

ABSTRACT

This study develops a web-based Satellite Anomaly Information System (SIAS) with a backend focus on integrating space weather data and analyzing satellite anomalies. The SIAS backend is designed using the Laravel framework with a Model-View-Controller (MVC) architecture, ensuring modularity, scalability, and efficiency. The system adopts a modular Laravel–Flask architecture and automates the parsing of over 7 GB of annual data from authoritative sources such as NOAA and OmniWeb, covering the Kp index, Dst index, F10.7 solar flux, particle flux measurements, and satellite anomaly records. SIAS employs a Long Short-Term Memory (LSTM) model to predict anomalies using historical and real-time data, achieving up to 95% accuracy. The backend functions include automated data grouping, optimized storage using MySQL, CRUD services, and responsive API endpoints with response times under one minute, validated through load testing with up to 100 concurrent users without loss of stability. The system is expected to support satellite operators in monitoring anomalies and mitigating operational risks posed by extreme space weather events. The development results show that the system effectively automates data parsing and storage, provides API services with response times under 5 seconds, and offers endpoints for visualizing and predicting satellite anomalies. The main output variables achieved include data processing efficiency, system response speed, and anomaly detection accuracy based on particle data and geomagnetic indices.

Keywords— Backend, Laravel, API, Space Weather, Satellite Anomaly, LSTM, MySQL, MVC, Web-based System.