

1. Desired Needs

- Quantitatively evaluate normalization methods for flow cytometry data.
- Visualize cell clustering behavior using UMAP and 2D plots to assess normalization effects.
- Evaluate existing and novel machine learning methods for leukemia classification.

2. Major Constraints

- Large-scale analyses required significant computational resources, making subsampling necessary for some experiments.
- Only preprocessed, de-identified biomedical datasets were used to ensure privacy and research compliance.

3. Engineering Standards

- Standards for reproducibility, documentation, code quality, and version control were maintained throughout development.
- Project code and resources were organized to support accessibility and future reuse.

4. Ethical, Environmental, and Societal Concerns

- Computational limitations required balancing analysis depth with practical resource usage.
- Patient privacy was maintained through exclusive use of de-identified datasets.
- Interpretability and responsible reporting were emphasized due to the project's diagnostic applications.

5. Active Teamwork and Leadership

- Team members met multiple times weekly to discuss progress, exchange feedback, and coordinate deliverables.
- Responsibilities were divided across subprojects while maintaining collaborative integration of results.
- Milestones and deadlines were managed through a shared g-cal planning system

6. Motivating Factors

- The project required learning different machine learning workflows, dimensionality reduction, as well as normalization methods such as cyCombine.
- Independent subprojects required perseverance, adaptability, and determination through many different technical setbacks.
- The potential clinical impact on leukemia diagnostics motivated rigorous evaluation and accountability.

7. Innovative and Entrepreneurial Ideas

- Most innovative idea was utilizing cluster stability as a metric to determine whether a sample is cancerous or not, as it had not been on our field of radar entering the project