Day 1: Research and Planning

- Conducted initial research on neonatal syndromes: Turner syndrome, Prader-Willi syndrome, Microcephaly, and Macrocephaly.
- Defined the objective: To create a predictive model that inputs various child measurements and compares them against CDC data to identify potential syndromes.
- Identified the independent variables (child's age, length, weight, sex, head circumference) and dependent variables (syndrome flags and NeoScore).

Day 2: Data Collection and Preparation

- Collected hypothetical CDC data for baseline measurements in male and female babies.
- Prepared a sample dataset to simulate real-world inputs for the model.

Day 3: Model Development

- Developed a Python script to compare input measurements against CDC data.
- Implemented logic to identify potential matches with the specified syndromes based on the input data.
- Created a basic version of the predictive model.

Day 4: Testing and Refinement

- Conducted initial tests with the model using the sample dataset.
- Adjusted the model to improve its accuracy and reliability.
- Added a scoring system (NeoScore) to quantify the likelihood of each syndrome.

Day 5: Advanced Analysis

- Enhanced the model to provide a detailed score (NeoScore) for each syndrome.
- Tested the model with various hypothetical cases to evaluate its performance.
- Analyzed the output to ensure the model's functionality and accuracy.

Day 6: Visualization of Results

- Created visual representations (Heatmap and Stacked Bar Chart) of the model's output.
- Adjusted visualizations for clarity and better understanding.
- Ensured the graphs were suitable for presentation and printing.

Day 7: Documentation and Review

- Compiled the findings and results into a comprehensive report.
- Reviewed the entire process to ensure all steps were well-documented.

- Prepared materials for the presentation, including visual aids and written documentation.

Day 8: Finalization and Submission

- Finalized the report and presentation materials.
- Double-checked the experiment's results and conclusions.
- Submitted the project for the science fair competition.

The formula for the Closest Age: (Graphs)

$$\text{closest\_age} = a_j \text{ where } j = \arg\min_i |a_i - \text{age}|$$

Model Equations for each Syndrome and Final Model Score value

Turner Syndrome Score:

$$\text{Turner Score} = \max\left(0, \min\left(100, \frac{\text{5th Percentile Length} - \text{Child Length}}{\text{5th Percentile Length}} \times 100\right)\right)$$

Prader-Willi Syndrome Score:

$$\text{Prader-Willi Score} = \max\left(0, \min\left(100, \frac{\text{Child Weight} - \text{95th Percentile Weight}}{\text{Child Weight}} \times 100\right)\right)$$

Microcephaly Score:

$$\text{Microcephaly Score} = \max\left(0, \min\left(100, \frac{\text{Norm Head Circumference} - 2\text{ SD} - \text{Child Head Circumference}}{\text{Child Head Circumference}} \times 100\right)\right)$$

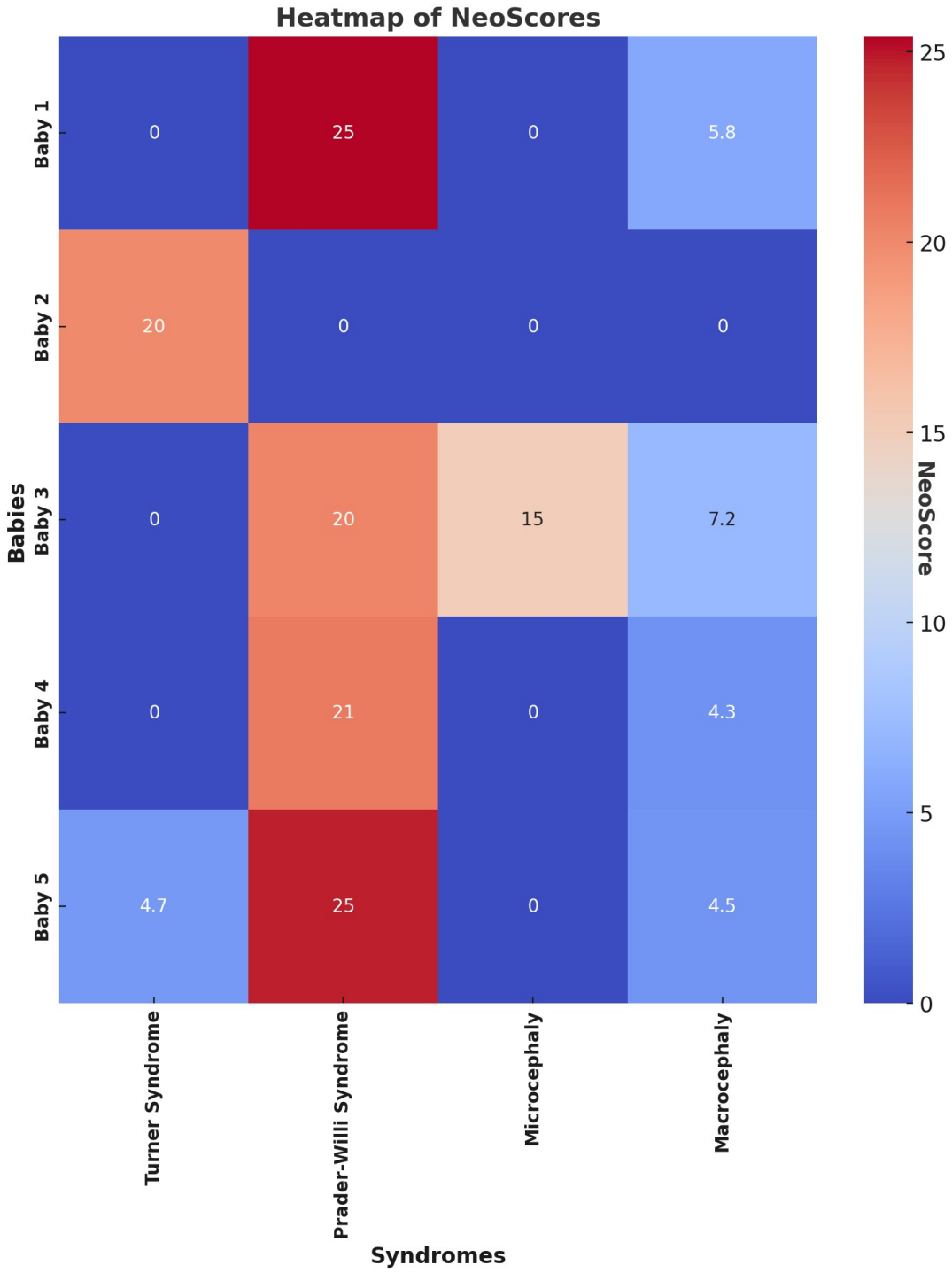
Macrocephaly Score:

$$\text{Macrocephaly Score} = \max\left(0, \min\left(100, \frac{\text{Child Head Circumference} - \text{Norm Head Circumference} + 2\text{ SD}}{\text{Child Head Circumference}} \times 100\right)\right)$$

$$\text{Final NeoScore} = \frac{\sum \text{Flagged Syndrome Scores}}{\text{Number of Flagged Syndromes}}$$

The AI learns from each instance and uses the back propagation technique of neural networks to keep the model current.

The Heatmap shows the distribution graph of the sample subjects used for model validation and accuracy testing.



Initially, the model produced output for a subject with both micro and macrocephaly. We then updated the training dataset and retained the model to ensure the accuracy of the results.