International Applicant Rating Algorithm

Project Requirements and Specifications

Washington State University International Programs

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WSU International

25-FA25-SP26-IAOWIP-GEN

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I. Introduction

The International Applicant Rating Algorithm (IARA) is a system designed for Washington State University (WSU) to improve the evaluation of international student applications. Currently, admissions staff must rely heavily on manual review of data from Slate, including GPA, travel history, curriculum, applicant essays, and other risk factors. This process is time-consuming, prone to inconsistencies, and often delays decision-making, making it difficult to apply the admissions rubric fairly and efficiently across large applicant pools.

The objective of IARA is to automate and standardize the applicant scoring process while ensuring fairness and transparency. The system will calculate categorical scores and combine them into a composite rating that admissions counselors can use to compare applicants. Essays will be analyzed using AI, with fallback methods available if AI services cannot be accessed. Results will include a detailed breakdown and exportable reports to ensure decisions can be explained and defended.

Future versions will expand integration with Slate, improve AI-assisted document processing, and allow administrators to adjust scoring rules via configuration files rather than direct code changes. By combining automation with human oversight, WSU can improve efficiency, reduce bias, and build a scalable system for international admissions.

II. System Requirements Specification

This section outlines the key functional and non-functional requirements and use cases for the International Applicant Rating Algorithm system. It provides an overview of the system's intended features, behavior, and interactions with admissions counselors and other stakeholders involved in evaluating international applicants.

A. Functional Requirements

The following are functional requirements describing what the website and backend are supposed to do, with a description, source, and priority level.

I. Student Data Input

FR – 01: Input Student Data

Description	The system shall enable authorized users to input comprehensive student information, including Student ID, GPA, country of origin, curriculum type, travel history, personal essay, and associated risk factors
Source	Client rubric, Team brainstorm
Priority	Level 0

FR – 02: Field Validation

Description	The system shall validate required fields and provide real-time feedback if any inputs are missing.
Source	Client rubric, Team brainstorming
Priority	Level 0

II. Essay Analysis

FR – 03: Essay Analysis with Fallback

Description	The system shall perform AI-driven essay analysis to assess sentiment, motivation, and academic focus, with a fallback to local heuristic analysis in the event of API failure.
Source	Client rubric, GenAI brainstorming
Priority	Level 0

FR – 04: AI Insights

Description	The system shall show AI insights and recommendations based on final scoring.
Source	Client rubric, AI brainstorming
Priority	Level 1

FR – 05: AI Fallback Support

Description	The system shall support both AI-powered analysis and local fallback analysis when APIs are unavailable.
Source	Client rubric, Team brainstorming, GenAI brainstorming
Priority	Level 0

III. Scoring Engine

FR – 06: Positive Score Calculation

Description	The system shall calculate positive scores based on GPA, curriculum rigor, travel experience, essay quality, and motivational indicators derived from AI analysis.
Source	Client rubric
Priority	Level 0

FR – 07: Negative Score Calculation

Description	The system shall calculate negative deductions based on fee waiver requests, payment issues, pending documents, and early I-20 requests.
Source	Client rubric
Priority	Level 0

FR – 08: Composite Score Calculation (POS/NEG/AI)

Description	The system shall compute a final composite score combining positive scores, negative deductions, and AI analysis.
Source	Client rubric
Priority	Level 0

FR – 09: Financial Risk Assessment

Description	The system shall assess financial risk levels using application fee waivers, payment issues, and regional risk factors
Source	Client rubric
Priority	Level 0

IV. Results

FR – 10: Results Presentation

Description	The system shall present results in a structured format, including Academic, Financial, and Behavioral scores, overall enrollment probability, and detailed factor breakdown
Source	Client rubric
Priority	Level 0

B. Non-Functional Requirements

The non-functional requirements outline the system's operational qualities, such as performance, scalability, and security, to ensure it meets quality standards beyond core functionality. The details of non-functional requirements are given below.

