

GEMM - eMFIS(FRI/E)

A General Episodic Memory Mechanism for Neuro-Fuzzy Networks With Applications in Event-Driven Financial Market Forecasting and Straddle Option Trading

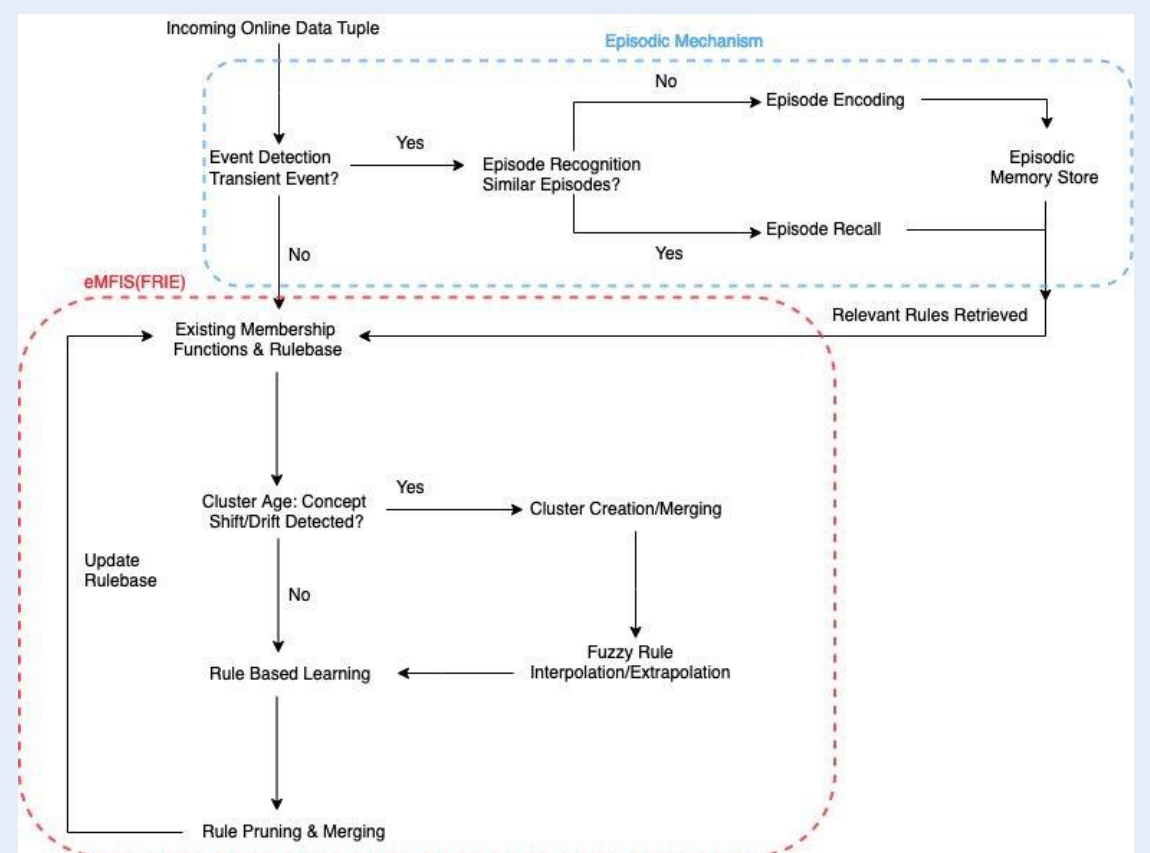
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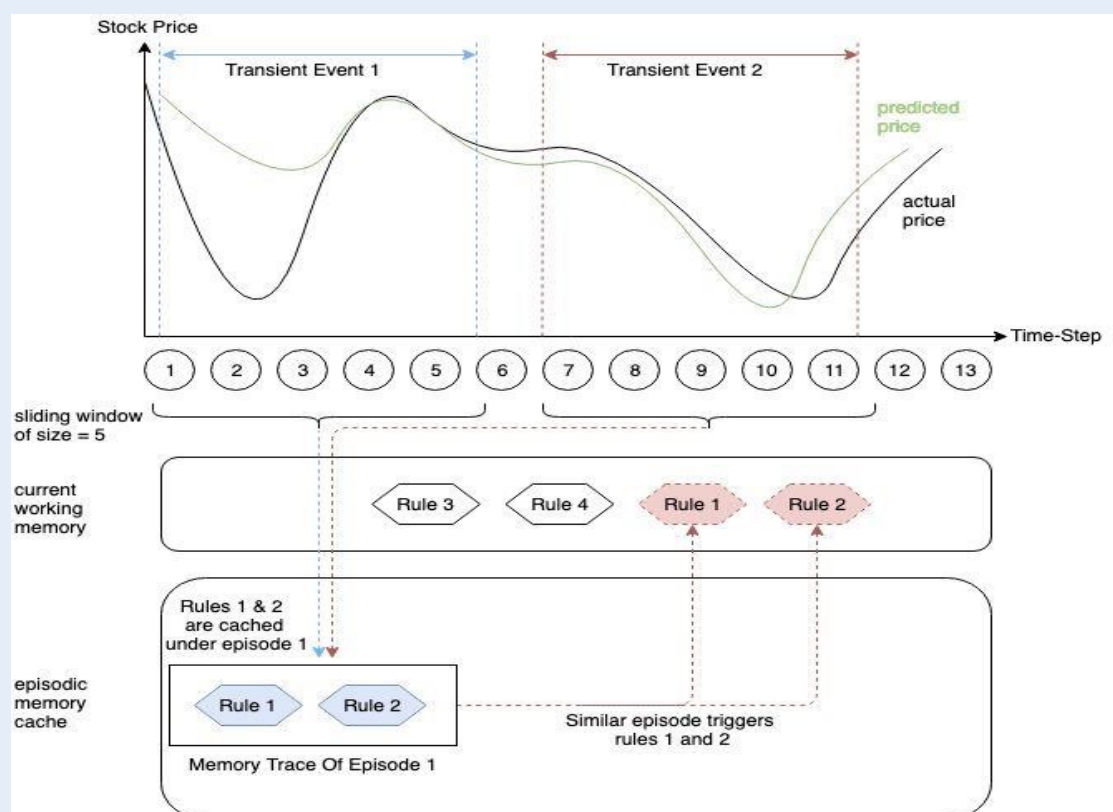


