

An Abstract
On
Volunteer Service System

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Federated Learning for Privacy-Preserving Cloud Threat Detection

ABSTRACT

This project introduces a Federated Learning framework for Privacy-Preserving Cloud Threat Detection, designed to provide a secure and scalable solution for identifying and mitigating cyber threats in distributed cloud environments. The research addresses the limitations of traditional centralized threat detection systems, which often require sensitive data aggregation and risk exposing confidential information. The central question explored is how federated learning can enable collaborative model training across multiple cloud nodes while preserving data privacy and ensuring robust detection of malicious activities.

The objective is to create a platform that allows cloud service providers and enterprises to jointly train threat detection models without sharing raw data, thereby enhancing transparency, security, and trust. To achieve this, we employed federated machine learning methodologies, incorporating secure aggregation protocols, differential privacy mechanisms, and role-based authentication to build and evaluate a fully functioning system.

The results demonstrate that federated learning significantly reduces privacy risks, improves detection accuracy, and minimizes communication overhead compared to centralized approaches. These findings indicate that the proposed system successfully enhances security efficiency and user confidence in cloud services. The implications of this research suggest that such a privacy-preserving framework can be widely adopted ac

PROJECT GUIDE

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