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Introduction

- CNH Industrial, a global manufacturer of agricultural and construction equipment, operates multiple locations worldwide.
- Currently, there is no standardized method for assessing facility conditions, making consistent and objective evaluation difficult.
- This project applies Machine Learning to images of offices, bathrooms, and canteens to generate standardized quality ratings, enabling CNH to move from subjective assessments to data-driven decision-making across its global facility portfolio.

Project Scope and Data

- Three facility spaces were selected based on the areas frequently inspected and compliance-sensitive in a manufacturing facility.
- Images in various angles, qualities, and lighting used for training



Canteen

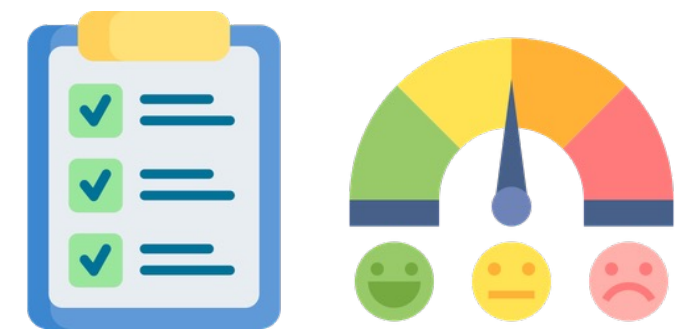


Bathroom



Office

Methodology



Defined rubrics for each room type and rate on scale of 1-10 focused on cleanliness, accessibility, damage.

Manual scoring a subset of images across the three room types and model training



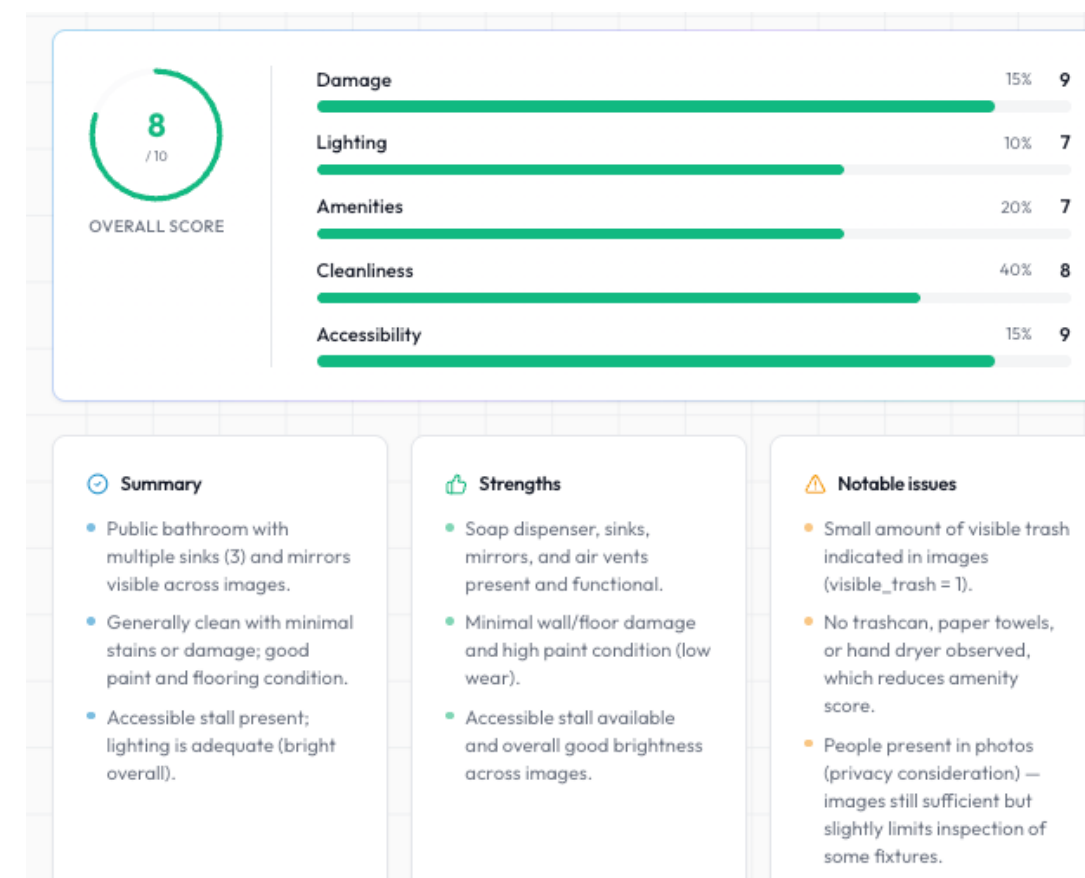
GPT-4 powered multi-agent AI framework for image analysis and summary



