

Title:-“TALFS: A Trust-Aware Adaptive Learning Feature Selection Framework for Robust Intelligent Intrusion Detection Systems”

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Abstract

The rapid growth of networked systems has significantly increased the complexity and volume of cyber security threats, making traditional Intrusion Detection Systems (IDS) less effective in handling high-dimensional, noisy, and dynamic data environments. This research proposes **TALFS (Trust-Aware Adaptive Learning Feature Selection)**, a novel framework designed to enhance IDS performance through intelligent and adaptive feature selection.

TALFS integrates three critical components—**statistical relevance, model-based importance**, and a newly introduced **trust score**—to evaluate feature stability under noisy conditions.

Keywords

- Robust Feature Selection
- Cyber security Analytics
- High-Dimensional Data Processing

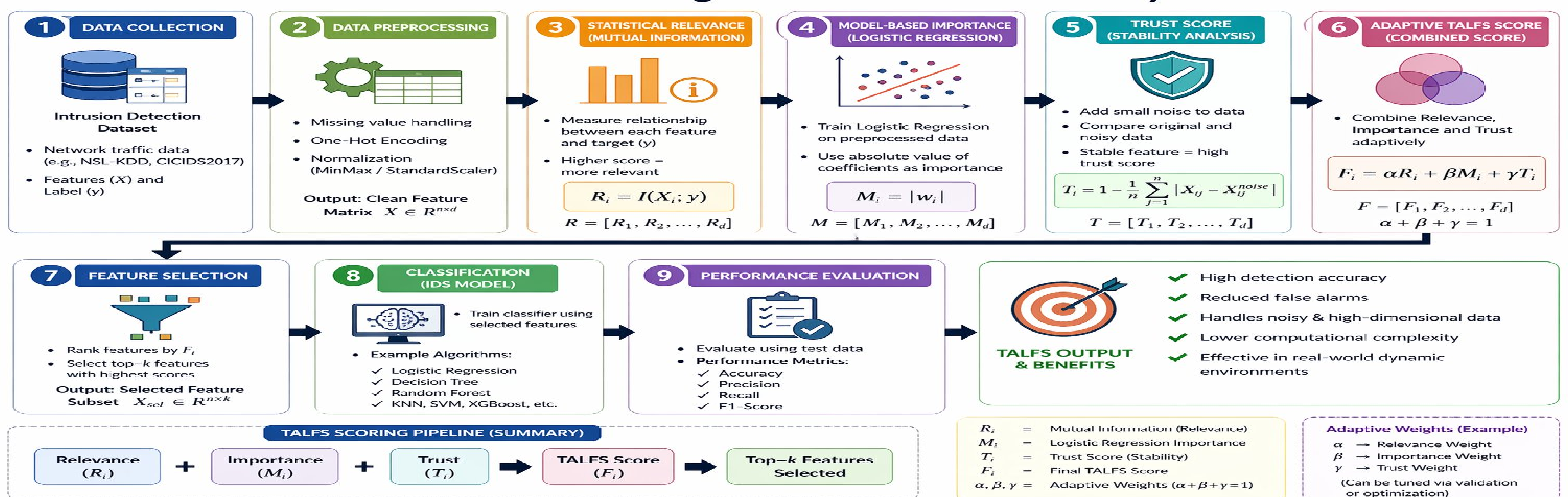
Problem statement

Subject	Description
High-dimensional data	Large number of features increases complexity and reduces model efficiency.
Noise sensitivity	Irrelevant and noisy data negatively affect detection performance.
Low detection accuracy	Existing IDS models struggle to accurately identify attacks.

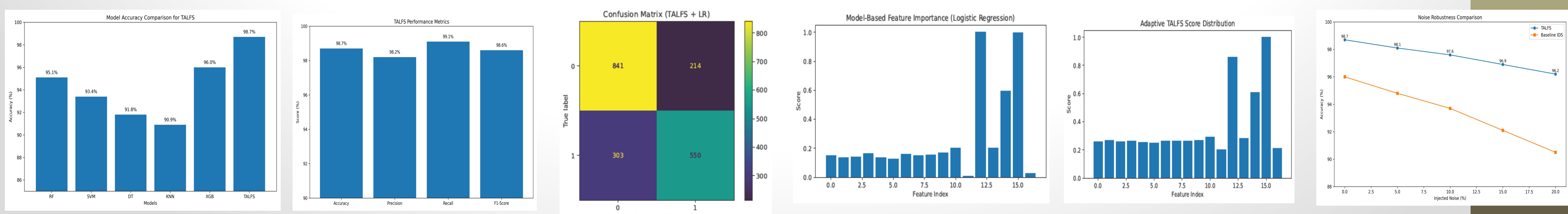
Objectives

Subject	Description
Improve IDS accuracy	Enhance detection performance using adaptive feature selection.
Select stable features	Identify consistent and reliable features across datasets.
Reduce complexity	Minimize computational cost by selecting optimal features.

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Results



Real-world applications

- Enterprise network traffic monitoring system
- Bank transaction monitoring system (e.g., bKash, Visa)
- Smart home / IoT device network

Conclusion

TALFS provides a scalable, resilient, and intelligent solution for next-generation cybersecurity systems.

References

- Zhou, Y., Cheng, G., Jiang, S., & Dai, M. (2020). Building an Efficient Intrusion Detection System Based on Feature Selection and Ensemble Classifier. Computers & Networks.
- Maabouly, A. I., Gody, A. M., & Barakat, T. M. (2014). Relevant Feature Selection Model Using Data Mining for IDS. arXiv preprint.