Non-Functional Requirement	Description
NFR-01: Scalability (Concurrent Users)	The system shall support up to 500 concurrent users without performance degradation.
NFR-02: Data Accuracy	The system shall match student data against the client-provided spreadsheet with 100% accuracy; any discrepancies shall be flagged.
NFR-03: Security and Role-Based Access	Data shall be protected with WSU-issued keys and role-based authorization (student, counselor, admin, etc.).
NFR-04: Compliance and Auditability	The system must comply with relevant data regulations, restrict unauthorized access, maintain a trail of who viewed which records, and allow data to be sent or deleted when authorized.
NFR-05: Availability	The system shall achieve at least 99% uptime per month, with only planned or scheduled maintenance, which must include at least 24+ hours of advance warning.
NFR-06: Performance (Batching & Parallel Processing)	The system shall handle applicant volumes larger than expected by batching requests and supporting parallel processing for scoring.
NFR-07: Configurable Export Formats	Scoring results shall be exportable in multiple file formats (e.g., JSON, YAML). New configurations shall not require redeployment.
NFR-08: Logging and Monitoring	The system shall track key metrics (uploads, scoring time, error rates, AI response speed) and maintain logs including config version, user info, and timestamps. An admin shall be able to receive daily summaries and export this data.
NFR-09: Accessibility	The system shall be accessible to users with disabilities, ensuring core actions are possible within a few seconds, and that errors are displayed clearly and immediately.
NFR-10: AI Fallback Handling	If AI services are unavailable or exceed timeout thresholds, the system shall perform a fallback process and mark the result as an AI fallback error.

C. Use Case Diagrams & Selected Use Cases

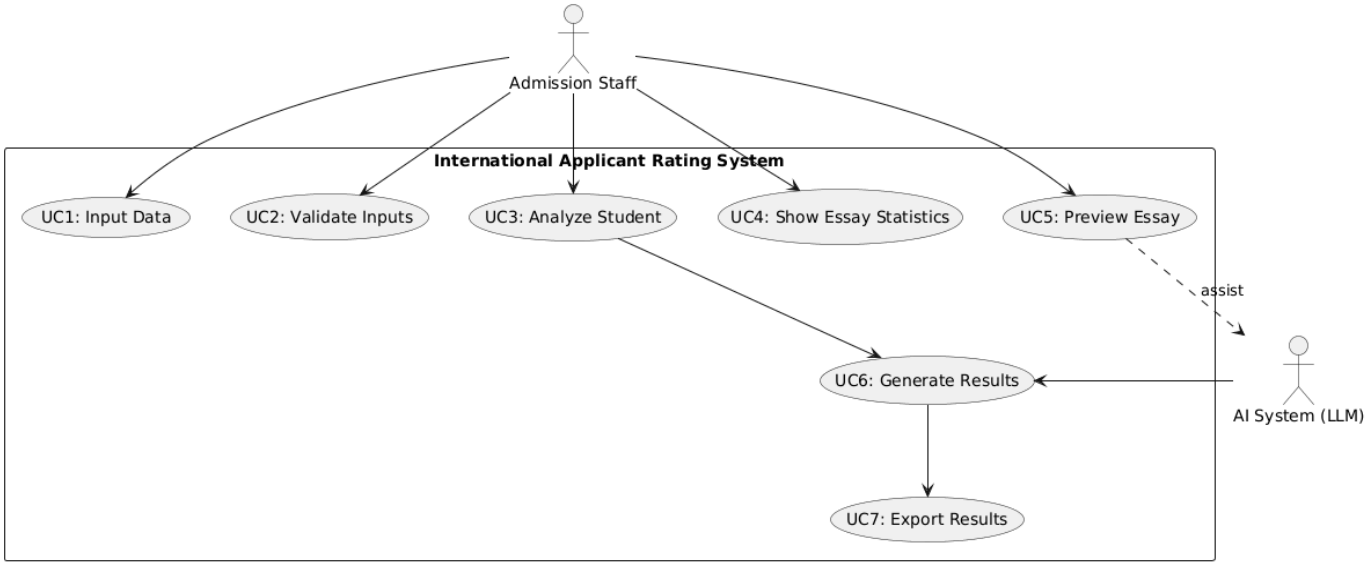


Figure 1: Use case diagram

Use Case 1: Input Student Profile Data

Actor	Admissions Counselor
Precondition	Counselor is logged in and form is open and empty
Postcondition	Student academic, financial, and behavioral attributes are entered into the system
Main Flow	Counselor enters Student ID, GPA, curriculum type, country, travel history, essay, risk factors → submits
Alternative Flow	Missing/invalid fields → form shows validation errors
Related Requirements	FR-01, FR-02

