Rain Hu

System Analyst — Senior Software Engineer

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Professional Summary

Experienced System Analyst and Senior Software Engineer with proven expertise in designing and implementing enterprise-scale software libraries and frameworks. Strong track record in developing modular, scalable systems with emphasis on clean architecture and SOLID principles. Demonstrated ability to bridge traditional software development with emerging technologies, particularly in AI/ML integration. Excel in creating comprehensive technical specifications and leading cross-functional development teams. Proven success in analyzing complex systems, creating reusable libraries, and implementing efficient solutions that enhance development productivity.

Core Competencies

- **Programming Languages:** C#.NET, C++, TypeScript, Python, Java
- **Software Architecture:** Object-Oriented Design, SOLID Principles, Clean Architecture, CQRS
- **Library Development:** API Design, SDK Development, Framework Architecture
- **Modern Technologies:** AI/ML Integration, DDD, Microservices
- **Development Tools:** Visual Studio, VS Code, Vim, Git, Docker
- **Testing & Quality:** Unit Testing, TDD, Integration Testing
- **Languages:** Chinese (Native), English (TOEIC - 775/900), Korean (TOPIK I - 180/200)

Professional Experience

Senior Software Engineer — UMC — 08/2022 - Present

- **System Architecture & Analysis**
  - Led architecture design for multiple enterprise-scale applications
  - Conducted comprehensive system analysis and requirement gathering
  - Created detailed technical specifications and documentation
  - Designed scalable and maintainable software architectures
- **Library & Framework Development**
  - Developed reusable class libraries following SOLID principles
  - Created standardized API interfaces for system integration
  - Implemented plugin architectures for extensible systems
  - Designed modular components for cross-platform compatibility
- **Technical Leadership**
  - Mentored team in software architecture and design patterns
  - Led technical discussions and architecture review sessions
  - Established coding standards and best practices

  - Improved development efficiency through standardized libraries

- **Technology Integration**
  - Developed frameworks for AI/ML service integration
  - Implemented cloud-based and local solutions and services
  - Created abstraction layers for new technology adoption(langChain for dotnet)

Device R&D Engineer — UMC — 08/2018 - 08/2022

- Developed automated tools for layout optimization and analysis
- Created cross-platform utilities for engineering calculations
- Implemented data processing and analysis frameworks
- Designed modular solutions for complex engineering problems

KEY PROJECTS

UEDA 5.0 - Enterprise Analysis Framework

- **Architecture & System Analysis:**
  - Conducted comprehensive system analysis for multi-regional deployment requirements
  - Designed modular architecture supporting 4 sites(Taiwan, Japan, Singapore, Xiamen)
  - Created detailed technical specifications and system documentation
  - Developed standardized API interfaces for cross-system integration

- **Library Development:**
  - Designed reusable class libraries for data analysis
    - Implemented Repository Pattern for database abstraction
    - Created Factory Pattern for analysis component creation
    - Dependency Injection for decoupling of application layer to DB and I/O
  - Built extensible plugin architecture
    - Created interface-based plugin system
    - Implemented dependency injection for loose coupling
    - Create RAG-Chain with C#.NET and implmenting multiple solutions

- **Core Components:**
  - Data Access Layer
    - Generic repository implementations
    - Query specification pattern
    - Connection management system
  - Analysis Engine
    - Modular analysis pipeline
    - Extensible algorithm framework
    - Results caching system
  - Visualization Components

        - Custom control library
        - Chart generation system
        - Interactive data grid components

- **Technical Documentation:**
    - Created comprehensive API documentation
    - Developed integration guides and examples
    - Maintained architecture decision records

- **Tech Stack:**
    - C#.NET Framework/Core
    - Oracle, PostgreSQL, Impala
    - WinForms, WPF
    - Spotfire SDK

DSM Bot - Advanced Software Integration System

- **System Analysis & Architecture:**
    - Conducted comprehensive requirement analysis for next-generation manufacturing assistant
    - Designed scalable architecture supporting both traditional and AI-powered features
    - Created detailed system specifications for multi-component integration
    - Developed framework for seamless integration of emerging technologies

- **Core Library Development:**
    - Universal Message Processing Framework
        - Built extensible middleware pipeline supporting multiple processing engines
        - Implemented pluggable architecture for different AI models
        - Developed abstract factory pattern for processing strategy selection
    - Advanced Integration Libraries
        - Created modular AI service integration layer
        - Developed standardized interfaces for ML model integration
        - Built flexible data transformation pipeline
    - Modern Technology Integration
        - Implemented RAG (Retrieval-Augmented Generation) system
        - Developed vector database integration layer
        - Created abstraction layer(RAG-chain) for different ML frameworks

- **API & Service Development:**
    - Designed comprehensive API architecture
        - RESTful endpoints for traditional services
        - Modular design for easy technology updates
        - Plugin system for new feature integration
        - Standardized interfaces for various AI services

- **Technology Integration:**

  - Emerging Technologies
    - Large Language Model integration
    - Vector database implementation
    - Real-time processing pipeline
  - Traditional Systems
    - Database management
    - Caching mechanisms
    - Authentication services

- **Quality & Documentation:**
  - Comprehensive testing framework
    - Unit tests for core libraries
    - Integration tests for AI services
    - Performance benchmarking suite
  - Technical documentation
    - API specifications
    - Integration guides
    - Architecture decision records

- **Tech Stack:**
  - Core Development: C#.NET Core, React with TypeScript, Python
  - AI/ML: LangChain, Vector Databases
  - API: ASP.NET Web API
  - Testing: MsUnit, Moq, FluentAssertion, FluentValidation, ErrorOr, MediatR

- **Impact & Results:**
  - Built flexible framework supporting both traditional and AI-powered features
  - Reduced system integration time by 60% through standardized interfaces
  - Created foundation for future technology adoption
  - Successfully integrated multiple emerging technologies while maintaining system stability

UGPT API System

- **System Design:**
  - Designed scalable API architecture
  - Created detailed API specifications (OpenAPI)
  - Implemented API versioning strategy
  - Developed error handling framework (using ErrorOr and MediatR)

- **Core Features:**
  - Authentication/Authorization system
    - JWT token implementation
    - Role-based access control
    - API key management(user secret)

    - Request/Response Pipeline
        - Custom middleware development
        - Request validation system
        - Response transformation
    - Monitoring System
        - Performance metrics collection
        - Error logging and tracking
        - Usage analytics

- **Documentation:**
    - Generated OpenAPI specifications
    - Created integration guides
    - Developed sample implementations

- **Tech Stack:**
    - C#.NET Core
    - ASP.NET Web API
    - Swagger/OpenAPI
    - Azure DevOps

EDUCATION

MS in Material Science and Engineering — National Tsing Hua University — 2014 - 2018

- GPA: 3.97
- Thesis: Production of Graphite from Catalytic Liquid Cast Iron Bath

BS in Material Science and Engineering — National Tsing Hua University — 2010 - 2014

- GPA: 3.61