
TCU COMPUTER SCIENCE

**CLASSIFAI Instructional Effectiveness Tool
Software Requirements Specification**

Version 1.0

ClassifAI Instructional Equity Tool	Version: 1.0
Software Requirements Specification	Date: 05/06/2024

Revision History

Date	Version	Description	Author
11/01/2023	0.1	Initial Draft. Includes purpose and scope of project.	John Nguyen
05/06/2024	1.0	Final draft. Includes all required information.	Jaxon Hill

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Software Requirements Specification

1. Introduction

1.1 The Purpose of ClassifAI

The purpose of ClassifAI is to provide instructors a way to measure their lecture instructional effectiveness through classroom engagement. It provides automatic transcription, summarization, and question categorization (based on costa level) through Artificial Intelligence (AI). Using AI speeds up the analysis process instead of the instructor having to generate a transcript manually and analyze its contents. With ClassifAI, a few clicks offers a suite of services within seconds!

1.2 The Purpose of this Document

This purpose of this document is to describe the functional and nonfunctional requirements for software release 1.0 of the ClassifAI system. Its role is to describe the problem to be solved, not the solution: what the system must do, not how. This document is intended to be used by the members of the project team who will implement and verify the correct functioning of the system. Unless otherwise noted, all requirements specified here are committed for release 1.0.

1.3 Product Scope

Product scope provided in the ClassifAI Vision and Scope Document [2]

1.4 Definitions, Acronyms, and Abbreviations

Definitions, acronyms, and abbreviations provided in the ClassifAI Glossary [1]

1.5 References

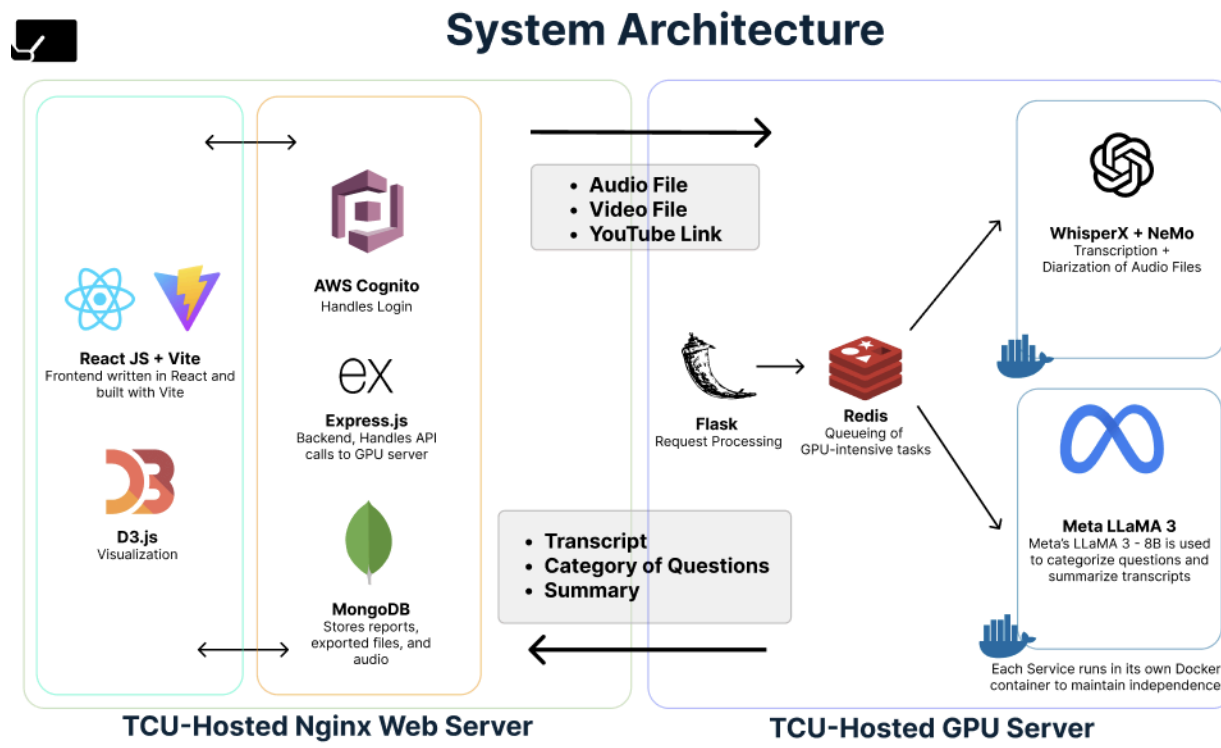
1. ClassifAI Glossary
<https://docs.google.com/document/d/1lEVZvjTh0QyJptfb0WdclhNSuLnkbtg/edit?usp=sharing&oid=103223789369158626001&rtpof=true&sd=true>
2. ClassifAI Vision and Scope Document
<https://docs.google.com/document/d/18z2YCrV5iPMysDiaPw4swa0SFzvJuolq/edit?usp=sharing&oid=103223789369158626001&rtpof=true&sd=true>
3. ClassifAI Use Cases
<https://docs.google.com/document/d/1G4alGDudgNQSX2J5MN2lvO1HudqlqqFAR1WzcvQKmfA/edit?usp=sharing>