Use Case 2: Analyze Student

Actor	Admissions Counselor
Precondition	Student profile is entered and complete
Postcondition	System displays positive, negative, and composite scores with AI insights
Main Flow	Counselor clicks “Analyze” → system validates fields → calculates scores → displays factor breakdown

Alternative Flow	AI timeout → fallback used; invalid config → process aborted.
Related Requirements	FR-03, FR-04, FR-05, FR-06, FR-07, FR-08, FR-10

Use Case 3: Show Essay Statistics

Actor	Admissions Counselor
Precondition	Essay text is present
Postcondition	Panel displays essay statistics (characters, words, reading time)
Main Flow	Counselor clicks “Stats” → system calculates and displays stats
Alternative Flow	Essay empty → no stats shown
Related Requirements	FR-02, FR-10

Use Case 4: Preview Essay

Actor	Admissions Counselor
Precondition	Essay text is present
Postcondition	Formatted, read-only preview is shown
Main Flow	Counselor clicks “Preview” → system formats essay and displays
Alternative Flow	Essay empty → prompt for input
Related Requirements	FR – 02

Use Case 5: Clear Essay

Actor	Admissions Counselor
Precondition	Essay section contains text
Postcondition	Essay field is reset to empty
Main Flow	Counselor clicks “Clear” → essay cleared
Alternative Flow	Essay already empty → no change
Related Requirements	FR – 01, FR – 02

Use Case 6: Apply Risk Factors

Actor	Admissions Counselor
Precondition	Risk factor checkboxes visible
Postcondition	Selected risk factors applied during scoring
Main Flow	Counselor selects risk factors → system applies during Analyze Student
Alternative Flow	No risk factors selected → system defaults to low risk
Related Requirements	FR-04, FR-06, FR-07

D. User Stories and Scenarios

The following are selected user stories that describe ways a user or an administrator can utilize the website, detailing what they want to accomplish and why and how the website (or its backend) will respond.

US-1: Input Student Profile
As a counselor, I need to input a student's profile so that I can record GPA, curriculum, country, essay, and risk factors for analysis.

Feature: Data Entry of Student Information
Scenario: Counselor inputs student profile
Given the counselor is on the "New Student Profile" page,
When they enter the student's GPA, curriculum, country, essay, and risk factors,
And click the "Submit" button,
Then the system validates all inputs and saves the student profile to the database.

US-2: Analyze Student
As a counselor, I need the system to compute a composite score including AI analysis so that I can evaluate student profiles efficiently.

Feature: Composite Scoring & AI Analysis
Scenario: Counselor performs analysis
Given the counselor is on a student profile page,
When they click the "Analyze" button,
Then the system validates the profile, computes scores using AI and predefined factors,
And displays a detailed factor breakdown on the screen.

US-3: View Essay Statistics
As a counselor, I need to view essay metrics so that I can quickly understand essay length, readability, and content size.

Feature: Essay Statistics Panel
Scenario: Counselor checks essay statistics
Given the counselor is on the essay section of a student profile,
When they click the “Stats” button,
Then the system calculates the number of characters, words, reading time, and other metrics,
And displays the results in a panel.

US-4: **Preview Essay**
As a counselor, I need to preview an essay in formatted, read-only mode so that I can review it without editing.

Feature: Formatted Read-Only Preview
Scenario: Counselor previews essay
Given the counselor is on the essay section,
When they click the “Preview” button,
Then the essay is formatted according to the system’s style and displayed in a read-only view.

US-5: **Clear Essay**
As a counselor, I need to reset the essay input field so that I can remove all text and start fresh.

