Project Name : Rough Theory

Aims

- **Main Aim**: Develop a model to analyze uncertain or incomplete data using **Rough Set Theory**.
- **Sub-Aims**:
  - Improve data classification methods when information is missing.
  - Identify similar groups and predict them based on partial data.
  - Expand the use of this theory in fields like **Artificial Intelligence, Data Analysis, and Data Mining**.

Audience & Stakeholders

- **Target Audience**:
  - **Data Analytics Organizations**: Companies that rely on Big Data analysis.
  - **Researchers and Academics** in fields such as Artificial Intelligence and Data Analytics.
  - **Developers** who need tools for implementing mathematical techniques like Rough Set Theory.
- **Stakeholders**:
  - **Companies** working in fields like **E-commerce, Healthcare, Finance** that face challenges in analyzing incomplete data.
  - **Educational Institutions** offering advanced studies in Applied Mathematics or Artificial Intelligence.

Methodology

- **Data Collection**:
  - Use a **dataset** with missing or incomplete information, such as customer data, sales data, or healthcare data.
- **Practical Application of Rough Set Theory**:
  - Identify similar elements in the dataset.
  - Create **approximation tables** to determine the relationship between the incomplete data.
  - Analyze the relationships between the **different groups** using the mathematical tools of Rough Set Theory.
- **Analysis**:
  - Use **algorithms** to determine the **lower and upper approximations** in the data.
  - Compare the results of Rough Set Theory with other traditional data classification methods.
- **Tools**:

- **Programming Language**: Python (with libraries such as NumPy and Pandas).
- **Mathematical Tools**: Use mathematical libraries for analysis like **SciPy**.

Requirements

- **Technical Requirements**:
  - **Programming Environment**: Python or other tools for mathematical analysis like R.
  - A **database** containing incomplete or ambiguous data.
  - **Analytical Tools** such as **approximation tables** to apply Rough Set Theory.
- **Human Requirements**:
  - **Academic Researchers** in fields like **Artificial Intelligence** and Applied Mathematics.
  - **Developers** to build software tools and systems for data analysis.