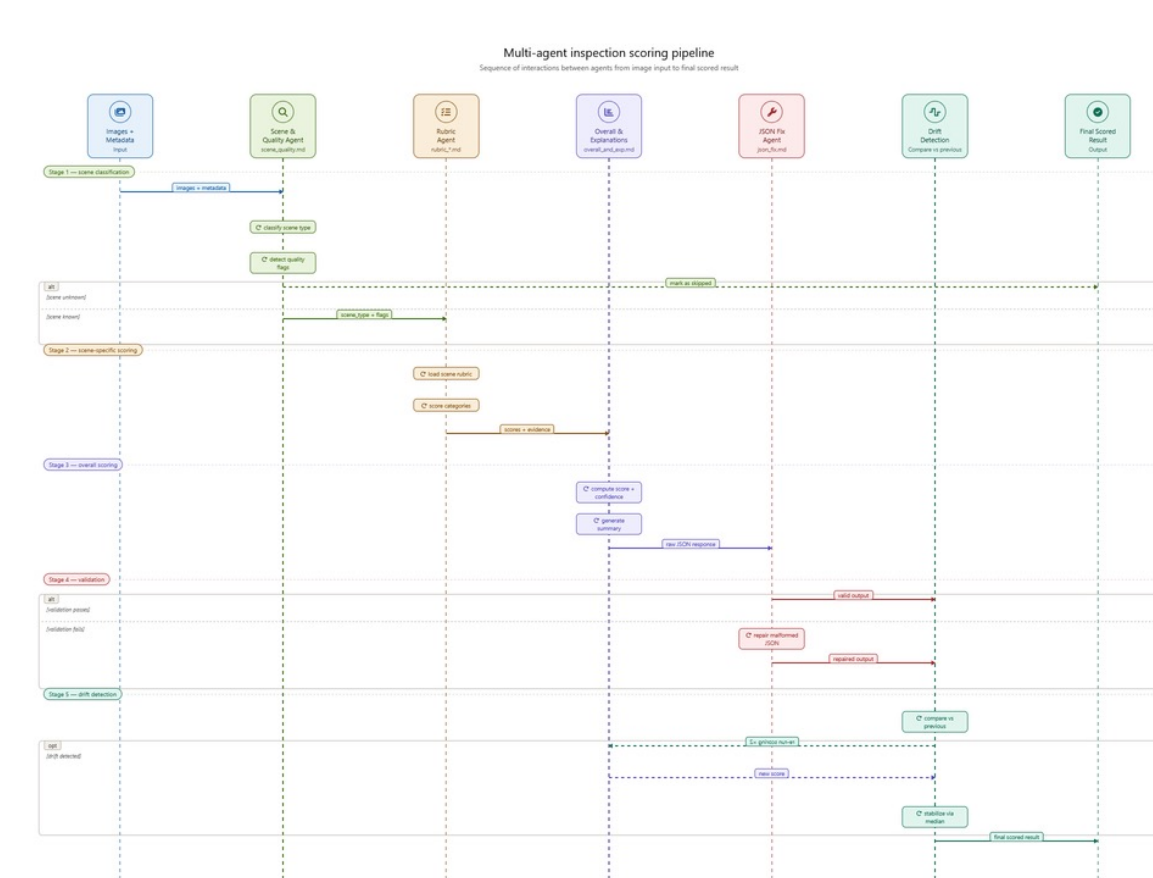
Developed a back-end AI analysis pipeline and a clean Frontend UI for image upload and review