Feature: Clear Essay Field
Scenario: Counselor clears essay
Given the counselor is on the essay input page,
When they click the “Clear” button,
Then the essay field is reset to empty.

US-6: Apply Risk Factors
As a counselor, I need to apply risk factors to a student profile so that they are accounted for in analysis.

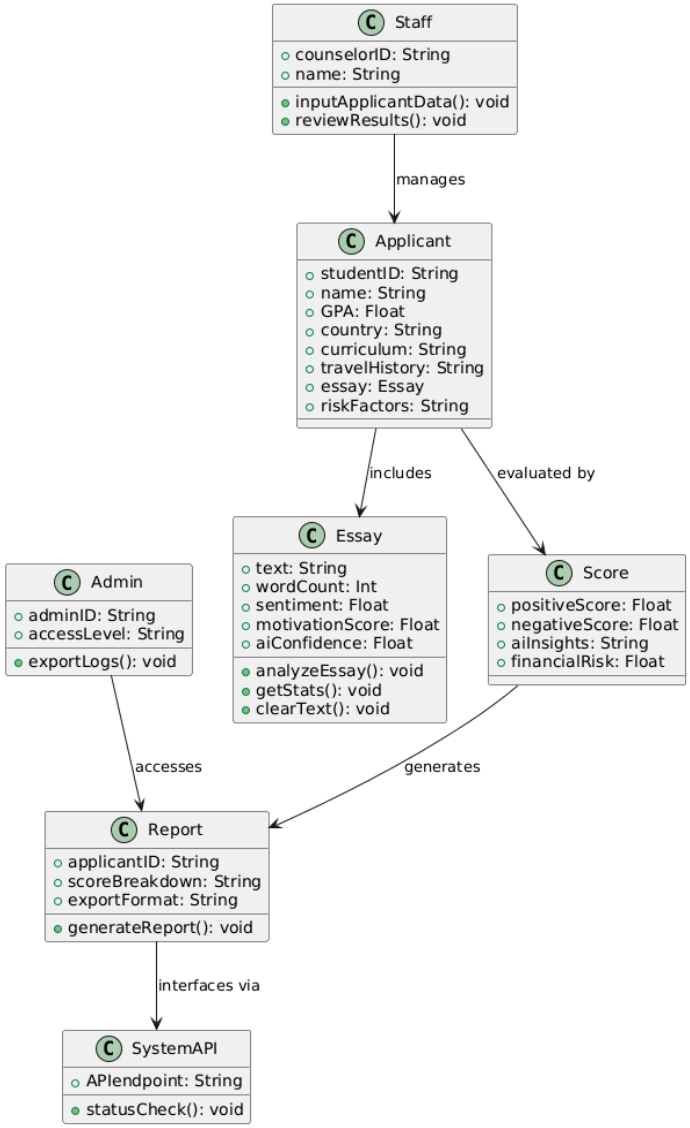
Feature: Risk Factor Selection and Deduction
Scenario: Counselor applies risk factors
Given the counselor is on the risk factors section,
When they select one or more checkboxes for applicable risk factors,
Then the system applies the deductions during the analysis process.

E. Class Diagram

The Class Diagram illustrates the key components of the International Applicant Rating Algorithm system, their attributes, methods, and the relationships between classes. It is designed according to software engineering standards to ensure clarity, modularity, and maintainability.

The diagram adheres to IEEE 1016 and IEEE 830 guidelines for documenting software architecture, providing a high-level structural view of the system while linking it to functional requirements and use cases. It also supports traceability, allowing developers and stakeholders to understand how classes implement specific features such as student data input, essay analysis, scoring, and risk factor management.

