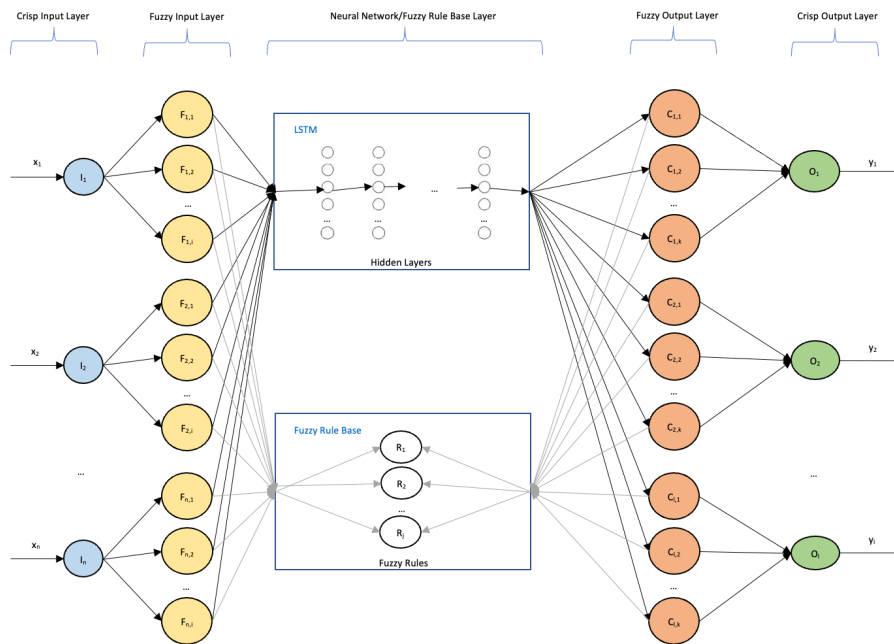


Reinforcement-based Portfolio Allocation with Evolving Deep Fuzzy Neural Systems

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Evolving Fuzzy Interpretable Recurrent Neural Network (EF-IRNN)



Project Objectives:

This project introduces a novel interpretable fuzzy deep neural network, EF-IRNN, a hybrid combination of neural networks and fuzzy logic. Deep learning refers to a large neural network with 3 or more layers, while fuzzy logic is a method of reasoning that resembles human reasoning by making use of linguistic variables mimicking the deduction process of humans. The incorporation of fuzzy logic into deep neural networks allows a degree of reasoning while maintaining the high accuracy of neural networks. EF-IRNN is able to effectively handle concept drifts and handle dynamic data, and is designed to be specially applied for financial market price prediction problems.

Model Performance:

Model	SPX		HSI	
	R ²	RMSE	R ²	RMSE
t+1	0.988	76	0.972	645
t+2	0.985	84	0.970	661
t+3	0.986	82	0.970	665
t+4	0.985	86	0.970	662
t+5	0.985	86	0.970	659
t+6	0.985	86	0.971	648
t+7	0.985	85	0.975	604
t+8	0.984	86	0.975	611
t+9	0.984	87	0.975	604
t+10	0.985	86	0.975	606
t+11	0.985	85	0.977	580
t+12	0.983	90	0.977	583
t+13	0.974	87	0.978	565

