**Quality Check of engineering documents for ingenia**

**Project Plan**

Vinit Dave

Sindhuja Reddy

Sujan Gaha Magar

Madeline Coldy

Li Guan

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## Executive Summary

The goal of this project is to create a comprehensive design and specifications document that outlines the requirements for performing the documentation for the digitalisation of checklists, investigation report for the automation of checklist tasks, adaptable project plan, technical prototypes, integration documentation, and strategies. To digitalize the checklist and carry out collaborative work across many sections, we are utilising Figma to develop a mock-up of the automated checklist. By using Figma, we will create detailed wireframes that precisely depict the design and functioning of your paper-based checklist. For all stakeholders, we want to ensure a seamless change from manual to digital. This project resolves the problems and downsides that result from manually reviewing engineering documentation, including time consumption, human error, inaccuracy, and inconsistent results. Additionally, it expands the organization's use of limited automation. The project work is expected to be finished over the timeframe of 13 weeks, and a budget of $50,000 has been set up for it.

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## Project Background and Description

### **Overview and Context**

Ingenia is a distinguished consulting firm headquartered in South Australia, specializing in offering innovative and holistic business solutions to a diverse clientele. Renowned for its commitment to excellence, creativity, and professionalism, Ingenia is a trusted partner for businesses seeking strategic guidance, operational enhancement, and technological progress. The company's adaptability to various aspects such as technological advancements, industry diversity, economic shifts, and global connectivity positions it as an invaluable collaborator for businesses navigating challenges and opportunities in South Australia's evolving business landscape.

### **“Quality Check of Engineering Documents" Initiative and Challenges**

The "Quality Check of Engineering Documents" project is a pivotal endeavour within Ingenia's framework. It focuses on guaranteeing precision, uniformity, and compliance of engineering documents. By implementing a comprehensive review process encompassing technical specifications, design drawings, schematics, and reports, the project ensures alignment with industry standards, regulatory requisites, and internal guidelines. This initiative addresses the significance of accurate documentation, particularly in multifaceted engineering projects involving diverse data sources, aiming to automate verification through natural language processing and data integration.

The initiative's significance to Ingenia's operations is substantial. As a consultancy specializing in strategic guidance, technological solutions, and operational excellence, Ingenia's success hinges on the quality and precision of engineering documents it manages on behalf of clients. This importance is underscored through factors such as maintaining reputation and credibility, mitigating risks and errors, and ensuring adherence to regulatory standards. By consistently delivering accurate and high-quality engineering documentation, Ingenia fosters client contentment, effective communication, operational efficiency, and long-lasting partnerships.

### **Project Contributions**

The core objectives of the "Quality Check of Engineering Documents" project are to ensure document accuracy, consistency, and compliance. To ensure that the list of drawings checks can be performed more efficiently, checklist automation could be required. Creation of requirements and design documents for the installation of an app to handle engineering document checklists for the digitalisation of checklists. We are using Figma to provide the app as a mock-up for demonstration purposes. We are investigating how the use of cutting-edge technology like AI (Artificial Intelligence) to automate checklist activities could be helpful. The final product will be a report outlining current technologies and how they might be applied to the given tasks. Improved tracking and assistance in the quality of engineering results, such as reports and drawings, will be a major benefit to the organization. Creating a platform where it is also possible for users to store and organise files, monitor changes as well as create quality metrics reports is beneficial to the company to reduce the number of steps in the checklist workflow.

## Project Scope

The approach for this project revolves around two pivotal tasks digitalization of your existing quality checklist and research automation opportunities that collectively redefine your quality assurance practices. Before delving into the specifics of these tasks, let us understand the intricacies of your current process, identifying its strengths, limitations, and areas for enhancement.

### **Current Process Overview: (AS IS Process Analysis)**

The current workflow for engineering document quality assessment relies on manual procedures and reviewer expertise. Here is a comprehensive look at the existing process:

