**Sprint-4**

**Introduction**

In this Sprint, the purpose was to add crew AI agents, integration and validation tests and also backtesting the strategy. The following sections contain the User Stories I worked on with a detailed description of the Tasks I worked on.

**User Stories**

I worked on the following User Stories:

[SNIF: Stock Network Inference Framework #599](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/599)

**Conditions of Satisfiability:**

* Data Integrity: Return matrix contains no NaNs; missing values handled.
* Model Correctness: Autoencoder and GCN+LSTM accept correct tensor shapes and produce valid outputs.
* Performance: Full inference pipeline (topology build + GCN+LSTM → JSON) runs in ≤ 5 s.
* Robustness: Pipeline tolerates days with low volatility or missing tickers without crashing.
* Integration: Crew AI DecisionAgent consistently maps snif\_prob thresholds to valid recommendations.

**Definition of Done:**

* Return ingestion, autoencoder, topology inference, GCN+LSTM, inference API, and Crew AI integration are all implemented.
* Unit tests and integration tests covering every module pass.
* Performance benchmarks meet latency targets.
* README and inline documentation updated.
* Crew AI DecisionAgent returns correct BUY/SELL/HOLD in end-to-end tests.
* Backtesting harness implemented and performance report generated.

**Tasks**

[SNIF.1 Return Data Ingestion (8 ph) #600](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/600)

[SNIF.2 Autoencoder Training (8 ph) #621](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/621)

[SNIF.3 Topology Inference (5 ph) #632](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/632)

[SNIF.4 GCN+LSTM Model Development (10 ph) #633](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/633)

[SNIF.5 Inference API (5 ph) #634](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/634)

[SNIF.6 Crew AI DecisionAgent (4 ph) #635](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/635)

[SNIF.7 Integration & Validation (9 ph) #636](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/636)

[SNIF.8 Backtesting & Evaluation (9 ph) #637](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/637)

**Tasks I Worked On**

[SNIF.6 Crew AI DecisionAgent (4 ph) #635](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/635)

I have add crew AI agents which gives out the recommendation. The task is estimated at 4 person hours but took 8 hours to complete.

[SNIF.7 Integration & Validation (9 ph) #636](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/636)

I have have written unit tests and integration tests. The task is estimated at 9 person hours but it took me 10 hours to complete.

[SNIF.8 Backtesting & Evaluation (9 ph) #637](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/637)

I have created the backtesting code and evaluated the strategy. The task is estimated at 9 person hours but it took me 12 hours to complete.

**Summary Table of Work**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| UserStory GitHub Issue ID | User Story | Story Points | Task GitHub Issue ID | Task | Task Hours | Status | Actual Hours |
| [SNIF](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/599) | Stock Network Inference Framework |  | [SNIF.6](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/635) | Crew AI DecisionAgent (4 ph) #635 | 4 | Complete | 8 |
| [SNIF](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/599) | Stock Network Inference Framework |  | [SNIF.7](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/636) | Integration & Validation (9 ph) #636 | 9 | Complete | 10 |
| [SNIF](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/599) | Stock Network Inference Framework |  | [SNIF.8](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/637) | Backtesting & Evaluation (9 ph) #637 | 9 | Complete | 12 |

**Summary Table of Commits**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Commit Number | Commit Description (exactly as in github) | User Story | Task |
| August 3rd, 2025 | eb7447274b94dba852c04177bf5555e53a0e2118 | [SNIF.6 SNIF.7 and SNIF.8](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/pull/778/commits/eb7447274b94dba852c04177bf5555e53a0e2118) | [SNIF](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/599) | [SNIF.6](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/635)  [SNIF.7](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/636)  [SNIF.8](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/637) |