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2. Overall Description

2.1 Product Perspective

ClassifAI is a new software system that replaces the current manual methods of transcribing and analyzing recorded lectures. The system architecture diagram illustrates the external entities and system interfaces for release 1.0. The left panel in blue represents the frontend, the orange represents the backend, and the right side represents the Artificial Intelligence module. The system is expected to evolve over several releases, improving upon the Artificial Intelligence Models in the TCU-Hosted GPU Server.



2.2 User Classes and Characteristics

User class	Description
Instructor	An instructor may be a regular user of ClassifAI. They will use the transcript, summarization, and question categorization visualizations to measure their lecture engagement.
Student	Students may use this product to generate transcripts and lecture summaries for notetaking.
General Public	Any ordinary person may use this product to speed up their recording analysis,

2.3 Operating Environment

OE-1: ClassifAI frontend and backend database will run on Texas Christian University's classifai.tcu.edu Nginx webserver as two services.

OE-2: ClassifAI worker machine will run on Texas Christian University's llm.cs.tcu.edu GPU server as a service.

OE-3: ClassifAI shall permit user access from the internet.

OE-4: The worker machine permits the ClassifAI Nginx server access but restricts outside user access.

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2.4 Design and Implementation Constraints

CO-1: The frontend framework will be React.js and built with Vite

CO-2: Express.js must be used as the backend programming language.

CO-3: The worker machine will be run as a Python Flask app

2.5 Assumptions and Dependencies

AS-1: ClassifAI's TCU webserver and GPU server will remain available and running.

AS-2: AWS Cognito's API does not change.

DE-1: The transcription, summarization, and question categorization depends on the llm.cs.tcu.edu GPU server service to be running and working.

DE-2: Saving reports and files depends on the Express.js webservice and MongoDB to be running.

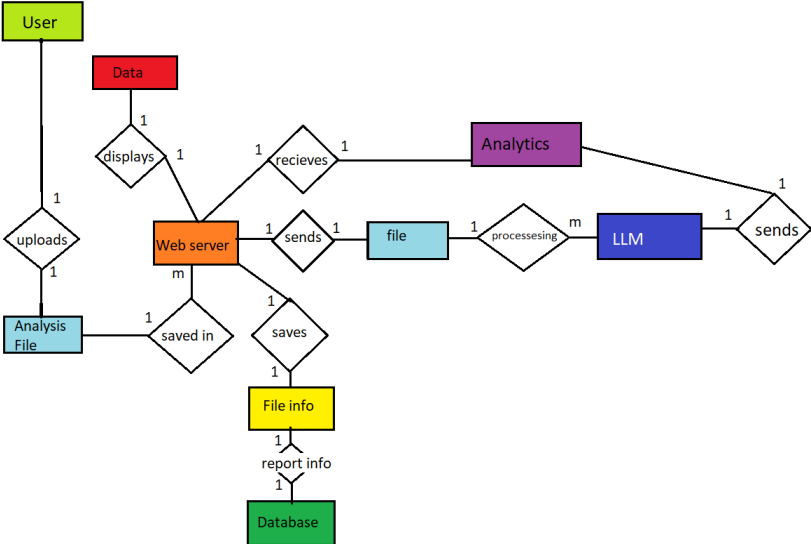
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3. Specific Requirements

Use cases are covered in use cases document [3]

4. Data Requirements

4.1 Logical Data Model



4.2 Data Dictionary

Report Object:

Data Element	Description	Data Type
audioDate	Date and time audio took place	String
audioFile	File name of uploaded file	String
file	Array of string file paths associated with a report	String []
fileName	Array of length 1 containing the audioFile name (id for file)	String []
gradeLevel	Grade associated with a report	String
reportId	Auto generated unique identifier for a report entry	String
reportName	User defined report name	String
subject	User defined subject of report	String
transferData	Object returned from GPU server containing string of file name,	Object

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	job_id (string), job_type (enum), progress (enum), message (string)	
userId	Email of user account	String