* Manual Quality Assessment: The heart of the process lies in the manual review of engineering deliverables, including reports and drawings. Expert reviewers meticulously analyse documents against a predetermined checklist, evaluating aspects such as formatting, content accuracy, and adherence to industry standards. Drawboard Tool is used for annotating pdf engineering documents.
* Reviewer Dependency: The quality assessment heavily depends on individual reviewers' expertise and availability. This introduces variations in evaluation methods, feedback, and timelines, often leading to inconsistencies in document evaluations.
* Limited Automation: Automation is limited to basic tracking and notifications. For instance, reminders for incomplete assessments or tracking overdue checklists are managed manually, potentially leading to delays and oversights.
* Documentation Challenges: Physical copies and scattered digital files serve as repositories for documents, hampering efficient version control and retrieval. This lack of a centralized repository results in confusion and inefficiencies, particularly when multiple stakeholders are involved.
* Collaboration Hurdles: Collaboration among stakeholders, including reviewers and engineers, is hindered by the absence of integrated collaboration tools. Marking up drawings, exchanging feedback, and real-time interactions are typically handled outside the formal assessment process.
* Reporting Bottlenecks: The process of tracking progress and generating reports on document quality metrics is time-consuming and labour-intensive. Extracting insights into the overall quality of engineering deliverables is challenging due to manual reporting methods.

As we delve into the AS-IS analysis, we recognize these challenges as the catalyst for our two transformative tasks.

Task 1, involves the digitalization of your existing quality checklist, rendering it into an intuitive, user-friendly format using Figma wireframes or Online Forms Tools. This move aims to streamline the assessment process and enhance user experience.

Task 2, on the other hand, revolves around researching automation opportunities that could elevate your assessment procedures.

The project scope of the "Ingenia - Engineering Document Quality Application," has been meticulously structured to drive efficiency and accuracy into your engineering deliverable evaluations. Divided into two pivotal tasks, each with distinct goals, this project is poised to redefine how you assess and ensure document quality.

### **Digitalization of Quality Checklist**

In this task, we will embark on the process of seamlessly transforming your existing paper-based quality checklist into a dynamic and interactive digital format. Every facet of this task is orchestrated to ensure a smooth transition and enhanced user experience:

* Tool Selection: We shall use Figma/Online Forms, for a versatile design and prototyping. Figma's collaborative nature aligns seamlessly with our approach, allowing us to craft wireframes that replicate your existing checklist visually.
* Wireframe Creation: Leveraging Figma's capabilities, we will create meticulously detailed wireframes that replicate the structure and functionality of your paper-based checklist. Dropdowns, checkboxes, and other elements will be thoughtfully recreated, mirroring the familiar format.
* User-Centric Design: The wireframes will prioritize user experience through intuitive navigation, clear instructions, and responsiveness across devices. Our design will provide a natural transition for users accustomed to the paper checklist.

### **Research on Automation of Checklist Tasks**

Built upon the digitalized checklist infrastructure, this task delves into exploring the potential of automation technologies to streamline and enhance quality assessments:

* Thorough Automation Exploration: We will conduct a meticulous exploration of automation technologies, encompassing machine learning, natural language processing, and image recognition. Our goal is to identify technologies that align with your unique requirements.
* Feasibility and Applicability Analysis: Every automation possibility will be analysed to assess its feasibility and applicability to specific checklist items. Complexity, accuracy, and potential benefits will be meticulously weighed.
* In-Depth Documentation and Recommendations: Our findings will be documented in a comprehensive report. This report will not only outline the research process and outcomes but will also provide actionable recommendations for integrating automation where it can make the most substantial impact.

### **Project Inclusions**

* A meticulously designed digital checklist, created using Figma wireframes, fostering a user-centric and intuitive experience.
* Thorough research into automation technologies, accompanied by documented findings and recommendations/solution design document (Refer to Deliverables Section for more details on Documentation).

### **Project Exclusions**

* Full-scale implementation of automation for all checklist items (limited to research and recommendations) with the working application.
* Integration of dashboard with Drawboards.

## Risks

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk** | **Probability (out of 100%)** | **Impact** | **Mitigation Strategy** |
| Lack of technical expertise | 70% | High | Research, mentor guidance, contact clients and having regular meetings, dividing tasks based on strengths. |
| Misalignment with project goals | 20% | High | Regular alignment checks with mentors and clients, and clear documentation of goals and requirements. |
| Changes in the project scope | 20% | Medium | Re-negotiating project scope, and consulting with mentors. |
| Client’s availability | 20% | High | Reach out to a representative |
| Unexpected circumstances | 10% | Medium | Seek mentor advice, have a risk management plan in place |

## Budget

The estimated budget has been calculated with consideration for essential development resources, server hosting, quality assurance efforts, integration with drawboard and user experience improvements. It provides a solid foundation for delivering a robust and user-friendly engineering document quality application that fits Ingenia's requirements.

