quality of the training data.This could lead to decreased performance on real-world data.	Area Under ROC Curve True Positive Rate False Positive Rate	Abstract VI. Introduction VII. Appearance-Motion andMotion-only Analyses VIII. Transfer Learning to Benefit from CNN IX. Experiment Results X. Conclusion

Diagram/Flowchart

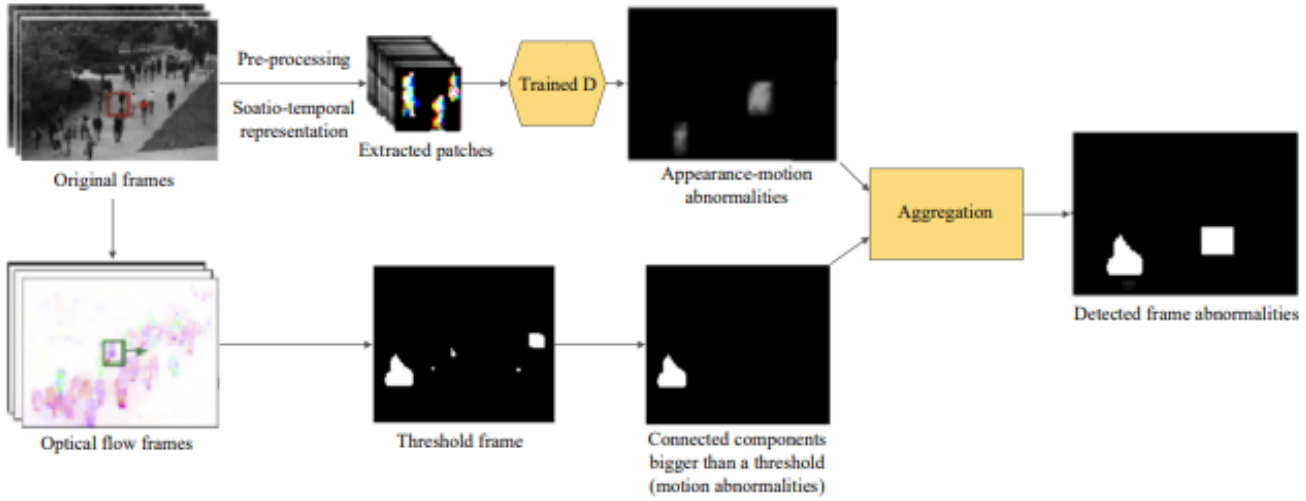

Fig. 4. Testing phase of the proposed method.

--End of Paper 2--

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Reference in APA format		
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.researchgate.net/publication/339050531_Temporal_Saliency-Based_Suspicious_Behavior_Pattern_Detection	Kyung Joo Cheoi	suspicious behavior detection; motion; magnitude; gradient; reactivity; saliency
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Temporal saliency-based approach Machine learning-based approach	The goal of the method is to automatically detect suspicious activity in CCTV footage..	Selection of Feature, Context aware spam detection.
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process		

	Process Steps	Advantage	Disadvantage (Limitation)
1	This step detects moving objects in the video footage. This can be done using a variety of methods, such as background subtraction or optical flow.	Detects moving objects in the video footage, which is essential for detecting suspicious activity.	Can be computationally expensive, can be sensitive to noise in the video footage, and can be sensitive to changes in the lighting conditions.
2	Features are extracted from the motion detection results. The magnitude feature represents the magnitude of the motion vector,	Extracts motion features from the video footage, which are essential for detecting suspicious behavior patterns	Can be sensitive to noise in the video footage.

	while the gradient feature represents the direction of the motion vector.		
3	These values are calculated for each pixel in the video footage. The statistical values include the mean, median, and standard deviation of the motion vector	Provides additional information about the motion of objects in the video footage, which can be helpful for detecting suspicious behavior patterns.	Can be sensitive to changes in the lighting conditions.
4	This map is created by combining the magnitude and gradient feature maps with the statistical values of the motion vector. The temporal saliency map highlights regions of the video that are likely to contain suspicious activity	Highlights regions of the video that are likely to contain suspicious activity, which can help operators to quickly identify suspicious events.	Can be sensitive to the camera angle

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
Temporal saliency map	Video stream	Camera angle Lighting conditions	Motion features Statistical values of the motion vector

Relationship Among The Above 4 Variables in This article

The independent variable provides the raw material and moderating variables affect the quality of the input, the mediating variables extract meaningful information from the input, and the dependent variable represents the final outcome.

