Risk Management Plan

RajaMark

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Approvals

Approved Date	Approved Version	Approver role	Approver

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Project Description

Rajamark is an innovative automated grading system that leverages Optical Character Recognition (OCR) technology to streamline the assessment process of handwritten multiple-choice question (MCQ) answer sheets. This system aims to address the challenges inherent in the traditional manual grading process, which is notoriously labor-intensive, error-prone, and subject to human bias, thus causing significant inefficiencies and inconsistencies in the evaluation of student responses. By deploying Rajamark, educational institutions can look forward to a transformative change in how assessments are conducted.

Currently, the manual grading of handwritten MCQ answer sheets involves several cumbersome steps: examiners must individually read each response, determine the correct answers, and manually tally the scores, often double-checking to prevent errors. This process is not only slow but also subject to inconsistencies as fatigue or distraction can lead to mistakes in scoring. Moreover, the manual method poses challenges in maintaining a consistent standard of grading when multiple examiners are involved, leading to potential discrepancies in student evaluations.

The introduction of the Rajamark automated grading system promises to revolutionize this traditional approach. Utilizing advanced OCR technology, Rajamark automatically scans and reads handwritten entries with high precision. The system then processes these entries, accurately aligning answers to their corresponding questions based on a predefined answer key. Once alignment is confirmed, Rajamark calculates the scores for each answer, compiling these into a final grade for each student which is then recorded in a summary report. This report not only shows the scores but can also provide insights into overall class performance, highlighting areas where students may need additional support or instruction.

By implementing Rajamark, educational institutions can achieve a much higher degree of operational efficiency, significantly reducing the manpower and hours traditionally required for grading. This automation also ensures a higher level of

objectivity in scoring, as it eliminates the subjectivity and variability introduced by human graders. Ultimately, Rajamark aims to ensure that educational assessments are more reliable, time-efficient, and less prone to errors, thereby improving the overall quality of education provided to students.

For a more detailed explanation and objectives, please refer to System Design Document.

Risk Identification

No.	Risk Event	Description
1	Inaccurate Training Data	The quality of the OCR system heavily relies on the training data. If the training data doesn't encompass a wide variety of handwriting styles, the system might struggle with real-world MCQs.
2	Data Security	If the MCQ answer sheets contain sensitive information, a data breach during storage or processing could be a major security risk.
3	Poor Image Quality	Scanned images might be of poor quality due to various factors like scanner settings, lighting, or paper quality, which could significantly affect OCR accuracy.
4	Character Recognition Challenges	Handwritten characters can be ambiguous and prone to misinterpretation. The OCR system might struggle with specific characters or writing styles.
5	Integration Issues with External Systems	The OCR system might not integrate seamlessly with existing scoring or educational platforms.
6	Unclear Requirements	Inaccurate or incomplete understanding of user needs and functionalities could lead to development of features that are not valuable.
7	Lack of OCR Expertise	The Scrum team might lack specific expertise in OCR technology or educational assessment systems, leading to development challenges
8	Frequent Changes and Branch Management	Managing frequent updates and changes without introducing bugs or affecting existing functionalities can be challenging. Also, inefficient branch management strategies could lead to integration issues, especially when parallel developments are ongoing.
9	Code Quality Issues	Under pressure to meet deadlines, especially in a Scrum environment, developers might rush to complete features, leading to shortcuts and compromises in code quality.
10	Unforeseen Technical Challenges	The development team might encounter unforeseen technical hurdles during

		development, causing delays in completing user stories within the sprint timeframe
11	Overly Optimistic Time Estimates	Underestimating the complexity of tasks during sprint planning can lead to missed deadlines and incomplete functionalities.
12	Unfamiliarity with MCQ Handwriting Variations	The team might underestimate the variability in handwriting styles encountered in MCQ answers, impacting the accuracy of the OCR system.
13	Promotional Strategy Failures	Ineffective advertising strategies could fail to reach or convince the target audience of the product's value.