**Note**: The below figures are in reference to costing data available on Fiverr/Upwork (<https://www.fiverr.com> or <https://www.upwork.com>) freelancing portals and Cloud Server Hosting Platforms like AWS (<https://aws.amazon.com>).

|  |  |  |
| --- | --- | --- |
| **Budget Item** | **Estimated Cost** | **Justification** |
| Software Development Resources | $25,000 | Allocation for skilled developers, UX/UI designers, and QA (Quality Assurance) testers to create the application. |
| Server Hosting and Maintenance | $5000 | Provisioning and maintaining servers for hosting the application, ensuring reliability and security. |
| Integration with Drawboard Projects | $3000 | The cost associated with integrating the app with Drawboard, expanding collaboration capabilities. |
| Quality Assurance and Testing | $6000 | Investment in rigorous testing to ensure the application's functionality, security, and user experience. |
| User Interface/Experience Enhancement | $4000 | Budget for refining the app's design, optimizing user flows, and ensuring an intuitive user experience. |

## Roles and Responsibilities

|  |  |  |  |
| --- | --- | --- | --- |
| **Role** | **Student** | **Responsibility** | **Rationale** |
| Requirements Analyst | Madeline Goldy | Collecting and analysing requirements | Strong analytical and communication skills. |
| Documentation & Process Analyst | Sindhuja Reddy | Document all processes, findings, and strategies, ensure clarity and coherence in documentation, and review and revise, as necessary. | Ensures thorough and coherent documentation of all processes. |
| Prototyping Specialist | Li Guan | UI design, proof-of-concept/mock-up with Figma | Creative mindset and experience in UI design tools. |
| Research and Development Lead | Sujan Gaha Magar | Conduct in-depth research on OCR and digitalization and guide the team on technical aspects. | Background in research, apt for understanding OCR and digitalization. |
| Project Manager & Workflow Designer | Vinit Dave | Project coordination, swim lanes diagram. | Leadership qualities and ability to oversee multiple aspects |

#### **Communications Plan**

##### **Purpose**

To establish clear and consistent communication among all stakeholders involved in the Ingenia project, including clients, mentors, team members, and others.

**Target Audience and Communication Details**

1. Client Communication

* **Purpose**: To update the client on project status, gather feedback, and align expectations.
* **Method**: Zoom call, email updates, formal reports.
* **Frequency**: Bi-weekly meetings, monthly reports.

2. Mentor Communication

* **Purpose**: To seek guidance, validate project direction, and ensure adherence to best practices.
* **Method**: Zoom call, email communication, Microsoft Teams.
* **Frequency**: Weekly meetings, or as needed, weekly progress reports.

3. Team Members' Communication

* **Purpose**: To ensure alignment, collaboration, task tracking, and addressing any issues.
* **Method**: Weekly team meetings, collaboration tools like Microsoft Teams, WhatsApp messaging app
* **Frequency**: Weekly for team meetings, or as needed.

**Documentation**

* **Communication Logs**: Maintain logs of all formal communication, including meeting minutes and email correspondence.
* **Collaboration Platform**: Utilize a platform like Microsoft Teams to store all project-related documents and facilitate collaboration.

**Contingency Planning**

* **Alternative Communication Methods**: phone call.

**Review and Adjustments**

* **Regular Review**: Assess the effectiveness of the communication methods and make necessary adjustments.
* **Stakeholder Feedback**: Regularly seek feedback from all relevant parties on communication preferences and adjust as needed.

#### **Project Stakeholders**

|  |  |
| --- | --- |
| **Stakeholder** | **Interest or Concerns** |
| **End User (Future Stakeholder)** | Requiring a user-friendly interface, efficient functionality, and the ability to easily manage and assess engineering documents. |
| **Software Developer (Future Stakeholder)** | Providing necessary software or hardware components, meeting integration requirements, and maintaining long-term business relationships. |
| **Client Organization Staff** | Ensuring that the project meets their specific needs, aligns with their standards, and facilitates improved quality assurance for engineering deliverables. |
| **Project Team** | Meeting project goals, adhering to deadlines, ensuring personal growth and skill development, and collaborating effectively. |
| **Project Mentor** | Guiding the team, sharing industry knowledge, ensuring the project meets industry standards, and supporting team growth. |

## Deliverables and Project Evaluation Criteria

### **Deliverables**

This section outlines the key deliverables throughout the project lifecycle. It highlights their significance in adding value to Ingenia’s operations and aligning with the project’s goals of enhancing engineering document quality. Each deliverable serves a specific purpose and contributes to the overall project.

