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A Pattern Recognition Neural Network Model for Detection and Classification of SQL Injection Attacks

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Abstract : Structured Query Language Injection (SQLI) attack is a code injection technique in which malicious SQL statements are inserted into a given SQL database by simply using a web browser. Losing data, disclosing confidential information or even changing the value of data are the severe damages that SQLI attack can cause on a given database. SQLI attack has also been rated as the number-one attack among top ten web application threats on Open Web Application Security Project (OWASP). OWASP is an open community dedicated to enabling organisations to consider, develop, obtain, function, and preserve applications that can be trusted. In this paper, we propose an effective pattern recognition neural network model for detection and classification of SQLI attacks. The proposed model is built from three main elements of: a Uniform Resource Locator (URL) generator in order to generate thousands of malicious and benign URLs, a URL classifier in order to: 1) classify each generated URL to either a benign URL or a malicious URL and 2) classify the malicious URLs into different SQLI attack categories, and an NN model in order to: 1) detect either a given URL is a malicious URL or a benign URL and 2) identify the type of SQLI attack for each malicious URL. The model is first trained and then evaluated by employing thousands of benign and malicious URLs. The results of the experiments are presented in order to demonstrate the effectiveness of the proposed approach.

Keywords : neural networks, pattern recognition, SQL injection attacks, SQL injection attack classification, SQL injection attack detection
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