

❖ Article: Stages of an AI Project & the Role of an AI Engineer

➤ Introduction:-

Artificial Intelligence (AI) projects involve much more than just building machine learning models. A successful AI project passes through well-defined stages, each requiring different skill sets and clear coordination. A popular framework used to define these stages is the OSEMN framework: Obtain, Scrub, Explore, Model, and Interpret.

In this article, we explain each stage of the AI lifecycle using a Sentiment Analysis system for analyzing customer feedback as an example. We also highlight the role of an AI Engineer or Researcher at every step.

1. Obtain (Data Collection & Problem Understanding)

Objective: Understand the business problem and gather relevant data.

In the context of sentiment analysis, the goal could be:

"Automatically classify customer feedback as Positive, Neutral, or Negative."

Activities:

- Understanding the type of problem (Classification, Regression, Clustering)
- Defining the project scope and desired output
- Identifying data sources (Twitter API, product reviews, survey data)
- Specifying data format, size, and accessibility

Role of AI Engineer:

- Works with domain experts to understand the use case
 - Defines what data is needed and verifies its quality
 - Communicates technical limitations and requirements to stakeholders
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2. Scrub (Data Cleaning & Preprocessing)

Objective: Prepare raw data into a usable format.

For sentiment analysis, this could include:

- Removing stopwords, punctuation, special characters
- Handling missing values
- Label encoding sentiment tags
- Balancing classes (if dataset is skewed)

Role of AI Engineer:

- Applies preprocessing techniques (tokenization, normalization)
 - Writes reusable data-cleaning scripts
 - Ensures that noisy/unstructured data becomes analysis-ready
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3. Explore (Data Exploration & Visualization)

Objective: Understand data distribution, patterns, and relationships.

For example:

- Visualize most frequent words in positive/negative reviews
- Use word clouds, histograms, correlation matrices
- Check class distribution of sentiments

Role of AI Engineer:

- Performs exploratory data analysis (EDA)
 - Identifies anomalies, outliers, and potential biases
 - Documents findings and insights for model building
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4. Model (Model Building & Evaluation)

Objective: Build and train ML/DL models.

For sentiment analysis:

- Use models like Logistic Regression, Naive Bayes, or LSTM
- Evaluate with metrics: Accuracy, F1-Score, Confusion Matrix

Role of AI Engineer:

- Selects and tunes appropriate ML/DL algorithms
 - Splits data into training, validation, test sets
 - Performs hyperparameter tuning and model optimization
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5. Interpret (Insights, Explainability & Deployment)

Objective: Make sense of results and implement the solution.

In sentiment analysis:

- Interpret why a review is classified as negative
- Use SHAP/LIME for explainability
- Create dashboards or APIs for real-time prediction

Role of AI Engineer:

- Explains model decisions to non-technical teams
- Packages model into APIs, deploys in production
- Monitors model performance over time

➤ Conclusion:-

The success of any AI project depends on following a structured pipeline and effective collaboration between business and engineering teams. An AI Engineer plays a core role not just in model development but across the entire lifecycle—from understanding the problem to deploying the final solution.

Whether it's a Sentiment Analysis engine, Fraud Detection, or Recommendation System—every AI project relies on these foundational stages to deliver value.

-----**ASSIGNMENT COMPLETED**-----