Input and Output	Feature of This Solution	Contribution & The Value of This Work
<table><tr><th>Input</th><th>Output</th></tr><tr><td>Video Stream</td><td>Temporal saliency map</td></tr></table>	The method can be used to detect suspicious behavior patterns in a variety of domains, such as fraud detection, intrusion detection, and anomaly detection.	It is important to detect suspicious activity in real time, such as airports, train stations, and other public places.

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
Reduces the workload of security personnel	Temporal saliency-based suspicious behavior pattern detection may be complex to implement and maintain.

Analyse This Work By Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
It is important to consider the ethical implications of the technique	Precision,Recall and F1 Score	Abstract I. Introduction II. Materials and Methods III. Results and Discussion IV. Conclusion and Future work

Diagram/Flowchart

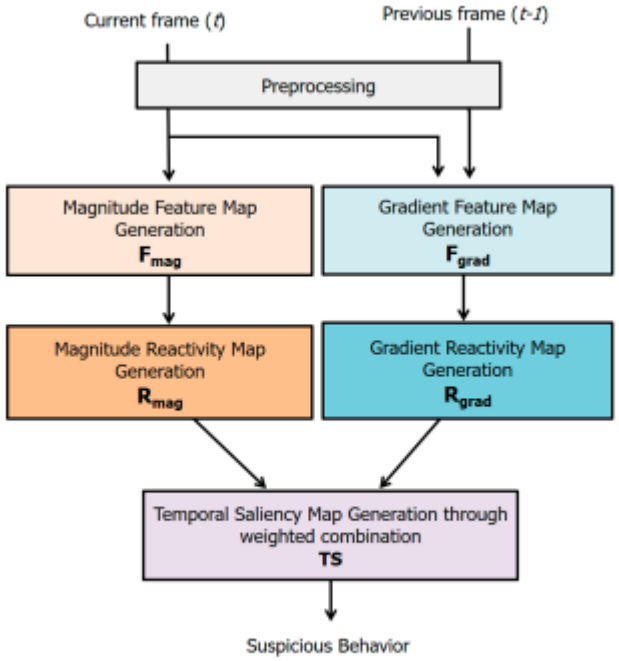

Figure 1. The overall process of the proposed method.

--End of Paper 3--

4		
Reference in APA format		
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.researchgate.net/publication/360390556_Detection_Anomaly_in_Video_Based_on_Deep_Support_Vector_Data_Description	Bokun Wang, Caiqian Yang ,Yaojing Chen3	video anomaly detection, deep learning, support vector machines, hypersphere, RGB, optical flow, AUC, public datasets
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Deep Support Vector Data Description	The goal of this solution is to detect video anomalies in a timely and accurate manner.	Automating a model that finds and adapts email spam with a specific feature of Locality sensitive hashing technique. By adapting BoW Concept introduced to to filter the spam. Outlier detection is an feature for getting accuracy.
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process		

	Process Steps	Advantage	Disadvantage (Limitation)
1	Train a deep neural network to map the input normal video frames to a latent space.	DSVDD is able to learn a feature representation of the normal data that is discriminative for anomaly detection.	DSVDD can be computationally expensive to train, especially for large datasets.
2	Find the smallest hypersphere that encloses the data in the latent space.	DSVDD is able to find the smallest hypersphere that encloses the normal data, which results in a more compact and efficient anomaly detection model	DSVDD is sensitive to the choice of hyperparameters.
3	Classify new video frames as normal or anomalous based on their distance to the hypersphere.	DSVDD can be used to detect anomalies in videos with complex environmental backgrounds and human behavior.	DSVDD can be difficult to interpret, which can make it challenging to debug the model.

