

Requirement analysis

Module

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Coach

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1. Introduction

This document outlines the functional and non-functional requirements for the AR Maintenance & Inspection Assistant project.

This requirement analysis aims to ensure a clear, shared understanding of what the system must do and how it should behave. It serves as a foundation for the project's design, implementation, and testing phases. The requirements in this document were collected and refined based on team discussions and early project planning. Specifically, they are derived from brainstorming sessions and design notes created by the development team during the initial project phase. The design notes can be found in the manage and control folder with the notes subfolder. This document also helps guide prioritization and ensures that the end product aligns with user needs and project goals.

2. Functional requirements

ID	Requirement
FR-01	The app must display information using Augmented Reality overlays.
FR-02	The api must handle most of the logic and computation
FR-03	The app must be lightweight and avoid heavy computations
FR-04	The app must fetch and display real-time data from the api
FR-05	The api must be capable of scaling in the future
FR-06	The api must store relevant real-time data for later reference or analysis
FR-07	The api must support multiple different apps (AR via phone or AR Glasses)
FR-08	The app must be able to detect QR codes or similar
FR-09	The app must be able to display an informational panel based on the QR code
FR-10	The app must show a mini map of the machine after the QR code is scanned
FR-11	The app must highlight relevant parts of the machine in the AR overlay
FR-12	The api must analyze the real-time data to detect maintenance needs
FR-13	The api must use fuzzy logic to classify the condition of the machine and determine if maintenance is necessary
FR-14	The api must support the dynamic definition of fuzzy logic antecedents
FR-15	The api must restrict fuzzy logic consequents to indicate whether maintenance is required or not.
FR-16	The app must show the user's position on a mini map during navigation
FR-17	The app must provide navigation guidance to machines based on a factory map
FR-18	The app must calculate the optimal path using the A* algorithm
FR-19	The app must show visual markers along the path using the AR overlay
FR-20	The app must use the user's location to determine the path
FR-21	The app must update the path dynamically when the destination or environment changes
FR-22	The app must get the 3d models from the api
FR-23	The app must get the static data from the api
FR-24	The app must be able to render the static data based on its type
FR-25	The app must stream documents from the api based on the QR code
FR-26	The app must display the real-time data
FR-27	The app must anchor data overlays to the current position of the machine in AR
FR-28	The app must hide the data when the user is too far from the machine
FR-29	The app must update the real-time data when new information is given from the api

3. Non–functional requirements

ID	Requirement
NFR-01	The app must provide a smooth AR experience with minimal latency on the supported devices
NFR-02	The api must support High availability to ensure real-time data access
NFR-03	The api must be designed to be modular and extensible
NFR-04	The api must use secure communication protocols
NFR-05	The api must be able to handle multiple simultaneous data streams without performance loss
NFR-06	The app must continue to work even in areas with limited connectivity
NFR-07	The app must load within 5 seconds
NFR-08	The app must load the resources from the api within 2 seconds
NFR-09	The api must be hosted on-premises

4. Technical constraints

ID	Constraint
TC-01	The api must be able to stream the 3d assets
TC-02	The Fuzzy logic must be handled inside the API

5. Prioritization of requirements

ID	High priority	Medium priority	Low priority	Must have	Should have	Could have
FR-01	X			X		
FR-02		X		X		
FR-03		X		X		
FR-04	X			X		
FR-05		X			X	
FR-06		X			X	
FR-07			X	X		
FR-08		X		X		
FR-09		X		X		
FR-10		X			X	
FR-11		X			X	
FR-12	X			X		
FR-13	X			X		
FR-14		X			X	
FR-15			X	X		
FR-16		X				X
FR-17		X			X	
FR-18	X			X		
FR-19		X			X	
FR-20	X			X		
FR-21		X		X		
FR-22	X			X		
FR-23		X			X	
FR-24		X			X	
FR-25	X				X	
FR-26		X		X		
FR-27			X	X		
FR-28			X		X	
FR-29			X	X		
NFR-01		X		X		
NFR-02			X		X	
NFR-03	X			X		
NFR-04	X			X		
NFR-05		X		X		
NFR-06		X			X	
NFR-07			X		X	
NFR-08		X			X	
NFR-09	X			X		
TC-01		X		X		
TC-02		X		X		