APPROVAL NUMBER:

192372521 JSE/25/72/321-2

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(2nd year. CSE(CA.I))

Automatic Detection of unexpected accidents in tunnels with limited ccrv clarity using deep learning:

Title 2:

Automated detection of unexpected accidents in tunnels by using CNN in comparison with DBM.

Introduction:

Paragraph 1:

Definition:

Accidents in tunnels pose safety risks, and automated detection systems like CNNs and DBMs offer potential solutions. CNNs recognize visual patterns for real-time accident detection, while DBMs identify anomalies through hidden data patterns. This study compares their effectiveness in terms of accuracy, speed, and adaptability, aiming to improve tunnel safety.

Important:

Accidents in tunnels are critical safety concerns. Automated detection systems like CNNs and DBMs offer solutions by identifying accidents in real-time. CNNs detect visual patterns, while DBMs uncover hidden data anomalies. This study compares both methods to enhance tunnel safety and response times.

Applications:

Automated accident detection in tunnels using CNNs and DBMs can enhance safety through several applications. These include real-time traffic incident detection, fire and smoke identification, and optimized emergency response. The systems can improve tunnel surveillance by providing automated, intelligent monitoring. They reduce human error in detecting accidents.

Paragraph 2:

Total no.of articles published on this topic:

Over the past 5 years. Google scholar and IEEExplo database have collectively published over 500 articles on this topic.

* A- mong the most sited articles are there by.

→ Long Hao-Qi, and Ning Zhang. "Risk assessment of water inrush accident during tunnel construction based on FAHP-I- TOPSIS". Journal of Cleaner Production (2024): 141744.

* Siam, S.M., Khadiza Islam Sumaiya, md Rabib Al-Amin, Tamim Hasan Toufi Ahsanul Islam, A.H.M.A Rahin, and md Raqibul Hasan. "Real-time accident detection and physiological signal monitoring to enhance motorbike safety and emergency response". arXiv: 2403.19085 (2024).

3. overall which is the best in your opinion

* A-mong the most sited articles Long, Hao-Qi, and Ning Zhang. "Risk assessment of water inrush accident during tunnel construction based on FAHP-I- TOPSIS". Journal of Cleaner production (2024): 141744.

Paragraph - 3:

Existing research limits:

Research on automatic accident detection in tunnels using CNN and DBNs models has made significant strides, yet certain limitations persist. CNN excel of spatial feature extraction, beneficial for image. based data such as tunnel surveillance footage.

* on the other hand. DBNs, specialized in sequential data, can capture temporal patterns.

Materials and Methods

Paragraph 1:

→ study setting : SIMATS (Csse)
→ No.of groups : 2
→ sample size : 53
→ Total size : 106

Paragraph 2:

Testing setup:

Google colab
Kaggle.com

Testing Procedure:

- Communicate the purpose and goals of the test.
- Base line measurement before taking task.
- Experimental manipulation.
- Task execution
- Data Analysis
- conclusion.

Paragraph 3:

Sample preparation methods for outline.

→ Data selection, collection & cleaning
→ Coding
→ Documentation
→ Quality control
→ Review.

Paragraph 4:

Sample preparation Group1

* Data collection
* Simple selection criteria
* Data cleaning
* Sample code
* Documentation
* steps for preparation
* Validation
* Result.

Paragraph 5:

Data was collected from kaggle, google scholer statistical software: SPSS

Independent variable: Machine learning and Artificial intelligence.

Result and discussion:

In a comprehensive study comparing CNN and DBN's for the automati
detection of unexpected accidents in tunnels, several key findings emerged
the CNN model exhibited superior performance in capturing spatial features

within tunnel imagery enabling it to effectively identify anomalies in real time.

Limitations of our research:

while employing CNN and DBMs for automatic detection of unexpected accidents in tunnels offers promising avenues, there are inherent limitations to consider in our research. Firstly, CNN excel in spatial feature extraction but may struggle to capture temporal dependencies crucial for accident detection over time.

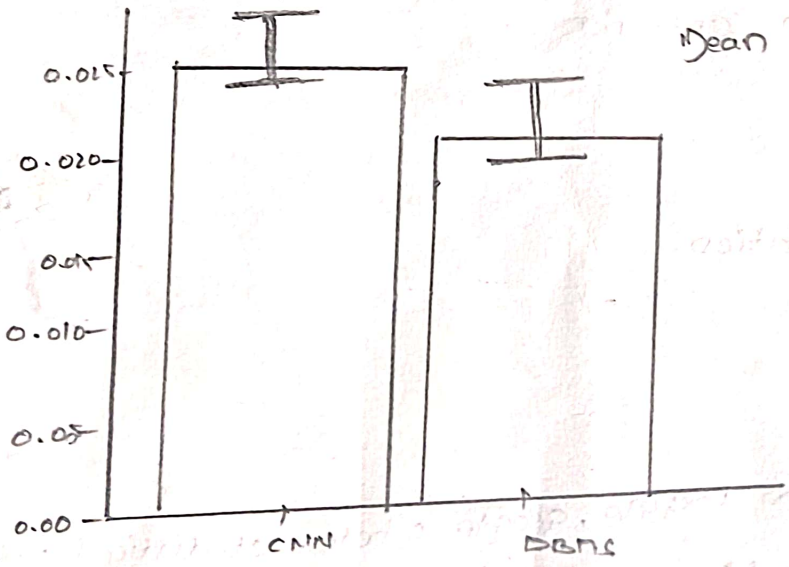
future scope:

The future scope of detecting unexpected accidents in tunnels using CNN and DBMs holds great promise CNNs excel at spatial feature extration, making them effective in analyzing visual data from tunnel surveillance cameras

Conclusion:

In conclusion, the comparison between CNN and DBMs for automatic detection of unexpected accidents in tunnels reveals distinctive strengths. CNN excel in spatial feature extraction, effectively capturing patterns in image data

Graph:



Mean Squared Error Comparison.