Figure 2: Class Diagram - International Applicant Rating Algorithm



F. Traceability Matrix

Functional Requirement	Related Use Cases	Related User Stories	Priority
FR-01: Input Student Data	UC-1	US-1	Level 0
FR-02: Field Validation	UC-1, UC-3, UC-4, UC-5	US-1, US-3, US-4, US-5	Level 0
FR-03: Essay Analysis with Fallback	UC-2	US-2	Level 0
FR-04: AI Insights	UC-2, UC-6	US-2,US-6	Level 1
FR-05: AI Fallback Support	UC-2	US-2	Level 0
FR-06: Positive Score Calculation	UC-2, UC-6	US-2,US-6	Level 0
FR-07: Negative Score Calculation	UC-2, UC-6	US-2,US-6	Level 0
FR-08: Composite Score Calculation	UC-2	US-2	Level 0
FR-09: Financial Risk Assessment	UC-2, UC-6	US-2,US-6	Level 0
FR-10: Results Presentation	UC-2, UC-3, UC-4	US-2, US-3, US-4	Level 0

G. Standards In Requirements

The International Applicant Rating Algorithm (IARA) follows several technical and ethical standards to ensure quality, fairness, and compliance throughout the system. These standards guide the structure of requirements, accessibility of the interface, and secure handling of student information.

Standard / Code	Domain	Description	Application in IARA
IEEE 830 – Software Requirements Specification (1998)	Software Documentation	Defines structure and content for requirements and specifications	Used to format functional/non-functional requirements, use cases, and traceability matrix
W3C WCAG 2.2 – Web Content Accessibility Guidelines	Web / UI Design	Ensures accessibility for users with visual or motor impairments	Applied contrast checks, alt text, and keyboard navigation for counselor interface
GDPR (2018) – General Data Protection Regulation	Data Privacy	Regulates how personal data is collected and stored	Implemented anonymized data storage and consent prompts before student information submission
FERPA (1974) – Family Educational Rights and Privacy Act	Educational Data Protection	Protects confidentiality of student records in academic systems	Ensures that applicant information is visible only to authorized counselors
IEEE 1016 – Software Design Description	Design Documentation	Provides standards for clear design structure and diagrams	Applied to class diagram and use case documentation for consistency
ACM Code of Ethics	Professional Conduct	Promotes fairness, accountability, and honesty in computing systems	Followed in AI scoring to avoid bias and ensure transparency in applicant evaluation

III. System Evolution

There are several key assumptions that the International Applicant Rating Algorithm is built on. First, it assumes that the admissions process for international students will continue to require a structured method for evaluating applicants based on their academic, financial, and behavioral factors. The system is designed around the assumption that admissions counselors will manually enter student data through the applications interface rather than direct database integrations. However, this system does anticipate and prepare future versions that may need to connect with Washington State University's Slate system. If Slate were to update how their data can be accessed or exported, then the system would need to update accordingly.

The system also assumes a stable internet connection for AI essay analysis. It further assumes that AI services will be available and compatible for future versions of the software. API costs or a change in AI policies could cause the team to need to change how AI is used. The system assumes that the current scoring model will continue to reflect stakeholder priorities. If the weighting criteria change, such as new behavioral metrics being added, the algorithms may need to be adjusted. Major revisions can affect the consistency of past scoring results. This is designed for long term use on modern browsers and does not need any special hardware or software requirements. Updates may need to be made to maintain performance and accessibility with future improvements such as clearer AI explanations, visual score trends, and connections to external applicant databases to make evaluations faster and easier.

IV. Glossary

- **AI (Artificial Intelligence):** enables machines to perform tasks requiring human intelligence, such as analyzing essays or generating recommendations.
- **API (Application Programming Interface):** a set of functions that allow software applications to communicate with external systems or services, such as AI models used for essay analysis.
- **Composite Score:** The final score generated by combining positive scores, negative deductions, and AI insight to evaluate an applicant's overall potential.
- **Essay Analysis:** The process where the system uses AI to evaluate a student's personal essay based on tone, motivation, relevance, etc.
- **Factor Breakdown:** A detailed summary showing how each academic, financial, and behavioral component contributes to an applicant's overall score.
- **Financial Risk:** calculated measure of if an applicant may face financial challenges based on indicators such as payment history.
- **Risk Factors:** applicant conditions (e.g., missing documents) that may negatively affect the final score.
- **Slate:** admission management system used by Washington State University to process and track student applications.

V. References

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