# Model Optimization and Tuning Phase

| Date | 18 February 2026 |
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| Team ID | LTVIP2026TMIDS66291 |
| Project Title | Civil Engineering Insight Studio |
| Maximum Marks | 10 Marks |

**Model Optimization and Tuning Phase**

The Model Optimization and Tuning Phase focuses on improving the performance and quality of the generated data by configuring and fine-tuning model generation parameters rather than training a neural network from scratch. Since the project uses a pre-trained generative AI model, optimization is achieved through prompt design and parameter tuning.

**Hyperparameter Tuning Documentation:**

| Model | Tuned Hyperparameters |
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| Gemini Flash Lite | **Temperature:** Controls creativity of output (set to a moderate value for balanced creativity). **Top-p:** Limits token selection to the most probable tokens for coherent responses. **Top-k:** Restricts token sampling to reduce irrelevant content. **Max Output Tokens:** Ensures generated photo data match the desired data. **Response Format:** Set to photo data for easy display in the UI. |

**Final Model Selection Justification:**

| Final Model | Reasoning |
|---|---|
| Gemini Flash Lite (models/gemini-flash-lite-latest) | Selected due to its fast response time, efficient resource usage, high-quality data generation, and seamless integration with Streamlit for real-time material data generation. |