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable

Relationship Among The Above 4 Variables in This article

Input and Output	Feature of This Solution	Contribution & The Value of This Work
<table><tr><th>Input</th><th>Output</th></tr><tr><td>Normal video frames</td><td>A hypersphere that encloses the normal data</td></tr></table>	DSVDD represent discriminative features,and robustness to complex backgrounds and detecting rare anomalies	it is an approach that can achieve state-of-the-art accuracy, robustness to complex backgrounds and human behavior, and compact and efficient model

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain
DSVDD can be used to detect rare anomalies in videos, which is important for applications such as security and surveillance	DSVDD can be difficult to interpret, which can make it challenging to debug the model and understand why it is making certain predictions

Analyse This Work By Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
As mentioned it is robust and effective in all ways, but is sensitive to the choice of hyperparameters, which can make it difficult to tune the model for optimal performance.	Precision-recall curves F1 score Area under the curve	Abstract I. Introduction II. Principle Of Algorithm III. Experiment IV. Conclusion

Diagram/Flowchart

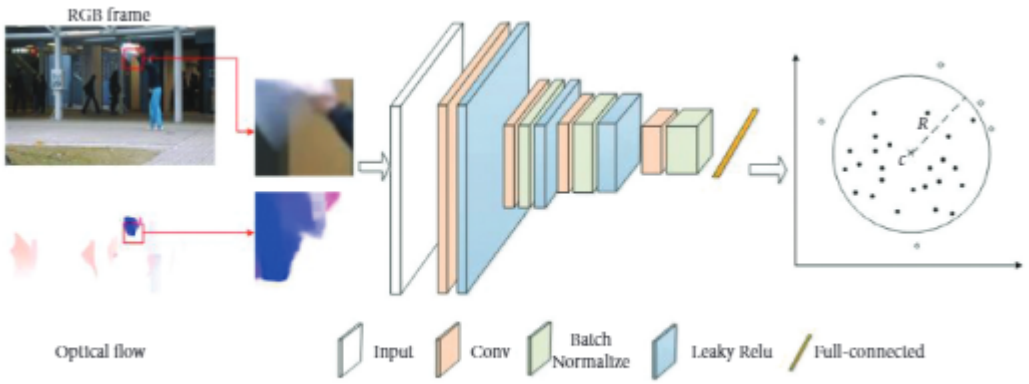

FIGURE 1: The flow chart of video anomaly detection based on DSVDD.

--End of Paper 4—

Version 2.0 Week 2		
5		
Reference in APA format		
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**
https://www.researchgate.net/publication/338338552_ABNORMAL_EVENT_DETECTION_IN_PEDESTRIAN_PATHWAY_USING_GARCH_MODEL_AND_MLP_CLASSIFIER	Dr. Manjula Pattnaik mpattnaik@pnu.edu.sa	Abnormal event detection, anomaly detection, GARCH modeling,multilayer perceptron, neural network
The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**
Abnormal Event Detection	The goal of the solution is to automatically detect abnormal events in pedestrian pathways.	We use GARCH modelling and MLP classifier.
The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process		

	Process Steps	Advantage	Disadvantage (Limitation)
1	The first step is to convert the video into frames. This is done by breaking the video down into individual images. The next step is to detect moving objects in each frame.	Reduces the amount of data that needs to be processed by the GARCH model and MLP classifier	Requires careful tuning of parameters

2	The GARCH model is used to model the events that occur in the pedestrian pathway. The GARCH model is a statistical model that can be used to model the frequency and volatility of events.	Can accurately model the frequency and volatility of events	Can be computationally expensive
3	The MLP classifier is used to classify the events as normal or abnormal. The MLP classifier is a type of neural network that can be used to classify data.	Can be used to classify new events that have not been seen before	Requires a large dataset of labeled events to train

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable
Accuracy of abnormal event detection	GARCH model and MLP classifier	Type of pedestrian pathway (e.g., urban, rural, commercial, residential)	Ability of the GARCH model and MLP classifier to learn the patterns of normal events in the pedestrian pathway

Relationship Among The Above 4 Variables in This article
The ability of GARCH model and MLP Classifier to produce an effective output with utmost accuracy.