#### **Documentation for the Digitalization of Checklists**

This pivotal deliverable addresses the organizational challenge of transitioning from manual to digital checklist management. By meticulously documenting the architectural framework, process flow, user interface specifications, stakeholder roles, and swim lane structure, this documentation empowers Ingenia to seamlessly implement a user-centric app for managing engineering document checklists. The clarity and completeness of this documentation ensure a smooth transition, reducing friction and resistance often associated with technology adoption.

#### **Investigation Report for Automation of Checklist Tasks**

The comprehensive investigation report in this deliverable offers Ingenia an in-depth analysis of automation opportunities for checklist tasks, focusing on the crucial information block of Engineering Drawings. This report serves as a strategic guide, outlining automation feasibility, benefits, and challenges. By identifying specific checklist tasks suitable for automation, the organization gains clarity on areas where automation can enhance accuracy, efficiency, and compliance. This deliverable enables Ingenia to make informed decisions about automation implementation, aligning technology with operational needs.

#### **Agile Project Plan**

Agile project plans ensure project execution aligns with goals and milestones. By providing a detailed bi-weekly sprint-based roadmap, this plan enables efficient task management and progress tracking. It ensures that the project remains on track and allows for timely adjustments based on feedback and evolving requirements. Regular alignment checks with the client provide a mechanism for course correction and validation of project direction, promoting a collaborative approach to project management.

#### **Technical Prototypes**

The creation of functional prototypes for both OCR technology and digital checklists showcases the tangible outcomes of the project's research and development efforts. These prototypes offer insight into the future of engineering document quality. They demonstrate OCR's potential for text recognition, error detection, and data extraction in Engineering Drawing QA. Simultaneously, the Figma prototypes visually illustrate the efficiency and user-friendliness of digital checklist management. These prototypes serve as a proof-of-concept, building confidence in proposed solutions.

#### **Integration Documentation and Strategies**

This deliverable connects innovative ideas with practical implementation. The integration strategies provide a clear roadmap for seamlessly integrating OCR automation and digital checklists into Ingenia's existing processes.

### **Evaluation Criteria**

This section outlines the criteria by which deliverables will be evaluated. These criteria reflect the alignment of the project's outcomes with Ingenia's operational needs and the overarching goal of enhancing engineering document quality. Each criterion provides a specific lens through which the success and effectiveness of the project's deliverables will be assessed.

|  |  |
| --- | --- |
| Deliverable Aspect | Evaluation Criteria |
| Documentation for the Digitalization of Checklists | Completeness and accuracy of requirement documents, ensuring a clear understanding of the mobile app's architecture, process flow, user interactions, stakeholder roles etc. |
| Investigation of Automation Opportunities | The thoroughness of the investigation report, including a detailed analysis of potential checklist tasks for automation, feasibility assessment, and consideration of the information block.  The clarity in identifying specific checklist tasks suitable for automation, accompanied by a well-defined rationale. |
| Agile Implementation and Progress | Adherence to the bi-weekly sprint structure, with clearly defined tasks and milestones for both digitalization and automation efforts.  Demonstrated progress and alignment with project goals during feedback sessions with the client, highlighting the successful sprint completion. |
| Technical Prototypes | Functionality and accuracy of OCR technology prototypes, showcasing text recognition, error detection, and data extraction capabilities within Engineering Drawing QA.  Quality of the Figma prototypes representing digitalized checklists, effectively illustrating the checklist management process. |
| Integration Documentation and Strategies | The clarity and effectiveness of the integration strategies, providing actionable guidance for integrating OCR automation and digital checklists. |

## Implementation Plan

**Methodology and Milestones for Exploring Automation Opportunities in Engineering Drawing and Digitalization of the Checklist Documentation.**

The project's progression will be guided by a series of well-defined milestones. It will commence by prioritizing the automation of the information block validation within engineering drawings in alignment with the designated checklist. As time availability allows, the project scope will broaden to encompass additional prospects for automation.

### **Sprint 1 (Week 1-2): Initial Research and Planning**

**Goal:** Define the scope and goals of the project, considering both digitalization and automation.

**Tasks:**

* Conduct initial research on OCR technologies, checklist digitalization methods, and their potential benefits.
* Identify team members and assign roles for both the automation and digitalization aspects.
* Outline project objectives, success criteria, and key milestones.

