**Sprint-3**

**Introduction**

In this Sprint, the purpose was to develop code for GCN and LSTM model development and Inference API. 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.4 GCN+LSTM Model Development (10 ph) #633](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/633)

I have implemented GCN layers and also LSTM and also train the models. The task is estimated at 10 person hours but took 18 to complete.

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

I have implemented the inference API. The task is estimated at 5 person hours but it took me 14 hour 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.4](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/633) | GCN+LSTM Model Development (10 ph) #633 | 10 | Complete | 18 |
|  | Stock Network Inference Framework |  | [SNIF.5](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/634) | Inference API (5 ph) #634 | 5 | Complete | 14 |

**Summary Table of Commits**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Date | Commit Number | Commit Description (exactly as in github) | User Story | Task |
| July 12th, 2025 | eb33d35c86f4eb64b7e7f5778dc3ee6829792fa0 | [SNIF.4 and SNIF.5](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/pull/770/commits/eb33d35c86f4eb64b7e7f5778dc3ee6829792fa0) | [SNIF](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/599) | [SNIF.4](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/633)  [SNIF.5](https://github.com/Rivier-Computer-Science/AI-Agent-Stock-Prediction/issues/634) |