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URL Threat Evaluation and Risk Scoring System

Abstract:

As the internet becomes central to our lives, the risk of malicious websites designed to steal data, spread malware, or perform phishing attacks is rising. This system provides an intelligent URL Security Checker that goes beyond manual inspection by combining powerful tools into one workflow. It validates HTTPS/SSL certificates, detects expired or self-signed ones, performs WHOIS lookups for domain age and registrar info, scans for suspicious keywords like “login” or “verify,” checks for missing critical security headers, and uses Python-nmap to scan open ports for exposed services. Furthermore, it leverages a simple machine learning model trained on phishing vs safe URLs, enhanced by ASCII encoding and TF-IDF vectorization, to predict phishing attempts. All individual checks contribute to a calculated risk score, which classifies the site as Safe, Suspicious, or Dangerous. Instead of building everything from scratch, this system integrates and automates trusted existing technologies, libraries and modules for delivering a fast, reliable, and consistent way to evaluate website safety and empower users with actionable insights. This system not only simplifies web security assessment but also empowers users by providing automated, and intelligent insights, bridging the gap between complex security analysis. It paves the way towards making web safety effortless, accessible, and bringing advanced security practices into everyday web browsing reliable for every user in an increasingly connected world.

Keywords: URL Security, Risk Scoring, Phishing Detection, Web Threat Analysis, HTTPS/SSL Validation, WHOIS Lookup, Machine Learning, Python-nmap, Security Headers, Keyword Analysis, Open Port Scanning.

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