

Transportation Invation

Driving the Future: Navigating the Intersection of AI, ML, and Transportation

Demystifying AI Workforce Impacts

Ryan McCreedy PE, PTOE... turned org psychologist

> **slalom** Slalom Consulting



U.S. Department of Transportation Federal Highway Administration

WELCOME

WELCOME

The pace at which Al is evolving is unprecedented.



Generative AI has supercharged AI

Chat-GPT sprints to 100 million users



ChatGPT instantly democratized access to LLMs (large language models), capturing the world's attention seemingly overnight and enabling what was previously difficult or impossible, on a massive scale.

Comparing Traditional and Generative AI

What is unlocked today with traditional AI vs. generative AI?

Traditional AI



Generative AI

*It's important to note that these use cases are not exclusive to either gen. AI or trad. AI, and there can be overlap and hybrid approaches where multiple AI techniques are combined to achieve specific goals

Practical Applications Aligned to Outcomes

Horizon 1 Productivity

Harness AI to optimize existing workflows, elevating efficiency and reducing overhead Horizon 2 Differentiation

2

Utilize AI to **transform current methods**, **introducing innovative approaches** that stand out among competition Horizon 3 Disruption

3

Embrace AI to reshape the industry landscape, creating **new revenue** streams and operational paradigms

Transform Business

Operate Better

Practical Applications Aligned to Outcomes

AEC and Transportation Industry Potential AI Use Cases:

Productivity

- Automated job site monitoring systems
- Predictive maintenance reporting for assets
- Intelligent search of policies, research, and plans of record
- Autonomous systems for design compliance review
- Scheduling and resource optimization, including worker availability and seasonality

Operate Better

REMEMBER

THIS ONE!

Differentiation

2

- Self-optimizing, real-time traffic management systems
- Generative engineering designs
- Autonomous construction equipment
- Automated project management and reporting
- Public stakeholder social listening and sentiment/impact reporting
- Intelligent job matching and career pathing for internal mobility

Disruption

3

- Real-time regional analysis and automated planning and project funding recommendations with predicted impacts
- Autonomous design/build equipment
- Cognitive job redesign to redefine job descriptions and roles based on emerging trends and organizational needs
- Al guiding DOT policies and decisions in alignment with ethical standards *and* emerging technologies/best practices

Levels of Human-Machine Interaction

	Human	Human	Human	Al
	only	in-the-loop	on-the-loop	only
Decisions	Humans using	Humans assisted	Al supervised	Autonomous
	heuristics & Bl	by Al	by humans	Al
Interactions	Humans	Humans	Humans	Humans
	required	required	on exception	monitoring Al
Automation	None	None > Partial	Partial > Mostly	Mostly > Fully
Which	jobs first? H	low do we t	take the no	ext step?

Solom ©2024 Slalom. All Rights Reserved. Proprietary and Confidential.

Jobs are the **containers of tasks** that determine overall outcomes of human-machine combinations.



A task has three key dimensions: *human*, *machine (AI)*, and *business impact/value*.



Human Dimension



- Nature of impact (direct, indirect)
- Type of impact (financial, customer, etc.)

Optimizing human-machine combinations happens at the work or task level.



Sample Tasks: **Transportation Engineer**

Task 1 - Analysis

Apply traffic modeling techniques to address issues such as operational process improvement, facility design, or layout.

Task 2 - Analysis

Create models or scenarios to predict the impact of changing circumstances, such as fuel costs, road pricing, energy taxes, or carbon emissions legislation.

Task 3 - Design

Design or prepare plans for new transportation systems or parts of systems, such as airports, commuter trains, highways, streets, bridges, drainage structures, or roadway lighting.

Task 4 - Design

Check construction plans, design calculations, or cost estimations to ensure completeness, accuracy, or conformity to engineering standards or practices.

First, we carefully examine the job tasks and **identify their characteristics**.



Sample Tasks: **Transportation Engineer**

Task 1 - Analysis

Apply traffic *modeling* techniques to address issues such as operational process improvement, facility design, or layout.

Task 2 - Analysis

Create models or scenarios to *predict* the impact of changing circumstances, such as fuel costs, road pricing, energy taxes, or carbon emissions legislation.

Task 3 - Design

Design or prepare plans for new transportation systems or parts of systems, such as airports, commuter trains, highways, streets, bridges, drainage structures, or roadway lighting.

Task 4 - Design

Check construction plans, design calculations, or cost estimations to ensure completeness, accuracy, or conformity to engineering standards or practices.



Collaborative Intelligence Artificial Intelligence Will Transform Jobs

AI will take over some tasks from the job and shape a job's form, nature, and interactions with other jobs and parties.



New Machine (AI) Tasks



Collaborative Intelligence Artificial Intelligence Will Transform Jobs

Collaborative Intelligence paves the way for the creation of *unprecedented job opportunities* for humans.



Collaborative Intelligence Key Questions to Be Asked

Evaluating optimization scenarios requires a consistent framework and addressing some key questions:



We have *a holistic approach* to address all these questions... and more.

Collaborative Intelligence Demystifying Optimization

So, how do we start the optimization process? A multi-dimensional assessment approach is needed!

Optimized Combination = f(task, human, business impact, machine (AI))



Job and AI use case analysis can be time consuming... so we have automated it!

New Tab X	Dem
$\leftrightarrow \Rightarrow \mathbf{C}$ Q	☆ ·
	slalom
Begin your enhancelQ Journey	Industry (required)
Use this free tool to learn how to enhance a single role today.	Select an option 🗸
Select your industry, job function, and role using the dropdowns, then select 'Begin Assessment' to view your results.	Job Function (required)
Stay on this page - the experience will refresh to show how AI will	Select an option 🗸
impact the selected job.	
	Role (required)
	Select an option V
	I understand that these are AI generated results and all data should (required) be validated for accuracy Begin Assessment





• • • New Tab			Demo
← ⇒ C			☆ ≡
	Dimension Analysis: Code Reviews	slalom	
	Explore how tasks score across 10 key work dimensions, revealing if they're better for Al or human skills. Toggle to view different attributes, understanding the balance between machine precision and human insight.		
	Task Nature Work Complexity Collaboration Scope Data Profile Operational Environment Expertise Requirement		
	Regulatory and Ethical Impact Business and Stakeholder Impact Risk Profile Resource Demand		
	Click on the task to see more details		
	Cognitive		
	Emotive In the context of software engineering, particularly for the task of 'Code Reviews', cognitive abilities are rated as machine-oriented		
	Physical physical and the second seco		
	Creative		
	Key: How to read the chart		
	Humans are better suited to do this task. 🔢 Both can do this		Į
	Machines are better suited to do this task Center		

So What? Developmental Psych & Call to Action We <u>need</u> to develop adaptive people and orgs!



Time

Based on research and theory by Lewin et al (2019) Minding the Form That Transforms: Using Kegan's Model of Adult Development to Understand Personal and Professional Identity Formation in Medicine, Kegan (1994) In Over Our Heads, Torbet (1987) Managing the Corporate Dream, Argyris & Schon (1978) Organizational Learning

Focus on augmenting people, not replacing them. Despite concerns, AI is not all about reducing labor costs, and organizations that approach the technology in this manner stand to miss out on real gains. Instead, early AI projects should focus on enabling employees to pursue higher value activities"

- Falguni Desai, Global Head of Strategy and Transformation, Equities, Credit Suisse



CARE DE LE PARTE HILLIONS COR

REPART AS

STATISTICS TO A STATISTICS AND A STATIST

Thank you