<table>
<tr><th>Input and Output</th><th>Feature of This Solution</th><th>Contribution & The Value of This Work</th></tr>
<tr><td><table><tr><th>Input</th><th>Output</th></tr><tr><td>video stream</td><td>classification of each frame</td></tr></table></td><td>The AED technique can be implemented in real time, allowing for real-time detection of abnormal events.</td><td>The AED technique can be used to identify and track suspicious individuals and activities. This information can be used to report crimes and prevent them from happening in the first place.</td></tr>
<tr><th colspan="2">Positive Impact of this Solution in This Project Domain</th><th>Negative Impact of this Solution in This Project Domain</th></tr>
<tr><td colspan="2">This helps in improved design and planning of pedestrian pathways</td><td>Possible potential for misuse</td></tr>
<tr><th>Analyse This Work By Critical Thinking</th><th>The Tools That Assessed this Work</th><th>What is the Structure of this Paper</th></tr>
<tr><td>By analysing it is important to develop safeguards to protect the privacy of individuals who are monitored by the AED technique. This could include anonymization of data and the use of opt-in consent.</td><td>UCSD Ped1 dataset
UCSD Peds2 dataset
Avenue dataset</td><td>Abstract
XI. Introduction
XII. Motion Information Image Generation
XIII. CNN Training and Classification
XIV. Evaluation and Results
XV. Conclusion</td></tr>
<tr><th colspan="3">Diagram/Flowchart</th></tr>
</table>

