

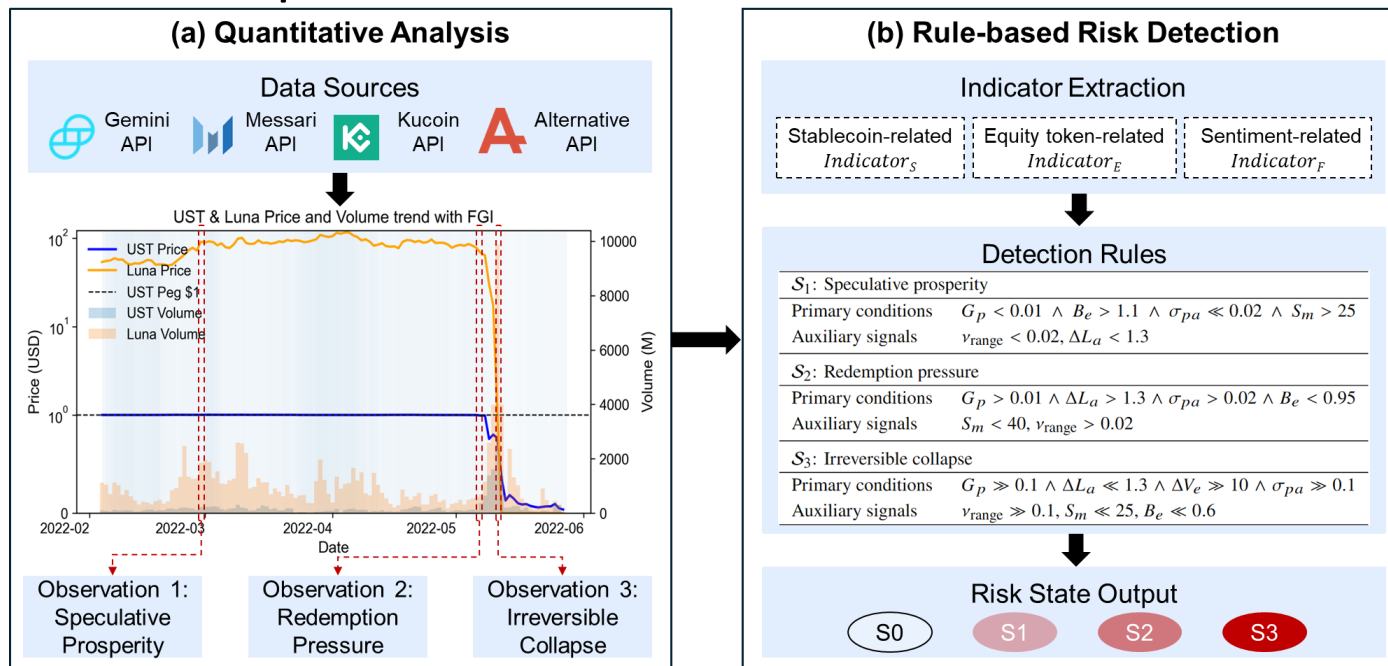
SpiralGuard: Characterizing and Predicting Death Spiral Risks in Algorithmic Stablecoins

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Problems & Ideas

- Problems of existing studies on algorithmic stablecoins:
 - Rely on theoretical modeling or retrospective analysis, which fall short in capturing the dynamic progression of death spiral events.
 - Existing risk detection approaches lack the capacity for timely detection and effective intervention.
- Ideas: A rule-based SpiralGuard framework that integrates market indicators to characterize risk states and enable early, accurate risk prediction.



Main Contributions

- Contributions:
 - A rule-based SpiralGuard framework designed to characterize representative death spiral risk states of algorithmic stablecoins and deliver early risk warnings;
 - Multi-dimensional indicators with empirically calibrated thresholds to enhance early-stage risk detection accuracy;
 - A comprehensive evaluation verifies SpiralGuard on representative algorithmic stablecoins, demonstrating a 29.6% improvement in precision compared to baseline models.

Metrics	Datasets	Baselines					Ablation studies			SpiralGuard
		KMeans	SVM	LR	RF	XGBoost	$Indicator_S$	$Indicator_{S+E}$	$Indicator_{S+F}$	
Precision	D1	0.6360	0.6363	0.6410	0.6458	0.7176	0.9231	0.9239	0.9412	0.9474
	D2	0.3583	0.6945	0.7093	0.7143	0.7321	0.9313	0.9292	0.9313	0.9318
Recall	D1	0.6568	0.6470	0.6568	0.6666	0.7338	0.1263	0.8947	0.5325	0.9574
	D2	0.4807	0.7068	0.7230	0.7269	0.7500	0.3361	0.8320	0.4105	0.9036
F1	D1	0.6483	0.6406	0.6483	0.6559	0.7253	0.2222	0.9091	0.6801	0.9524
	D2	0.4032	0.7005	0.7156	0.7199	0.7407	0.4939	0.8779	0.5698	0.9175

Performance comparison including baselines, ablation studies, and SpiralGuard