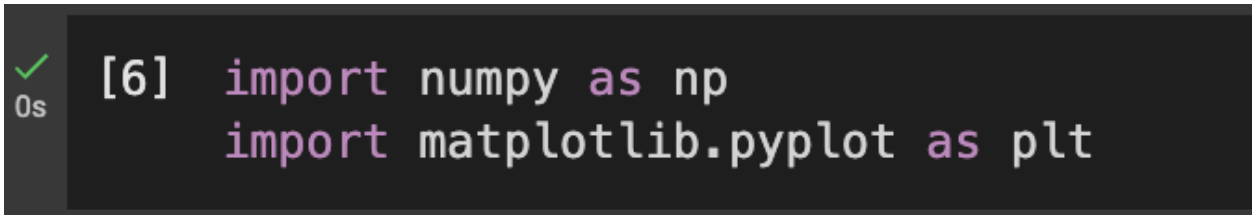
Software Engineering Task-3

Kavya Aggarwal

HU22CSEN0100288

1. **Develop weather modeling using the quadratic model using Agile model.**
2. **Write about all the phases in Agile model**

1. Importing necessary Libraries



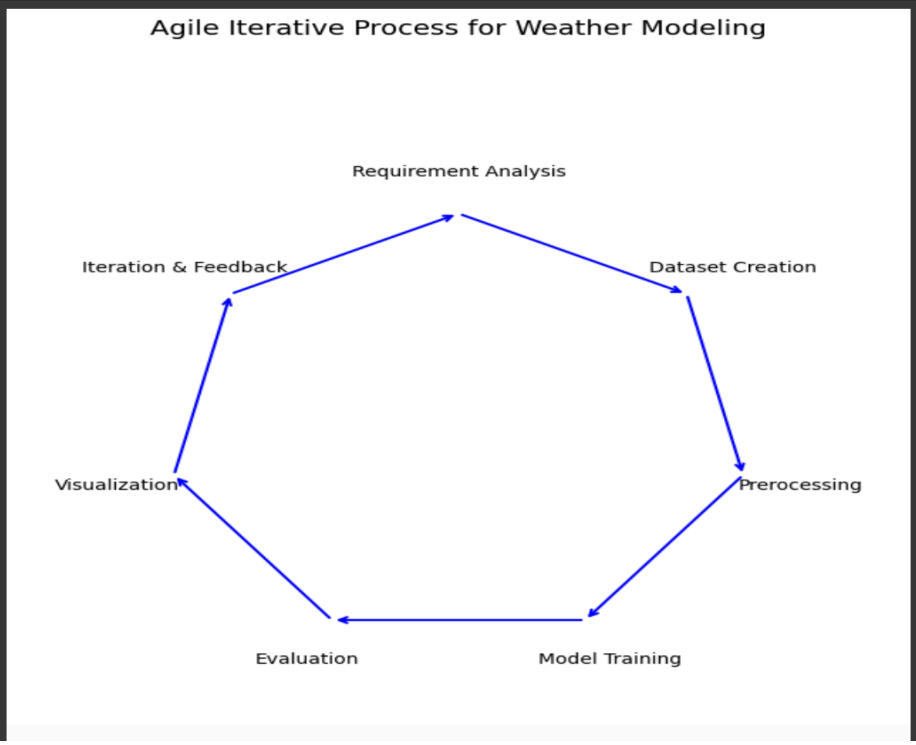
2. Defining the stages of Agile Model

Defining the stages of Agile model

```
def plot_agile_iterative_process():
  phases=["Requirement Analysis","Dataset Creation","Prerocessing","Model Training","Evaluation","Visualization","Iteration & Feedback"]

  #Calculating angles and plotting

  angles= np.linspace(0, 2 * np.pi, len(phases), endpoint=False).tolist()
  angles+=angles[:1]

  #Initializing polar plot

  fig, ax = plt.subplots(figsize=(8,8),subplot_kw={'polar':True})
  ax.set_theta_offset(np.pi/2)
  ax.set_theta_direction(-1)

  #Plot phase names around the circle

  for i, phase in enumerate(phases):
    ax.text(angles[i], 1.2, phase, ha='center', va='center', fontsize=10, wrap=True)


  #Drawing Arrows to show Iteration between different phases

  for i in range(len(phases)):
    next_index = (i+1) % len(phases)
    ax.annotate("", xy=(angles[next_index], 1), xytext=(angles[i],1), arrowprops=dict(arrowstyle="->", lw=1.5, color='blue'))

    #Configuring the plot

  ax.set_ylim(0, 1.5)
  ax.axis('off')  # turn off the circular grid and axis
  plt.title("Agile Iterative Process for Weather Modeling", fontsize=14, y=1.1)
  plt.show()
```

3. Output of the Implementation

```
plot_agile_iterative_process()
```



Phases of the Agile Model

The Agile Model is an iterative and incremental approach commonly used in software development and other dynamic fields. It emphasizes collaboration, adaptability, and continuous delivery of working solutions. Below are the key phases of the Agile Model, tailored to a data science or machine learning project context:

1. Requirement Analysis

- **Objective: Gather and prioritize requirements based on the stakeholders' needs and project goals.**
- **Activities:**
  - **Conduct meetings with stakeholders to understand the problem.**
  - **Define objectives, success metrics, and constraints.**
  - **Identify potential challenges and key resources.**
- **Outcome: A clear understanding of the project scope and an initial backlog of tasks.**

2. Dataset Creation

- **Objective: Collect and organize relevant data for the project.**
- **Activities:**
  - **Source data from various channels (e.g., APIs, databases, web scraping).**
  - **Validate data sources to ensure reliability.**
  - **Store data in structured formats, such as databases or flat files.**