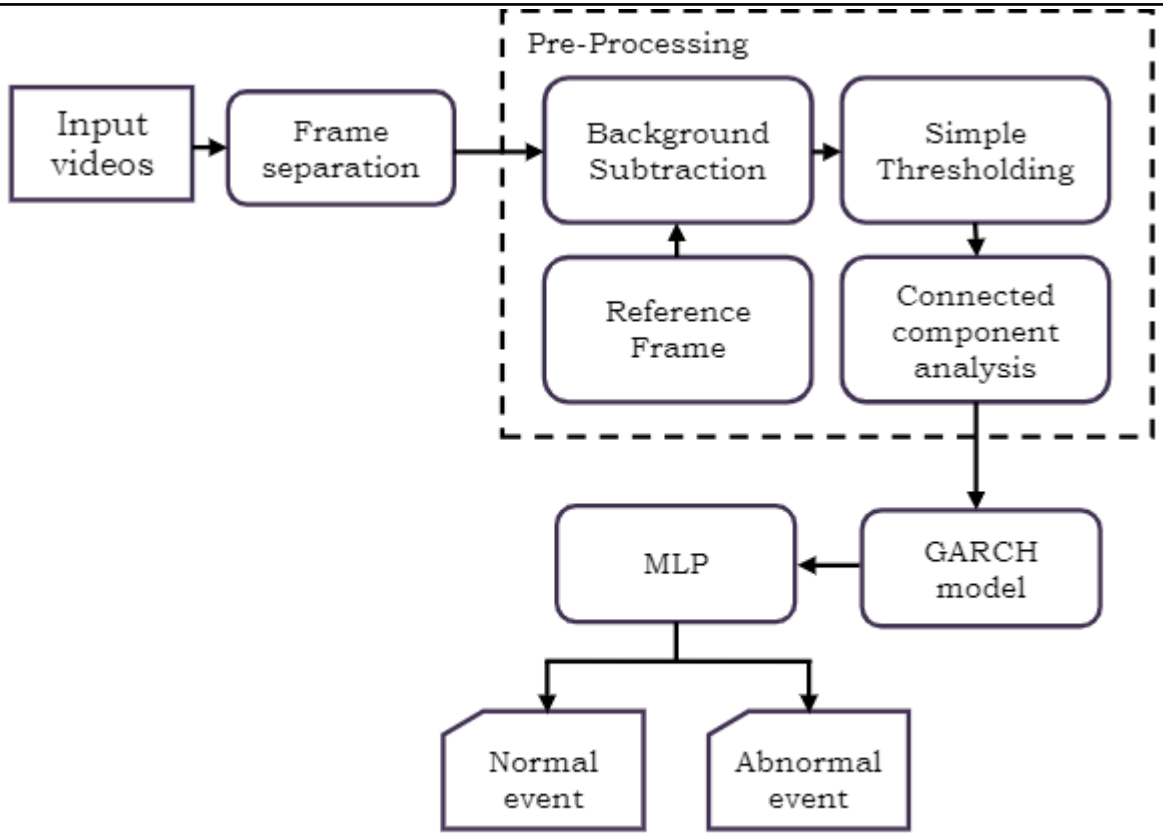

Fig. 1 Abnormal event detection in a pedestrian pathway

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Reference in APA format		
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The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process		

	Process Steps	Advantage	Disadvantage (Limitation)
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Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable

Relationship Among The Above 4 Variables in This article

Input and Output	**Feature of This Solution**	**Contribution in This Work**

Input	Output

Positive Impact of this Solution in This Project Domain	**Negative Impact of this Solution in This Project Domain**	
Analyse This Work By Critical Thinking	**The Tools That Assessed this Work**	**What is the Structure of this Paper**
Diagram/Flowchart		

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Analyse This Work By Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper

Diagram/Flowchart

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Input / **Output**		

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Analyse This Work By Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
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Version 3.0 Week 3		
9		
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Analyse This Work By Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper

Diagram/Flowchart

10

Reference in APA format		
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Diagram/Flowchart

11		
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Input / **Output**		
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Analyse This Work By Critical Thinking	**The Tools That Assessed this Work**	**What is the Structure of this Paper**
Diagram/Flowchart		

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Reference in APA format		
URL of the Reference	**Authors Names and Emails**	**Keywords in this Reference**

The Name of the Current Solution (Technique/ Method/ Scheme/ Algorithm/ Model/ Tool/ Framework/ ... etc)	**The Goal (Objective) of this Solution & What is the problem that need to be solved**	**What are the components of it?**

The Process (Mechanism) of this Work; Means How the Problem has Solved & Advantage & Disadvantage of Each Step in This Process

	Process Steps	Advantage	Disadvantage (Limitation)
1			
2			
3			
4			
5			

Major Impact Factors in this Work

Dependent Variable	Independent Variable	Moderating variable	Mediating (Intervening) variable

Relationship Among The Above 4 Variables in This article

Input and Output	Feature of This Solution	Contribution & The Value of This Work

Input	Output

Positive Impact of this Solution in This Project Domain	Negative Impact of this Solution in This Project Domain

Analyse This Work By Critical Thinking	The Tools That Assessed this Work	What is the Structure of this Paper
Diagram/Flowchart		

Version 4.0 Week 4		
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Input / **Output**		
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Work Evaluation Table

<Use the same factors you have used in "Work Evaluation Table" to build your own "Proposed and Previous comparison table ">

	Work Goal	System's Components	System's Mechanism	Features /Characteristics	Cost	Speed	Security	Performance	Advantages	Limitations /Disadvantages	Platform	Results
Cem Direkoglu	Develop abnormal crowd behavior detection using MIIs and CNNs, comparing with existing	The system components include MIIs extraction, CNN training, classification, evaluation on UMN and PETS2009 datasets, and	The system extracts MIIs, trains a CNN for abnormal behavior detection, classifies test frames, evaluates on UMN and PETS2009 datasets,	The generator takes random noise as input and generates data (such as images) that ideally should be indistinguishable from real data				Achieves high accuracy (UMN: 99.08%, PETS2009: 98.39%) in crowd behavior detection	Efficient anomaly detection Robust performance in crowd behavior analysis	Sensitivity to window size	Implemented on CNN architecture Utilizes motion intensity images (MIIs)	High accuracy in UMN and PETS2009 datasets for crowd behavior detection.

