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Deep semi-supervised learning method for false data detection

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A B S T R A C T:

In this paper we study about deep semi-supervised learning and false data detection methods. Deep semi-supervised learning has achieved remarkable success in various domains. Deep semi-supervised learning (SSL) techniques is hybrid method that approach combines the strengths to deep neural networks with the principal of adversarial training, in this paper we analaiys different approaches, that is training the label and unlabeled data by assumptions and detection of false data.

Keywords: Semi-supervised learning, labelled data, unlabeled data,

Introduction

Here introduces the paper, The detail information on deep semi-supervised learning, in the digital age there are many forgeries has been happening to avoid the data leakage and corruption in data semi-supervised learning acts as a boon agnest the false data. Traditional methods for false data detection often relay on the supervised learning approaches where labeled data is used to train modules to classify instances as either genuine or false.

However, the availability of labeled data is often limited and expensive to acquire, to address these challenges, semi-supervised learning techniques have emerged as a promising approach for false data detection. By leveraging both labeled and unlabeled data we provide an overview of related work in the field of false data detection and we conclude the paper with a summary of our findings and directions for future research.

LETERATURE SURVEY

Paper 1
Title: Unsupervised Anomaly Detection and Diagnosis in Power Electronic Networks Informative Leverage and Multivariate Functional Clustering
Authors : J Hangs, Wu, L Fang
Published on :23 October 2023
Description: This paper reviews the propose a novel unsupervised anomaly detection and diagnosis algorithm in power electronic networks. Since most anomaly detection and diagnosis algorithms in the literature

Paper 2
Title : A deep and scalable unsupervised machine learning system for cyber-attack detection in large-scale smart grids
Authors: H Karimi pour
Published on: 2020
Description: This survey paper provides an overview of Smart grid technology increases reliability, security, and efficiency of the electrical grids. However, its strong dependencies on digital communication technology bring up new

Paper 3
Title : Detecting false data injection attacks in smart grids: A semi-supervised deep learning approach
Authors: Y Zhang Wang
Published on: 2021

Description: This survey paper provides an overview of the dependence on advanced information and communication technology increases the vulnerability in smart grids under cyber-attacks. Recent research on unobservable false data

Paper 4
Title : Power system anomaly detection via ensemble of encoder and decoder networks
Authors: X Sun, D Wu, A Zyflo.
Published on: 2022.
Description: This paper reviews Hacking and false data injection from adversaries can threaten power grids' normal operations and cause significant economic loss. Anomaly detection in power grids aims to

Paper 5
Title : Efficient One-Class False Data Detector Based on Deep SVDD for Smart Grids
Authors: H Hubback, M Mahmoud.
Published on: 2023.
Description: This paper reviews in the smart grid, malicious consumers can hack their smart meters to report false power consumption readings to steal electricity. Developing a machine-learning based detector.

WORKING PRINCIPLE

semi-supervised learning is a broad category of machine learning techniques that utilizes both labeled and unlabeled data; in this way, as the name suggests, it is a hybrid technique between supervised and unsupervised learning. By following these steps, you can develop a deep semi-supervised learning method for false data detection that effectively utilizes both labeled and unlabeled data to improve detection accuracy.

TECNOLOGY

The key contributions of our work can be summarized as follows:
Deep Representation Learning: We utilize deep neural networks to learn hierarchical representations of the data, capturing both low-level and high-level features that are crucial for false data detection.
Semi-Supervised Framework: Our method seamlessly integrates labeled and unlabeled data, allowing the model to learn from abundant unlabeled instances while leveraging the limited labeled data available.
Adversarial Training: We employ adversarial training techniques to enhance the model's resilience against adversarial attacks and improve its ability to discriminate between genuine and false data instances.
Experimental Evaluation: We conduct extensive experiments on benchmark datasets to demonstrate the effectiveness and superiority of our proposed method compared to existing approaches

ADVANTAGES

- High Performance.
- Improved Accuracy
- Robustness.
- Reduced Human Intervention.
- Adaptability.
- Scalability.

Applications

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- Adaptability.
- Scalability

FUTURE SCOPE

- Enhanced Model Performance
- Adversarial Robustness
- Interpretability
- Online Learning
- Explainability
- Adaptation

CONCLTION

In this paper, we have presented a novel deep semi-supervised learning method for false data detection. Our approach harnesses the power of deep neural networks and semi-supervised learning techniques to effectively identify false instances in large-scale datasets. Through a combination of deep representation learning, semi-supervised framework, and adversarial training, our method demonstrates significant improvements in false data detection accuracy compared to existing approaches.

In conclusion, our proposed deep semi-supervised learning method represents a significant advancement in the field of false data detection. By combining the strengths of deep learning and semi-supervised learning, our approach offers a robust and scalable solution for detecting false data instances in diverse application domains. We believe that our work lays the foundation for future research in this area and opens up new possibilities for enhancing data integrity and trust in the era of big data.

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