Problem & Solution

- Online Neuro-Fuzzy Systems perform well in financial domain but fail to predict the stock price accurately during a transient event or financial crisis.
- Build a memory cache mechanism based on episodic theory and multi-store model.
- Utilize other mechanisms such as Fuzzy Interpolation/Extrapolation, Rule Pruning, Cluster Creation and BCM learning.
- Unify with eMFIS(FRIE) to predict results more accurately during such transient events.



Solution Methodology



- Episodic Mechanism uses the process of Event Detection, Event Encoding, Episode Recognition and Episode Recall to store and retrieve transient events.
- When volatility crosses a certain threshold, **Event Detection** activates the episodic mechanism.
- **Event Encoding** then converts the event into an episode which is then compared to other episodes using **Episode Recognition**.
- Episodes with similar volatility are then retrieved using **Episode Recall** and rules are modified accordingly and added to working memory of the system.



Results & Analysis

- By downsizing the number of rules during runtime, the results become 4-5% more accurate and interpretable allowing traders to access a large dataset of events and anticipate future transient events and financial crisis.
- When tested on stocks and indexes such as Microsoft and SNP500, an improvement of about 5% can be seen during transient periods.
- When tested on Hang Seng Index for Straddle Option Trading, GEMM-eMFIS(FRI/E) outperformed its benchmarks by a margin of 2-3%.