Table 1.1: Table of Risk Identification

Project Risk Assessment

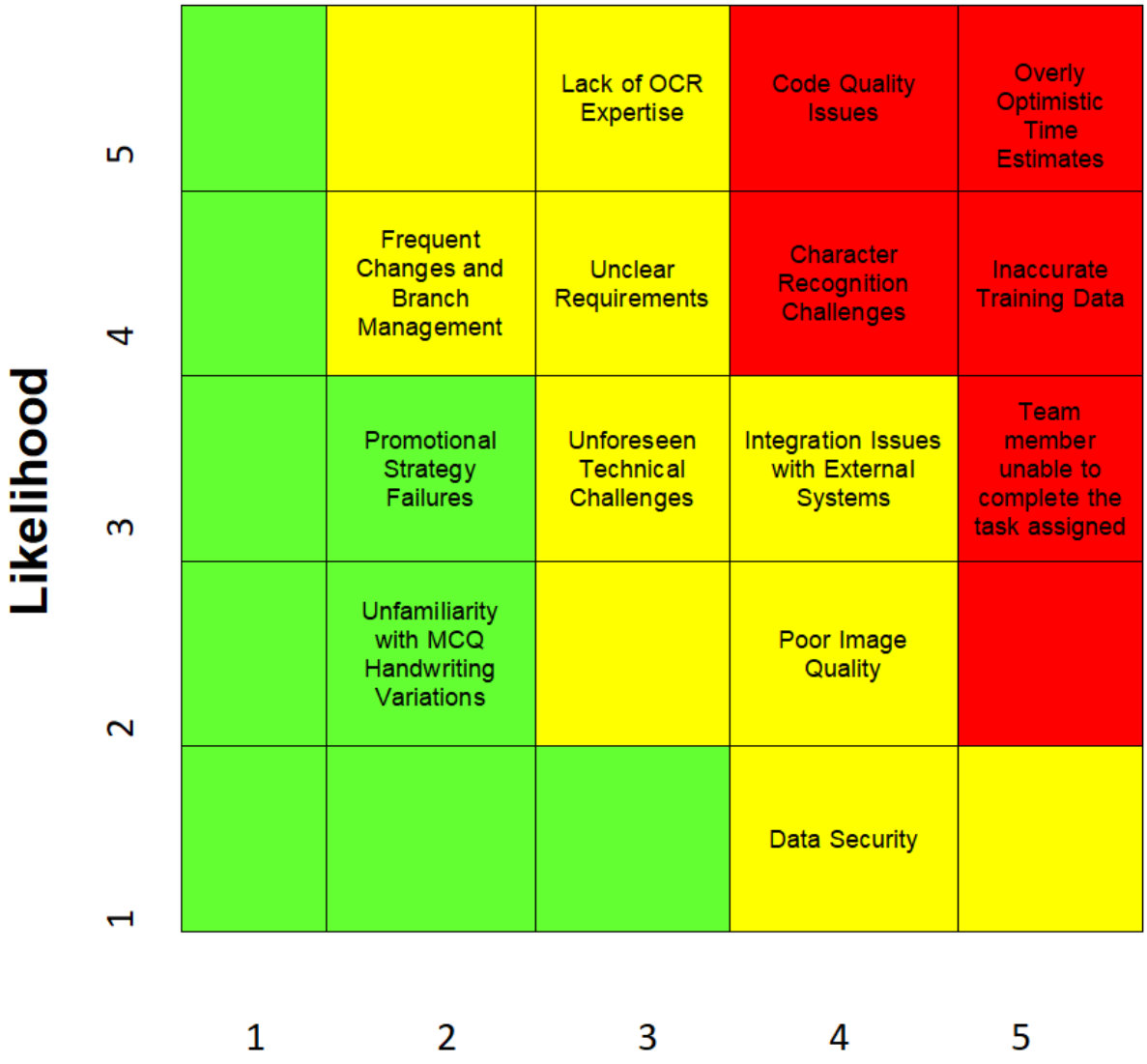
Rating: 1 - Low, 3 - High

Risk Event	Likelihood	Impact	Detection Difficulty	When	Owner of Risk
Inaccurate Training Data	2	2	1	Data Training & Development	OCR Integration Team
Data Security	2	3	1	Data Handling & System Integration	Database Management Team
Poor Image Quality	2	3	1	Development	Image Preprocessing Team
Character Recognition Challenges	3	2	1	Development	OCR Integration Team
Integration Issues with External Systems	1	2	1	System Integration	System Design Team
Unclear Requirements	2	3	1	Sprint Planning	- Project Management and Documentation Team - Functional Testing Team - Non-Functional Testing Team
Lack of OCR Expertise	3	3	1	Team Formation & Development	OCR Integration Team
Frequent Changes and Branch Management	2	1	1	Development	Quality Assurance Team - Version Control
Code Quality Issues	3	3	1	Development	Quality Assurance Team - Standards and Compliance

