Project Name
Smart Alloy Adviser

Project Objective

• User-Centric Objective (e.g., engineers, designers, manufacturers):

• Provide real-time recommendations for alloy selection based on:

• Key properties (e.g., strength, corrosion resistance, thermal conductivity, weldability).

• Application requirements (e.g., medical devices, aerospace components, industrial machinery).

- Technical Objectives:

• Analyze historical performance data of materials.

• Suggest alternative alloys if the ideal one is unavailable.

Target Audience & Stakeholders

• Target Audience:

• Engineers, chemists, and mechanical experts (manufacturers).

• Research institutions and designers.

•University students (materials science).

• Key Stakeholders:

• Industrial project managers.

• Material science researchers.

• Decision-makers in production.

Methodology

• Approach: Agile (e.g., iterative updates based on new data or alloy properties).

• Implementation Steps:

• "User Input" (e.g., collect requirements via a dynamic, user-friendly interface).

• "Database Processing" (e.g., analyze alloy properties like 6061 aluminum or 304 stainless steel).

• AI-driven matching between requirements and alloys.

• Continuous UI/UX improvements based on user feedback.

Requirements

• Functional Requirements:

• User input (e.g., key material properties, environmental conditions).

• Compatibility validation with existing alloys.

• Customizable results (e.g., prioritize cost vs. performance).

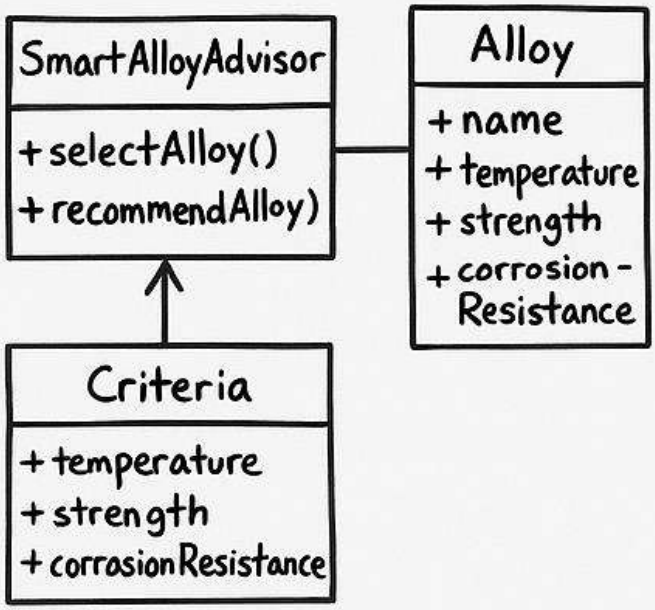
• Non-Functional Requirements:

• ≥ 95% recommendation accuracy.

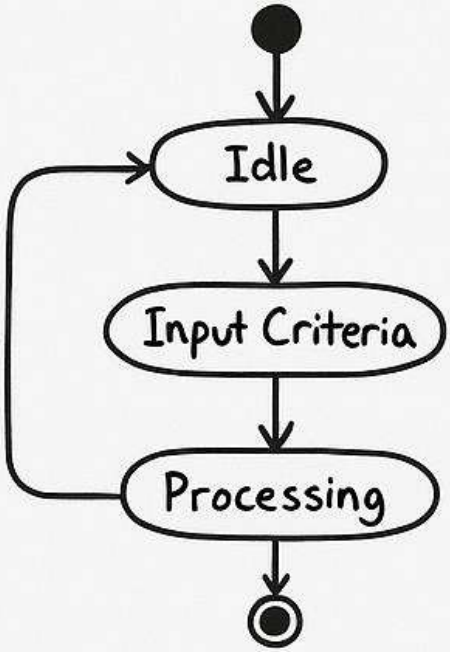
• Intuitive interface for non-technical users.

• Multi-language support (Arabic & English).

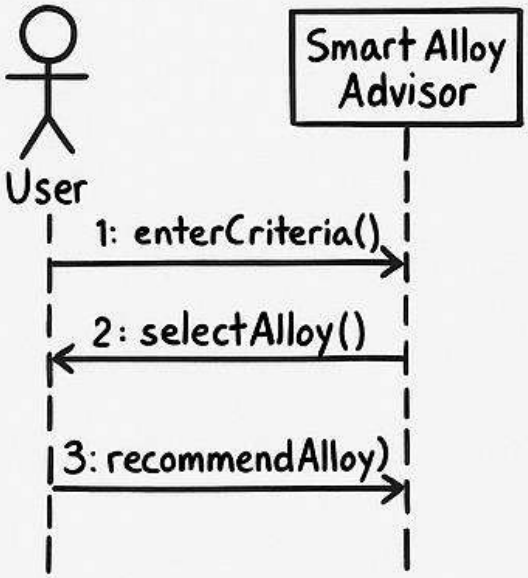
Class Diagram



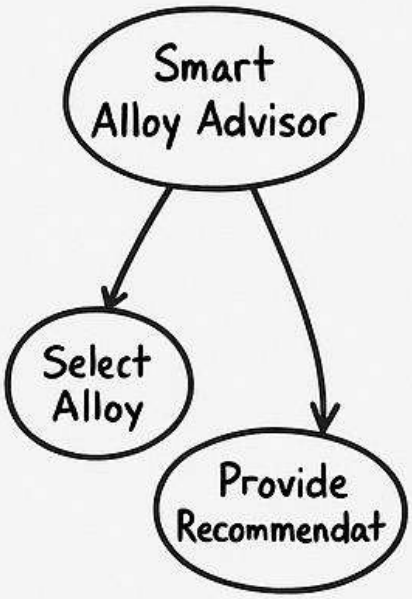
State Diagram



Sequence Diagram



Use Case



Activity Diagram