# *SE 491 WEEKLY REPORT 7*
***10/25/2024 - 10/31/2024***

## *Group number: sdmay25-30*

***Project title:*** *Explainable AI for source code applications*

***Client &/Advisor:*** *Arushi Sharma*

***Team Members:***
*Manjul Balayar*
*Kellan Bouwman*
*Sam Frost*
*Akhilesh Nevatia*
*Ethan Rogers*

| **Weekly Rotation** |
|---|
| Manjul Balayar |
| Kellan Bouwman |
| Sam Frost |
| Ethan Rogers |
| Akhilesh Nevatia |

**Weekly Summary**

This week, the focus was on design adjustments and implementing corrections based on customer feedback. Building on the base refactoring completed last week, we received updated instructions, leading to a migration to GitLab for improved task management and tracking of our group's progress. This shift has clarified our workflow, with task visibility enhanced.

Key tasks added to GitLab included:

- **Unit Testing:** Implemented for code validation and reliability.
- **Pipeline Integration:** Connected modules for streamlined functionality.
- **HPC Start:** Initiated high-performance computing integration for scalability.
- **Auto Labeling:** Added automated labeling to improve data processing.

- **Activation Expansion:** Extended the model's activation functionality.
- **Interactive Clustering Visualizations:** Enhanced data understanding through dynamic visuals.
- **Pipeline Automation Configuration:** Set up for seamless automated processing.
- **Clustering Analysis and Expansion:** Conducted deeper analysis and expanded clustering capabilities.

These steps strengthened our infrastructure and laid groundwork for more efficient, scalable, and insightful outputs moving forward.

- **Past week accomplishments**

  Manjul Balayar:
  - Understanding the activation extraction in transformers extractor
  - Looked at implementing awesomealign and fastalign

  Kellan Bouwman:
  - Created design documents for assigned tasks
  - Uploaded them to drive and git for feedback and team interaction

  Sam Frost:
  - Researched Hydra and how it can be used for automating builds
  - Researched how Hydra interacts with Python unittest

  Akhilesh Nevatia:
  - Read through How Birch Clustering Works and Implemented the same using a scikit-learn plugin
  - Read through basics of Hyperbolic Clustering, and started with a prototype implementation of it from scratch in Python
  - Started modifying the package to include these newly added clustering algorithms

  Ethan Rogers:
  - Reading on DSPV2 and its fitting into an auto-labelling pipeline alongside other modules.
  - Reading on HPS ontologies and their relationship to current pipeline
    - How to implement these and extend pipeline functionality
  - Exploring means of simplifying previous week's activations scripts for the user

- **Pending issues**

  Manjul Balayar: N/A
  Kellan Bouwman: N/A
  Sam Frost: N/A
  Akhilesh Nevatia: N/A
  Ethan Rogers: N/A

**Individual Time Contributions**

| Name | Hours This Week | Total Hours |
|---|---|---|
| Manjul Balayar | 5 | 41 |
| Kellan Bouwman | 4 | 48 |
| Sam Frost | 4 | 41 |
| Akhilesh Nevatia | 6 | 44 |
| Ethan Rogers | 5 | 43 |

- **Plans for the upcoming week**

Manjul Balayar:

- Continue implementing lexical and contextual alignment if finished in CodeConceptNet
- Start implementing fastalign and awesome align

Kellan Bouwman:

- This week the goal is to take the feedback from the designs, as well as the designs and convert them into MVPs (minimum viable products)
- Create tests for colab, local, and hpc integration.
- Create benchmarks for run time activity

Sam Frost:

- Adding Hydra to GitLab
- Begin building CI/CD pipeline with automatic unit tests

Akhilesh Nevatia:

- Test newly added Clustering Algorithms by modifying scripts on the NeuroXCode-Test Folder
- Begin work on Labeling issue assigned, Clustering Purity Evaluation
- Help Kellan out with the visualization of Clustering once top two points are done
- Pipeline Integration between different subcomponents we are handling ( if time permits )

Ethan Rogers:

- Implementing DSPV2 to extend auto-labeling functionality
- Attempt ontological HPS module addition if time permits
- Make changes to activations script for simplification purposes

**Summary of weekly advisor meeting**

This week, there was no advisor meeting due to a scheduling conflict with our advisor being out of town. In light of this, we adapted by uploading all design documents and relevant references

for asynchronous feedback. This preparation allowed us to shift our focus from design to implementation.

In line with tasks detailed in this week’s summary, we transitioned issues in GitLab from design to implementation stages. We also reviewed any additional requirements for assigned features to ensure that implementation aligns with current objectives and feedback. This shift keeps our team on track to meet project goals without delays due to the advisor's absence.