**Outcome**: A well-defined project scope and plan that covers both the digitalization and automation components.

### **Sprint 2 (Week 3-4): In-depth Research on OCR and Checklist Digitalization**

**Goal:** Understand OCR technologies for automation and Checklist Flow Process and UI/UX research.

**Tasks:**

* Conduct comprehensive research on various OCR techniques, algorithms, and tools.
* Collect Data from Client (Engineering drawings)
* Investigate the implications of OCR on Engineering Drawing QA and explore architecture, process/information flow, user interface, roles/stakeholders, for checklist digitization.
* Document key findings and potential challenges related to both aspects.

**Outcome:** Detailed insights into OCR technologies' applications and their relevance to automation and opportunities in the digitalization of the checklist document.

### **Sprint 3 (Week 5-6): Exploring OCR and Digitalization Opportunities**

**Goal:** Identify integration opportunities for both OCR automation and checklist digitalization.

**Tasks:**

* Collaborate as a team to brainstorm and identify specific areas where OCR can enhance Engineering Drawing QA.
* The primary focus of the automation would be the information block section of the checklist.
* Analyse the checklist digitalization process, and pinpoint potential bottlenecks.
* Create a comprehensive list of possible use cases and integration points for both aspects.
* Research and identify suitable architectural frameworks for the checklist application.

**Outcome:** A well-documented list of use cases and integration opportunities for both OCR and checklist digitalization**.**

### **Sprint 4 (Week 7-8): Formulating Strategies for OCR and Digitalization**

**Goal:** Develop strategies for OCR automation and checklist digitalization.

**Tasks:**

* Based on the use cases identified, formulate detailed strategies for integrating OCR within Engineering Drawing QA.
* For checklist digitalization, outline strategies to streamline the manual process and data management.
* Map out the end-to-end process flow of checklist digitalization, including user interactions and system components.
* Create process flow diagrams and document the sequence of activities.
* Present these strategies to the team, collect feedback, and make necessary refinements.

**Outcome:** Concrete integration strategies for both OCR automation and checklist digitalization, refined based on team feedback.

### **Sprint 5 (Week 9-10): Prototyping OCR and Digitalization**

**Goal:** Create prototypes for both OCR automation and digitalized checklists.

**Tasks:**

* Develop functional prototypes that showcase OCR's ability to perform text recognition, error detection, and data extraction.
* Testing Automation Algorithms on Sample Drawings.
* Create prototypes for digitalized checklists in Figma.
* Design wireframes for the user interface of the mobile app.
* Present wireframes to stakeholders for feedback and approval
* Test these prototypes rigorously, refine them as needed, and document the technical details.

**Outcome:** Working prototypes for both OCR automation and checklist digitalization, accompanied by detailed technical documentation.

### **Sprint 6 (Week 11-12): Refining Strategies and Documentation**

**Goal:** Refine integration strategies and prepare comprehensive documentation.

**Tasks:**

* Incorporate feedback from testing to further refine both OCR automation and checklist digitalization strategies.
* Create swim lane diagrams to illustrate the flow of activities across different stakeholders and departments for the checklist digitalization.
* Document the entire research process, integration strategies, prototype development journey, and lessons learned.
* Ensure the documentation is thorough, accessible, and ready for sharing with stakeholders.

**Outcome:** Finalized integration strategies for both aspects and comprehensive documentation for potential implementation efforts.

### **Sprint 7 (Week 13-14): Presentation and Conclusion**

**Goal:** Present research findings, strategies, and prototypes for both OCR and digitalization.

**Tasks:**

* Create a compelling presentation that showcases the project's journey, insights, strategies, and working prototypes.
* Deliver the presentation to stakeholders, including the project's supervisor and other relevant parties.
* Engage in discussions, receive feedback, and outline potential next steps for implementation.

**Outcome:** Stakeholder presentation that effectively highlights the potential of OCR integration and checklist digitalization, along with actionable feedback for further refinement.

## Project Schedule

The Gantt chart outlines the planned stages and milestones for the project, spanning from Monday of Week 2 to Friday of Week 13.

A screenshot of a project

Description automatically generated

# Approval

We approve the project as described above.

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Role | Signature | Date |
| Georg Grossmann | Mentor |  |  |
| Daniel Halls | Client |  |  |
|  |  |  |  |
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