Website and Architecture

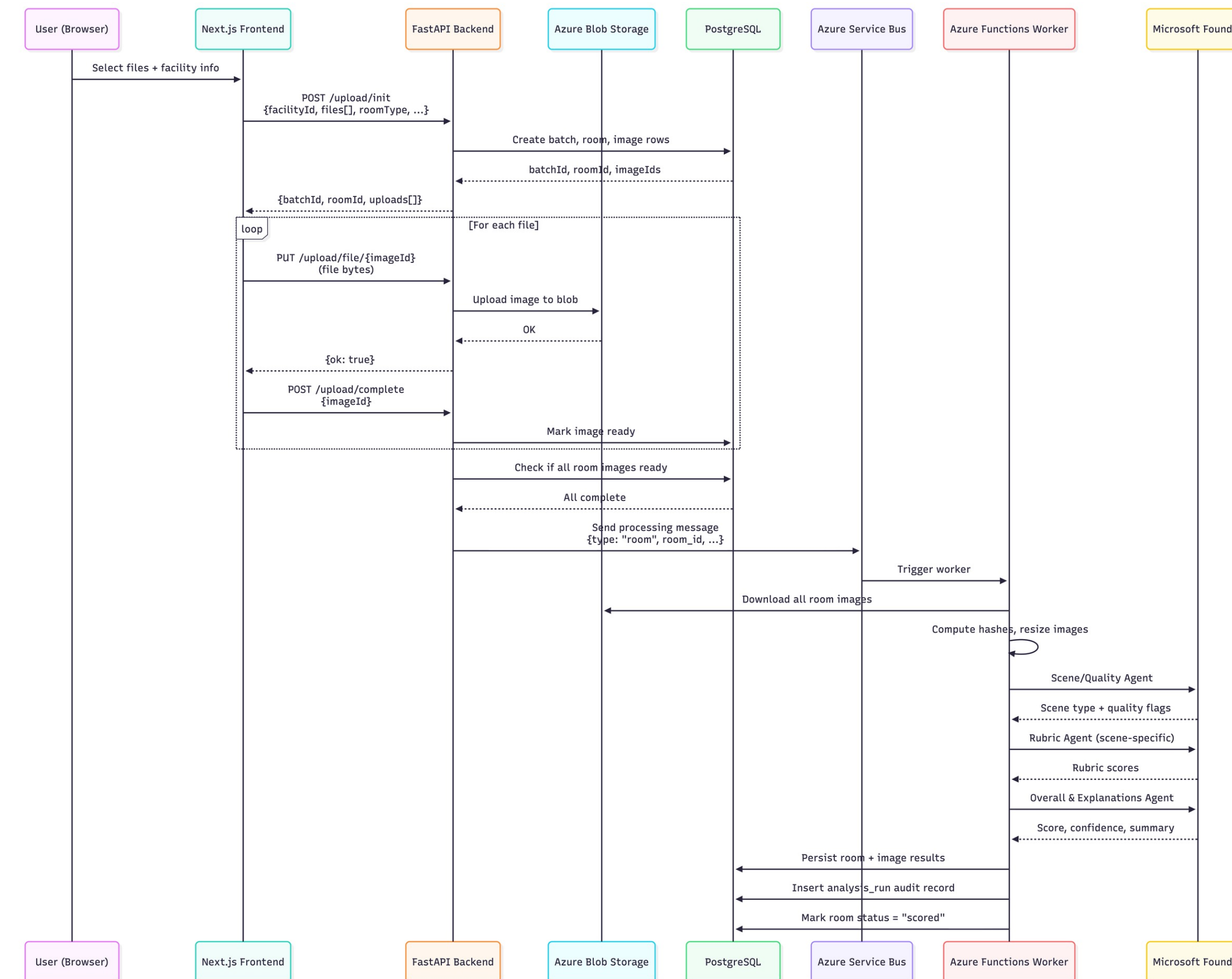
Facility Review



Multi-agent Architecture

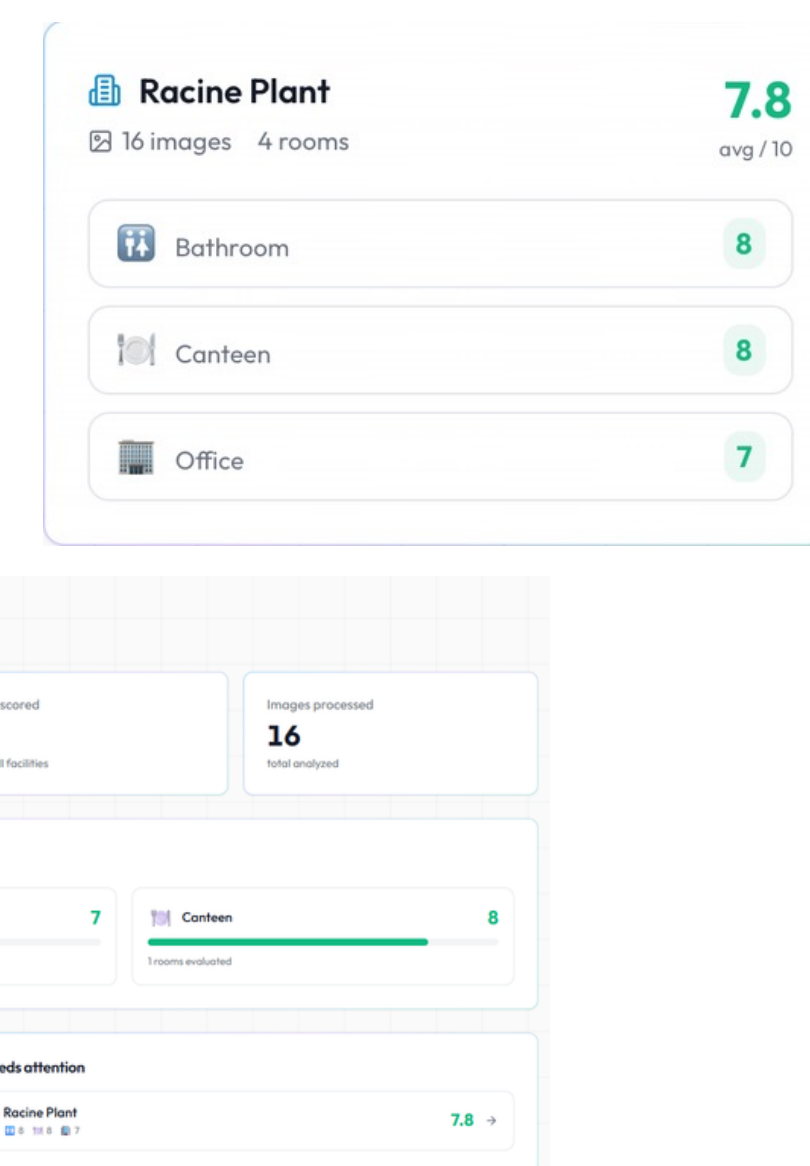


Product Workflow



Analysis Dashboard

- Based on model output, quality of facilities are summarized quantitatively
- Combined scores for each section help identify which areas are in need of improvement (ex. accessibility, aesthetics, lighting)



Conclusion

- Proof of Concept Established:** AI-driven image analysis is viable for facility compliance
- Built for Scale:** Modular architecture supports deployment across global facilities
- Consistent Results:** Reliable and repeatable assessments reduce human bias
- Improved Efficiency:** Automation reduces manual effort and speeds up inspections

Future Goals

- Improve Accuracy:** Fine-tune scoring using labeled audit data
- Expand Coverage:** Include production floors, warehouses and loading docks
- Customizable Rubric:** Easily adapt evaluation rubrics to different facility needs and standards
- Compliance Dashboard:** Track scores and trends across global sites

Acknowledgements

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