Visteon

Automotive AI Requirements Management: Visteon's Complete Transformation Guide

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In the fast-paced world of automotive engineering, AI requirements management has emerged as a game-changer for product development. At Visteon, we've always understood that clear, accurate specifications are critical to delivering high-quality automotive solutions. But like many engineering organizations, we found ourselves grappling with the limitations of traditional, manual requirements management processes.

Today, we're excited to share how we've transformed our approach using artificial intelligence in automotive engineering, creating a more efficient, accurate, and scalable AI-powered requirements management system that's transforming how our engineers work.

The Challenge of Overcoming Manual Requirements Management Limitations

Our traditional requirements management process, while structured, relied heavily on manual actions that introduced risks we could no longer accept. Engineers spent hours on repetitive tasks like translation, attribute management, and lengthy offline verification of requirements. These manual processes not only slowed down our development cycles but also created opportunities for errors and omissions that could cascade through entire projects.

The challenges were multifaceted:

- Processing large specification changes, conducting impact analysis, and managing skill allocation consumed significant engineering time that could be better spent on innovation.

- Identifying logical flaws, contradictions, and inconsistencies in requirements often happened too late in the development process, leading to costly downstream corrections.
- With vast amounts of technical documentation across multiple projects, finding relevant information quickly became increasingly difficult.
- Creating UML diagrams and other technical models manually was time-intensive and prone to algorithm flaws that weren't caught until later stages.

AI-Powered Solution: Azure OpenAI for Engineering Workflows

After careful evaluation, we selected Azure OpenAI's GPT-4 model as the foundation for our AI requirements management transformation. This powerful language model offered the sophistication needed to understand complex automotive engineering requirements while integrating seamlessly into our existing workflows.

We positioned AI as an intelligent co-pilot enhancing human expertise rather than substituting for it. We developed an in-house Python solution that leverages the cloud-based AI capabilities while maintaining the control and customization our engineering teams needed.

What sets our approach apart is that we built our solution around the inherent capabilities of advanced language models rather than extensive custom training. The GPT-4 model already demonstrated a strong understanding of systems engineering best practices, allowing us to focus on integration and workflow optimization rather than lengthy training cycles.

Real-World Impact: From Theory to Practice

The transformation in our daily workflows has been remarkable, touching every aspect of how we handle requirements processing. When we receive large specification change sets, our AI system now intelligently helps engineers focus on material changes rather than getting bogged down in minor corrections like typos, which has dramatically reduced review time while simultaneously improving accuracy.

This enhanced focus extends naturally into our modeling work, where UML diagrams assisted by AI help identify potential algorithm flaws much earlier in the development process, preventing the costly downstream corrections that once plagued our timelines.

Perhaps even more impressive has been our implementation of Retrieval-Augmented Generation, which has revolutionized how engineers interact with our vast documentation libraries. What once required hours of manual searching through multiple systems now takes just minutes of targeted queries, allowing engineers to quickly surface relevant information and context.

This efficiency gain creates a ripple effect throughout our process, as engineers can now dedicate more time to creating meaningful, comprehensive verification criteria with AI assistance, ultimately improving the overall quality of our specifications in ways that compound across entire projects.

Measurable Results That Matter

We've always believed in data-driven decision making, so measuring the success of our AI implementation was crucial. Our key metrics tell a fascinating story:

- We've seen a significant decrease in product defects caused by incorrect specifications—one of our most important quality indicators.
- Specification delivery timelines have improved markedly, with teams consistently meeting project milestones.
- The time required to execute quotes has decreased substantially, improving our responsiveness to customer needs.
- We measure accuracy through multiple lenses—reduced defects, fewer review issues, and improved on-time deliveries. All metrics show consistent improvement since implementation.

Perhaps most importantly, we've discovered unexpected benefits. New team members are now onboarded significantly faster with their AI co-pilot helping them understand complex technologies, frameworks, and protocols more quickly than traditional training methods alone.

Managing the Transition: People-First Approach

Technology transformation is ultimately about people, which is why we invested in a comprehensive change management strategy that went beyond simple tool training.

Our approach centered on building a collaborative learning environment through online training series paired with dedicated forums where team members could organically share best practices, lessons learned, and effective prompts for working with AI. This community-driven knowledge sharing proved essential because successful AI adoption requires finding the delicate balance between leveraging powerful capabilities and maintaining critical human judgment.

We're aware that overreliance on AI can actually produce negative effects, undermining the very expertise we sought to enhance. The sweet spot we've achieved involves positioning AI as an intelligent assistant that handles tedious and repetitive tasks while engineers maintain oversight and final decision-making authority on all critical matters.

This thoughtful approach has created a cycle where engineers can focus their expertise on higher-value challenges,

creative problem-solving, and innovation rather than getting bogged down in routine processing. The result has been not only improved efficiency and the reliability our automotive customers demand, but also increased career satisfaction as our engineering teams engage more deeply with the complex, rewarding aspects of their work.

Looking ahead, we view our current achievements as the foundation for even greater opportunities. We're exploring specialized AI quality agents that will further enhance specification quality, while anticipating that more powerful models will soon enable us to analyze larger datasets with greater accuracy.

Key Takeaways for Engineering Organizations

Our AI transformation journey offers several lessons for other engineering organizations:

Start with clear objectives and focus on specific pain points. Don't try to change everything at once.
Choose the right technology and make sure that these AI tools integrate well with existing workflows rather than requiring complete process overhauls.
Invest in people, because technology adoption succeeds when people are properly trained and supported through the transition.
Maintain human oversight – critical thinking and engineering judgment cannot be replaced.
Measure and iterate to continuously refine your approach based on real-world results.
Ultimately, by combining the power of advanced AI with human expertise and engineering judgment, we've created a more efficient, accurate, and innovative approach to one of our most critical processes.

The automotive industry continues to evolve rapidly, with increasing complexity in vehicle systems and accelerating development timelines. Our AI-powered requirements management system positions us to meet these challenges while maintaining the quality and reliability our customers expect.