- **Outcome: A comprehensive dataset ready for preprocessing.**

3. Preprocessing

- **Objective: Prepare the dataset for analysis and model training.**
- **Activities:**
  - **Clean data by handling missing values, duplicates, and outliers.**
  - **Normalize or standardize data as required.**
  - **Perform feature engineering and selection.**
  - **Split the dataset into training, validation, and test sets.**
- **Outcome: A clean and well-structured dataset optimized for modeling.**

4. Model Training

- **Objective: Develop and train machine learning models.**
- **Activities:**
  - **Select appropriate algorithms and frameworks.**
  - **Train models using the prepared training dataset.**

    - **Tune hyperparameters to optimize performance.**
- **Outcome: A trained model ready for evaluation.**

5. Evaluation

- **Objective: Assess the performance of the trained model.**
- **Activities:**
    - **Use validation and test datasets to measure model accuracy, precision, recall, etc.**
    - **Compare results against predefined benchmarks or other models.**
    - **Identify areas for improvement.**
- **Outcome: A performance report detailing the strengths and limitations of the model.**

6. Visualization

- **Objective: Communicate findings and insights effectively.**
- **Activities:**
    - **Create visualizations, such as graphs, heatmaps, and charts, to present data and model performance.**
    - **Develop dashboards for stakeholders to interact with the results.**
    - **Highlight key metrics and trends.**
- **Outcome: Clear and actionable visual representations of the project outcomes.**

7. Iteration & Feedback

- **Objective: Refine the solution based on stakeholder feedback and new insights.**
- **Activities:**
    - **Present findings and receive feedback from stakeholders.**
    - **Incorporate changes and improvements in subsequent iterations.**
    - **Revisit previous phases as needed to adapt to evolving requirements.**
- **Outcome: An improved solution that aligns more closely with stakeholder needs and project goals.**

Characteristics of the Agile Model

- **Iterative Development: Allows for continuous improvement through multiple iterations.**
- **Stakeholder Collaboration: Ensures alignment with end-user requirements.**
- **Flexibility: Easily adapts to changes in project scope or goals.**

Advantages

- **Quick delivery of functional solutions.**
- **Enhanced collaboration and transparency.**
- **Better adaptability to changing requirements.**

Disadvantages

- **Requires active stakeholder involvement.**
- **Can lead to scope creep if not well-managed.**
- **Needs experienced teams for effective implementation.**

4. Pushed to Github