System Diagrams

1. Use Case Diagram

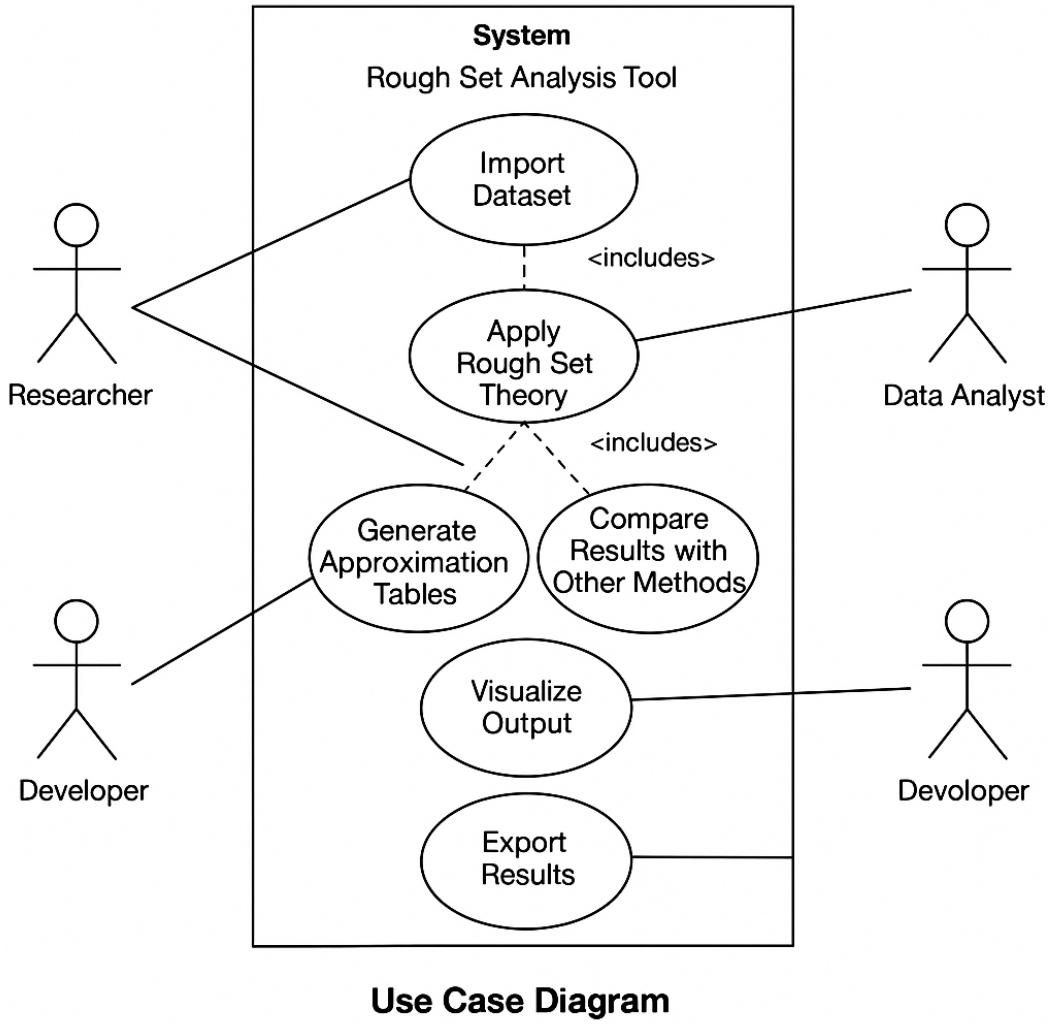

Figure 1: Use Case Diagram showing the interactions between the users and the Rough Set Analysis Tool.

2. Sequence Diagram

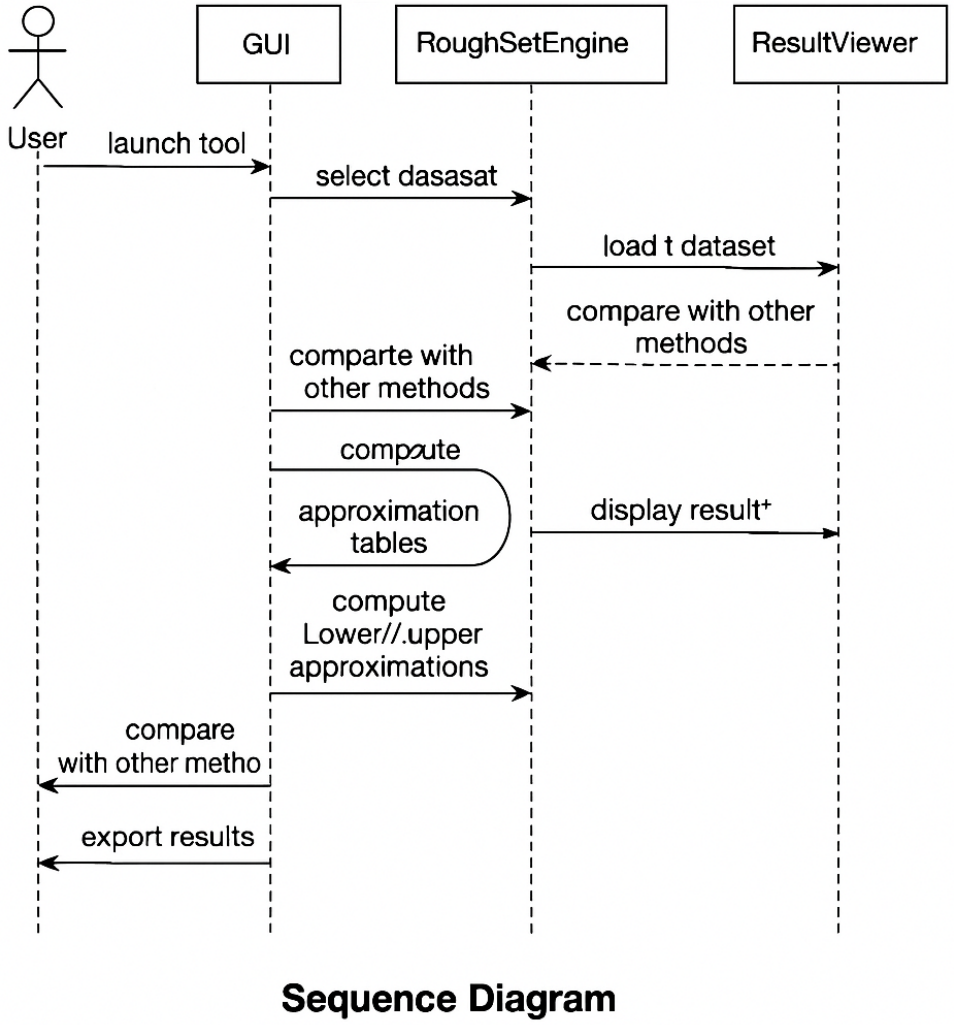

Figure 2: Sequence Diagram illustrating the flow of operations during data analysis using Rough Set Theory.