Unforeseen Technical Challenges	2	3	3	Throughout Development	- Image Preprocessing Team - Algorithm Development Team - OCR Integration Team
Overly Optimistic Time Estimates	3	1	1	Sprint Planning & Estimation	- Project Management and Documentation Team - UI Development Team - Desktop - UI Development Team - Web/Mobile
Unfamiliarity with MCQ Handwriting Variations	2	3	2	Development & Testing	OCR Integration Team
Promotional Strategy Failures	2	2	1	Advertising	Marketing Team

Table 1.2: Table of Risk Assessment

Project Risk Response Matrix



	Red zone (major risk)
	Yellow zone (moderate risk)
	Green zone (minor risk)

Risk Response Plan

Risk Events	Risk Response
Inaccurate Training Data	**OCR Integration Team**: Manually review the training dataset to correct errors in labels or features.
Data Security	**Database Management Team**: Implement stringent security protocols such as encryption, secure access controls, and regular security audits to protect sensitive information.
Poor Image Quality	**Image Preprocessing Team**: Develop robust preprocessing algorithms that can enhance image quality and normalize conditions like lighting and contrast. no
Character Recognition Challenges	**OCR Integration Team**: Implement advanced machine learning algorithms that can better recognize ambiguous or complex handwriting.
Integration Issues with External Systems	**System Design Team**: Plan for modular architecture that allows for easier integration and testing of external systems.
Unclear Requirements	**Project Management and Documentation Team, Functional Testing Team, Non-Functional Testing Team**: Adopt agile methodologies that embrace change and facilitate regular communication between the development teams and stakeholders to ensure alignment and quick adaptation to changes and new requirements.
Lack of OCR Expertise	**OCR Integration Team**: Find related documentation and tutorial to learn about the knowledge, consider to consult from expert if required.
Frequent Changes and Branch Management	**Quality Assurance Team - Version Control**: Utilize robust version control systems and enforce a branch management strategy that includes code reviews and automated testing.
Code Quality Issues	**Quality Assurance Team - Standards and Compliance**: Establish and enforce coding standards; conduct regular code reviews and pair programming sessions to maintain quality.
Unforeseen Technical Challenges	- **Image Preprocessing Team**: Implement testing strategies such as unit testing to test individual components or functions of the OCR system to ensure they perform as expected in isolation; integration testing to ensure that various components of the OCR system work together correctly; usability testing to ensure that the

	OCR system is user-friendly and meets the needs of its end users. - **Algorithm Development Team**: Generate synthetic data that can mimic potential unforeseen challenges and use this data for continuous training and refining of algorithms. - **OCR Integration Team**: Develop and maintain fallback mechanisms that can temporarily handle OCR tasks should the primary OCR integration face unexpected challenges.
Overly Optimistic Time Estimates	- **Project Management and Documentation Team**: Use detailed sprint planning and include buffers for unforeseen delays. Buffer time can help absorb the impact of underestimated tasks without disrupting the overall timeline. - **UI Development Team - Desktop**: Break down the UI development into smaller, manageable components or features, allowing more precise time estimates and focused development efforts. - **UI Development Team - Web/Mobile**: Use established frameworks like Bootstrap or Foundation that provide ready-made components and grid systems to speed up the responsive design process.
Unfamiliarity with MCQ Handwriting Variations	**OCR Integration Team:** Regularly update and train the OCR model with new handwriting samples to improve its understanding and accuracy.
Promotional Strategy Failures	**Marketing Team**: Research the target market thoroughly; test marketing strategies on a small scale before full deployment to gauge effectiveness.
Team member unable to complete the task assigned	**All teams:** Reassign the incomplete tasks among other team members who have the capacity and the necessary skills. Also, the teams should maintain clear and open lines of communication with all team membersby inform them about the situation and the steps being taken to address it, thus managing expectations.

