

ABSTRAK

Pasar altcoin mid-cap rentan terhadap manipulasi pump-and-dump yang menyebabkan kerugian signifikan bagi pelaku pasar ritel. Penelitian ini melakukan evaluasi komparatif model XGBoost dan Lag-LLaMA (zero-shot dan fine-tuned) untuk membangun sistem peringatan dini pump pada 18 altcoin mid-cap dengan lead window 1–6 jam. Dataset terdiri dari 470.528 observasi time series per jam dari LunarCrush selama periode Januari 2023 hingga Januari 2026, dibagi secara kronologis menjadi train, validation, dan test dengan embargo window untuk mencegah data leakage. Evaluasi dilakukan pada dua level: model-level menggunakan PR-AUC pada data imbalanced, dan system-level melalui simulasi kebijakan alert dengan constraint budget harian dan cooldown per aset. Hasil menunjukkan Lag-LLaMA Fine-Tuned mencapai PR-AUC tertinggi sebesar 0,2453 (Lift $4,64\times$ di atas random baseline), mengungguli XGBoost (PR-AUC 0,2177; Lift $4,12\times$) dan Lag-LLaMA Zero-Shot (PR-AUC 0,1116; Lift $2,11\times$). Pada evaluasi system-level, XGBoost menghasilkan EventRecall 35,8% dengan 4,42 false alert per hari, sementara Lag-LLaMA Fine-Tuned mencapai EventRecall 39,7% dengan 6,13 false alert per hari. Sistem memberikan rata-rata lead time 3,5 jam dan lift operasional $4,12$ – $4,64\times$ di atas prediksi acak. Ablasi menunjukkan budget sebagai parameter paling sensitif, dan ranking model konsisten di seluruh konfigurasi yang diuji. Prototipe dashboard Streamlit dikembangkan untuk mendukung transparansi dan reproduktibilitas evaluasi.

Kata Kunci: Pump-and-Dump, XGBoost, Lag-LLaMA, Sistem Peringatan Dini, Altcoin Mid-Cap

ABSTRACT

Mid-cap altcoin markets are vulnerable to pump-and-dump manipulation, causing significant losses for retail market participants. This study conducts a comparative evaluation of XGBoost and Lag-LLaMA (zero-shot and fine-tuned) for building an early warning system for pump events on 18 mid-cap altcoins with a 1–6 hour lead window. The dataset consists of 470,528 hourly time series observations from LunarCrush spanning January 2023 to January 2026, split chronologically into train, validation, and test sets with embargo windows to prevent data leakage. Evaluation is performed at two levels: model-level using PR-AUC on imbalanced data, and system-level through alert policy simulation with daily budget and per-asset cooldown constraints. Results show that Lag-LLaMA Fine-Tuned achieves the highest PR-AUC of 0.2453 (Lift $4.64\times$ above random baseline), outperforming XGBoost (PR-AUC 0.2177; Lift $4.12\times$) and Lag-LLaMA Zero-Shot (PR-AUC 0.1116; Lift $2.11\times$). At the system level, XGBoost yields an EventRecall of 35.8% with 4.42 false alerts per day, while Lag-LLaMA Fine-Tuned achieves an EventRecall of 39.7% with 6.13 false alerts per day. The system provides an average lead time of 3.5 hours and operational lift of $4.12\text{--}4.64\times$ above random prediction. Ablation studies reveal budget as the most sensitive parameter, with model rankings consistent across all tested configurations. A Streamlit dashboard prototype is developed to support evaluation transparency and reproducibility.

Keywords: Pump-and-Dump, XGBoost, Lag-LLaMA, Early Warning System, Mid-Cap Altcoin