AI-Integrated Custom Application Development (AICAD) Method Overview

---

1. Introduction

The **AI-Integrated Custom Application Development (AICAD) Method** is a structured, phase-wise approach for developing and delivering business and consumer applications with **AI-powered features**. It builds on the foundation of the traditional **Custom Application Development (CAD) Method** while introducing new processes and enhancements specific to AI model development, data preparation, and AI-based testing.

This method is particularly suited for projects involving multiple modules and features, each of which evolves through collaborative development with clients. The AICAD Method also accommodates **controlled scope adjustments** during the **User Acceptance Testing (UAT) phase**, allowing client-discovered changes to be incorporated. By integrating AI capabilities, it supports data-driven insights, predictive intelligence, and process automation.

---

2. Phases and Key AI-Specific Activities

The AICAD Method consists of a few new phases over CAD Method as well as a few additional activities under existing phases. Each phase is consisted of specific activities, participants, and deliverables. Below is a summary of the phases, with special emphasis on **AI-specific activities.**

Phase 1: AI Strategy & Feasibility Analysis

This phase focuses on **identifying AI opportunities** and **assessing the feasibility** of incorporating AI features. Key activities include defining AI use cases, conducting feasibility studies, assessing data privacy and compliance needs, and determining project readiness. The phase ensures a **clear AI strategy** and alignment with client expectations.

AI-Specific Activities: All activities

Phase 2: Requirements Phase

The goal of this phase is to **gather and define requirements** for both traditional application features and AI-specific needs. Activities include workshops with stakeholders, defining AI-specific requirements, prioritizing features, and documenting these in the **Business Requirements Document (BRD)** and **Functional Specification Document (FSD)**. This phase provides a **comprehensive view of what needs to be built**.

AI-Specific Activities: AI-Specific Requirements Definition, AI Model Compliance Requirements Definition

Phase 3: Design Phase

This phase focuses on **architectural design** for both the application and AI components. Activities include defining the system architecture, high-level design (HLD), low-level design (LLD), and specific designs for AI models and data flows. The output includes detailed design documents that serve as a blueprint for development.

AI-Specific Activities: AI Model Design

Phase 4: Data Preparation & Engineering

AI models rely on high-quality data, and this phase ensures that **data is collected, cleaned, labelled, and prepared** for model training. Activities include data collection, annotation, augmentation, and storage setup. This phase ensures that **AI models are trained on clean, well-labelled data** to maximize performance and fairness.

AI-Specific Activities: All activities

Phase 5: AI Model Development & Test Iterations

This is a specialized phase focused on **developing, training, and validating AI models**. Activities include feature engineering, model training, hyperparameter tuning, and explainability assessments. The phase aims to produce a **robust, bias-free AI model** that aligns with design goals and business needs.

AI-Specific Activities: Feature Engineering, Model Training & Hyperparameter Tuning, Model Evaluation, Bias & Fairness Assessment, Explainability Reporting

Phase 6: Application Development & Test Iterations

This is the core development phase where the **application features are developed, integrated and tested** iteratively. Key activities include developing program code, conducting unit testing, and integrating AI models with the application. Regular iterations ensure defects are identified and resolved as early as possible.

AI-Specific Activities: AI Model Integration & Testing

Phase 7: UAT Iterations

The **User Acceptance Testing (UAT) phase** allows the client to validate the application and AI components before deployment. Activities include executing UAT test cases, collecting feedback, and fixing defects. This phase allows client users to provide real-world feedback, ensuring that **final adjustments are made before go-live**.

AI-Specific Activities: AI Model Demo to UAT Users, AI-Specific UAT Testing

Phase 8: Deployment Phase

This phase ensures the smooth **go-live of the application and AI models**. Activities include obtaining sign-offs, finalizing the deployment plan, and performing regression and sanity testing. This phase ensures the **system is live, stable, and ready for users**.

AI-Specific Activities: AI Model Deployment, Model Drift Detection and Retraining

Phase 9: Closure Phase

The final phase focuses on **handover and knowledge transfer** to the client. Key activities include delivering training materials, conducting user training, and submitting final documentation. This phase ensures that **clients are equipped to maintain and operate the application and AI models**.

---

3. Roles and Responsibilities

The AICAD Method introduces AI-specific roles while preserving traditional roles from the CAD process. Key roles include:

- **AI/ML Engineer**: Builds, trains, and deploys AI models.
- **Data Scientist**: Designs AI models, performs feature engineering, and conducts explainability reporting.
- **Ethics Auditor**: Ensures AI models are fair, unbiased, and compliant with ethical standards.
- **Delivery Manager (DM)**: Manages project timelines, resources, and deliverables.
- **Business Analyst (BA)**: Gathers requirements and ensures business alignment.
- **Test Manager**: Oversees testing strategy and test execution.

---

4. Deliverables

The AICAD Method ensures specific deliverables are produced at key phases, including:

- **AI Use Case Document** (AI Strategy & Feasibility Analysis)
- **Data Requirements Report** (AI Strategy & Feasibility Analysis)
- **AI BRD** (Requirements Phase)
- **AI HLD** (Design Phase)
- **Data Set** (Data Preparation & Engineering)
- **Trained AI Model** (AI Model Development & Test Iterations)
- **AI Model Deployment Plan** (Deployment)

---

5. Enhancements for AI Integration

Key enhancements to the CAD Method to support AI include:

- **New Phases**: AI Strategy, Data Preparation, and AI Model Development Phases.
- **New Roles**: Data Scientist, AI/ML Engineer, and Ethics Auditor.
- **New Deliverables**: AI Model Requirements & Design Documents, AI Data Set, Explainability Report, Model Drift Report.

6. Benefits of the AICAD Method

- **Predictive Intelligence**: Incorporate AI-based insights to make data-driven decisions.
- **Improved Collaboration**: New roles enable efficient collaboration on AI-based initiatives.
- **Seamless Adaptability**: Allows controlled changes during UAT to refine AI features.