Production Environment Risk

Risk Event	Description	Owner of Risk
Quality of Input Images	Poor image quality due to low resolution, bad lighting, or artifacts (like smudges and creases) can severely degrade the performance of OCR systems. The system must be robust enough to handle diverse and poor-quality inputs.	Image Preprocessing Team
Integration Complexity	Integration with existing systems (such as databases and other applications) can pose significant challenges, particularly if these systems have outdated or incompatible interfaces.	System Design Team
Security Risks	Handwritten documents may contain sensitive information. Ensuring data security against unauthorized access and breaches is critical.	Database Management Team
Model Overfitting	Training models on a limited or non-representative dataset can lead to overfitting, where the model performs well on training data but poorly on unseen, real-world data. Ensuring the model generalizes well requires a diverse and comprehensive dataset.	Algorithm Development Team
Insufficient development time	Rushed project timelines can place undue stress on developers, leading to burnout and reduced morale. This not only affects the productivity and quality of the current project but can also have long-term impacts on team performance and retention.	Project Management and Documentation Team

Potential Impact of Code Quality Issues

Impact	Description
Reduced Accuracy and Reliability	Poorly written code can lead to logical errors or implementation flaws that degrade the accuracy of OCR readings. This could manifest as incorrect character recognition, misinterpretation of handwriting styles, or failure to read under varied conditions (like different lighting or angles). High error rates in OCR output can result in mistrust of the system and reduced user reliance.
Increased System Downtime	Bugs and other code issues can cause frequent crashes or system halts, leading to increased downtime. In a production environment, especially where document processing is time-sensitive (like in financial or legal sectors), downtime can have serious repercussions including operational delays and loss of business.
Difficulty in Maintenance and Scalability	Code that is not well-organized, lacks documentation, or does not adhere to coding standards can be difficult to maintain or modify. This becomes particularly problematic when updating the system to handle new types of handwriting or to improve recognition algorithms. Additionally, poorly structured code can hinder the system's ability to scale efficiently as user demand increases.
Compromised Data Integrity	Errors in code can cause problems in data handling, leading to corrupted data outputs. For an OCR system, this could mean incorrect text output that might not only require reprocessing but also lead to incorrect data storage and analysis.
Poor User Experience	If the OCR system has a user interface (UI), code quality issues can result in a clunky, unresponsive, or error-prone UI. This negatively affects the user experience, making the system frustrating and potentially difficult to use, which may deter users from fully adopting the technology.

People Risk Management

Risk	Description
Availability Risks	Availability risks arise when key project team members are unable to fulfill their roles due to various reasons such as illness, resignation, or conflicting commitments. This can delay project milestones if no suitable replacements are found promptly.
Skill Mismatches	Skill mismatches occur when team members do not have the necessary skills or expertise required for their assigned tasks. This can lead to poor quality work, increased project costs, and delays.
Communication Risks	Communication risks involve failures or inefficiencies in the exchange of information among project team members or between the team and stakeholders. Poor communication can result in misunderstandings, conflicts, and errors.
Team Dynamics	Team dynamics refer to the interpersonal relationships and interactions within the project team. Poor team dynamics, such as conflict or lack of collaboration, can undermine project performance.
Team member unable to complete the task assigned	If a team member is unable to complete an assigned task, this can lead to several project issues, including missed deadlines, potential bottlenecks in workflow, lowered team morale, and possibly compromised project quality.

People Risk Response Plan

Risk Events	Risk Response
Availability Risks	● Maintain a flexible approach to staffing, with options for quickly onboarding additional or temporary staff. ● Build redundancy into the team by ensuring that more than one person is familiar with critical roles and tasks.
Skill Mismatches	● Regularly perform skills assessments to identify gaps and mismatches via WhatsApp chat and regular meeting.
Communication Risks	● Develop and implement a robust communication plan that defines how information is shared. For instance, create a project timeline spreadsheet to allow all the team members access so that all members able to understand the progress of the project clearly. ● Utilize appropriate communication tools and technologies to facilitate seamless communication such as WhatsApp Community. ● Schedule regular meetings and updates to ensure all team members and stakeholders are aligned.
Team Dynamics	● Establish clear procedures for conflict resolution to address issues promptly and fairly in group contract. ● Promote a positive project culture that values respect, inclusivity, and teamwork.
Team member unable to complete the task assigned	● Implement regular performance reviews and feedback sessions to monitor progress and address issues early. ● Provide additional support, mentoring, or assistance to struggling team members.