Programme	B.Tech	**Semester**	WINSEM 25-26
Course	Software Lab	**Code**	BCSE301P
Faculty	Dr. Sakthivel Velusamy	**Slot**	L15+L16
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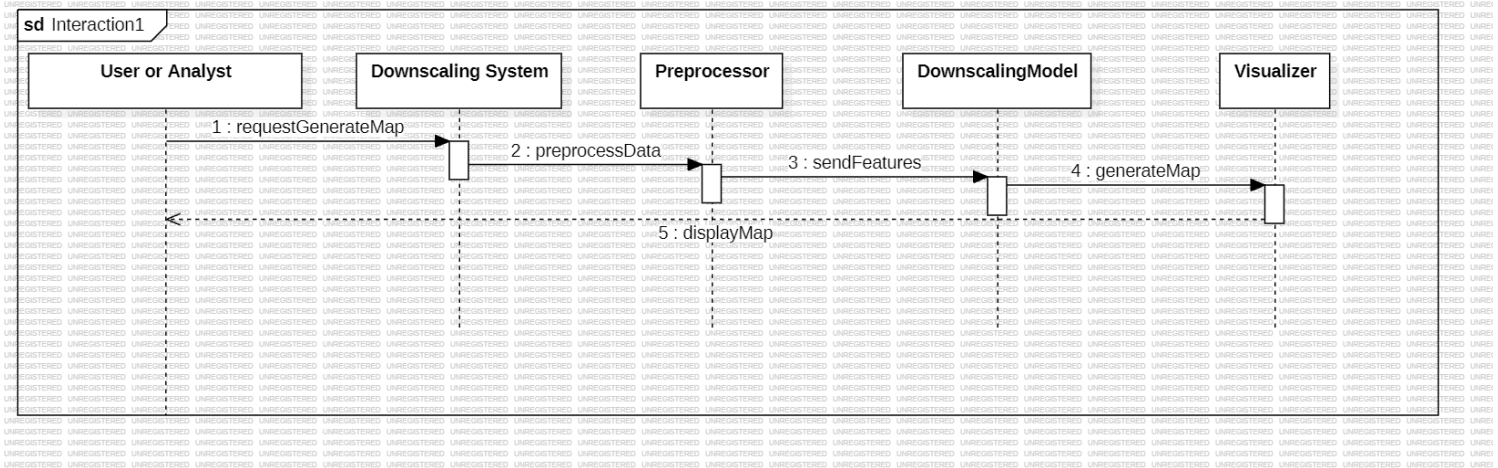
UML Diagrams – Sequence Diagram and Activity Diagram

UML diagrams are used to represent both the functional behaviour and internal structure of the AI-based Air Quality Downscaling System.

Sequence Diagram

The sequence diagram shows the interaction flow between the User / Analyst and internal system components over time. It begins with a user request to generate a high-resolution air quality map, followed by data preprocessing, feature transfer to the downscaling model, model execution, and map generation. The processed output is then visualised and returned to the user. This diagram helps in understanding the order of interactions and the responsibility of each component during execution.



Activity Diagram

The activity diagram represents the end-to-end workflow of the system. It outlines the sequential steps involved, starting from the ingestion of satellite and auxiliary data, followed by preprocessing and feature engineering. The downscaling model is then trained or applied, after which the model output is evaluated. Finally, high-resolution air quality maps are generated and visualised for the user. This diagram provides a clear view of the system's operational flow.