4.3 Reports

MongoDB Report JSON:

```

audioDate: "04-16-2024 22:26:54"
audioFile: "court_audio (9).mp3"
file: ['uploads/j4nguyen134@gmail.com/1713324414908_ducfgi/court_audio (9).mp3']
fileName: ['court_audio (9)']
gradeLevel: "8"
reportId: "1713324414908_ducfgi"
reportName: "Court Audio"
subject: ""
transferData: {fileName: 'court_audio (9).mp3', job_id:
'1e3a4413-a40e-40e1-a8c4-ad3002a645fc', job_type: 'analyze', progress: 'completed',
message: 'Analysis completed', ...}
userId: "j4nguyen134@gmail.com"

```

Worker Machine JSON:

```

{
  "meta": {
    "job_id": "3c73dd07-66ff-48ab-9f4e-e6726987c06f",
    "job_type": "transcription",
    "message": "Aligning audio",
    "status": "aligning"
  },
  "status": "started"
}

```

4.4 Data Acquisition, Integrity, Retention, and Disposal

DR-1: ClassifAI shall retain account data for 1 year following account generation

DR-2: ClassifAI shall retain reports for 6 months following a report generation. This is using local data. After 6 months, reports may be cleaned to save space.

DD-1: ClassifAI will dispose of data should the user wish to delete their reports or files

DA-1: Training data for fine-tuning AI acquired from Clients

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5. External Interface Requirements

5.1 User Interfaces

UI-1: ClassifAI shall conform to TCU standards of usage

UI-2: ClassifAI shall have navigation from both mouse and keyboard

UI-3: ClassifAI shall exhibit redundancy so there are multiple ways to get to at least 50% of pages.

5.2 Software Interfaces

ClassifAI shall transfer login information to AWS Incognito for sign in.

ClassifAI shall get data from YouTube to download youtube videos. No sensitive data is sent besides the URL.

ClassifAI shall download models from HuggingFace. No sensitive data is sent besides the model name.

5.3 Hardware Interfaces

No hardware interfaces have been identified

5.4 Communications Interfaces

CI-1: ClassifAI shall send an email upon sign up to confirm email. Similarly, with password reset.

CI-2: ClassifAI is a web portal with standard HTTPS communication protocol. All information is sent locally, except for login, which is handled through AWS.

There should be no other communications. ClassifAI does not keep passwords locally.

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6. Quality Attributes

6.1 Usability

USE-1: Within six months of release, 60% of ClassifAI users have utilized advanced features such as customizable reports at least once.

6.2 Performance

PER-1: ClassifAI shall accommodate a maximum of 100 users during peak times, with an estimated waiting time of less than 15 minutes.

PER-1: ClassifAI shall be robust enough to have an average wait time of under 2 minutes from submission to report generation, given a 30 minute video.

6.3 Security

SEC-1: All user data shall be kept locally and not given to other services or used for training.

SEC-2: Users shall be required to log on to ClassifAI for viewing their own files.

6.4 Availability

AVL-1: ClassifAI achieves an uptime of 99% within the first year of release, ensuring uninterrupted access to the platform for users.

6.5 Robustness

ROB-1: If the page is refreshed while a report is being generated, it shall continue its generation.

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7. Internationalization and Localization Requirements

To ensure the success of ClassifAI in a global educational landscape, careful consideration must be given to internationalization and localization requirements. This necessitates adapting the product for diverse languages, regional differences, and regulatory requirements.

Key Areas of Focus:

- **Language Support:** ClassifAI must handle multiple languages fluidly. This includes:
 - **Translation:** User interface elements, help documentation, and any generated text content need accurate translations.
 - NOT DONE THIS ITERATION.
 - **Character Encoding:** Support for character sets like UTF-8 is crucial to display various languages correctly.
 - **Text Direction:** Accommodate right-to-left languages (e.g., Arabic, Hebrew).
- **Transcription Model Flexibility:** Since accents and dialects vary globally, different language variants of WhisperX or similar speech-to-text models may be needed for optimal transcription accuracy.
- **Question Categorization Adaptability:** Costa's Levels of Thinking and educational frameworks can differ between countries. The ability to fine-tune the classification model, or potentially utilize different models based on region, ensures culturally relevant analysis.
 - NOTE: never got to this- question categorization is only fine tuned in english. Summaries are similarly provided in english, although they are accurate.
- **Data Formatting:** Regional variations in date, time, number, and currency formatting must be handled correctly.
- **Regulatory Compliance:** ClassifAI must adhere to data privacy laws like the EU's GDPR and regional regulations concerning the storage and handling of student data.
- **Cultural Sensitivity:** Design elements, examples, and terminology should avoid inadvertently causing offense or misunderstandings within target markets.