	methods for accuracy.	performance analysis.	and analyzes performance based on accuracy.									
Ali Atghaei, Soroush Ziaeinejad, and Mohammad Rahmati	Detect and locate abnormal events in urban surveillance videos using deep learning, optical flow, and generative adversarial networks for effective automated	Deep Learning Model Generative Adversarial Networks (GANs) Optical Flow Analysis Pre-processing Unit	Utilizes spatio-temporal features, motion analysis with optical flow, and transfer learning to train a GAN for abnormal event detection in surveillance videos.	Spatio-temporal feature extraction Abnormality detection and localization GAN for normal data distribution learning				High performance demonstrated through AUC criteria, comparing favorably with state-of-the-art methods in abnormal event detection.	Improved security in surveillance Transfer learning reduces data requirements	High computational resource requirements Dependency on labeled data for training	Implemented using Python, Keras module, and sklearn module for evaluation	Experimental results on UCSD Peds1 and UCSD Peds2 datasets show the proposed method's effectiveness in detecting and locating abnormal events, outperforming state-of-

	surveillance											the-art methods.
Kyung Joo Cheoi	The primary goal of the system is to detect suspicious behavior regions in real-time through surveillance video analysis.	Feature Extraction Module Optical Flow Analysis Temporal Saliency Map Generation	The system operates by extracting feature information from optical flow, generating reactivity images, and combining them through a weighting condition to create a temporal saliency map	High performance in detecting various suspicious behaviors. Robustness to changes in brightness.				The system demonstrates high accuracy, precision, and recall rates across various datasets	High performance in detecting suspicious behaviors. Robustness to changes in brightness.	Challenges in cases where the walking subject is too close to the camera	No such platform is mentioned	Results include a comprehensive evaluation on ten different types of video sequences, demonstrating the system's effectiveness in detecting various suspicious behaviors

Bokun Wang, Caiqian Yang ,Yaojing Chen3	**The primary objective is to detect abnormal events in videos accurately and timely, addressing challenges such as the ambiguity of anomaly definitions, scarcity of anomalous data, and**	**Deep Neural Network Support Vector Data Description (SVDD RGB Frame**	**Training Phase: Involves mapping normal sample data to the smallest hypersphere using DSVDD through a jointly trained deep neural network. Testing Phase: Judges samples inside the hypersphere as normal and those outside as abnormal based on anomaly scores.**	**A combination of deep learning and Support Vector Data Description for video anomaly detection**				**The proposed DSVDD method achieves frame-level AUC scores of 86.84% and 73.2% on the CUHK Avenue and ShanghaiTech Campus datasets**	**Utilizes DSVDD for mapping normal sample data to a hypersphere, enabling effective anomaly detection**	**imitations may include dependence on the quality and diversity of training data.**	**No particular platform is mentioned**	**The experimental results show that the proposed DSVDD method outperforms several existing methods in terms of frame-level AUC scores on the Avenue and ShanghaiTech Campus datasets.**

	complex environmental backgrounds.											
Dr. Manjula Pattnaik	**Develop efficient Abnormal Event Detection system in video surveillance using GARCH modeling and MLP**	**Preprocessing, GARCH modeling, MLP classification for abnormal event detection in video surveillance**	**GARCH modeling captures events in the pedestrian pathway using a statistical model. MLP classification classifies the parameters obtained from the GARCH model into normal or abnormal events.**	**Utilizes Generalized Autoregressive Conditional Heteroscedasticity (GARCH) for modeling events. Employs Multilayer Perceptron (MLP) as a neural network for classification.**				**Performance is evaluated through the efficiency of GARCH modeling and MLP classification in detecting abnormal events**	**Efficient modeling of events using GARCH. Successful classification of events using MLP**	**No explicit limitations.**	**Various environments**	**Results indicate that the AED system using GARCH and MLP outperforms other techniques in terms of ROC curves.**
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