

12TH

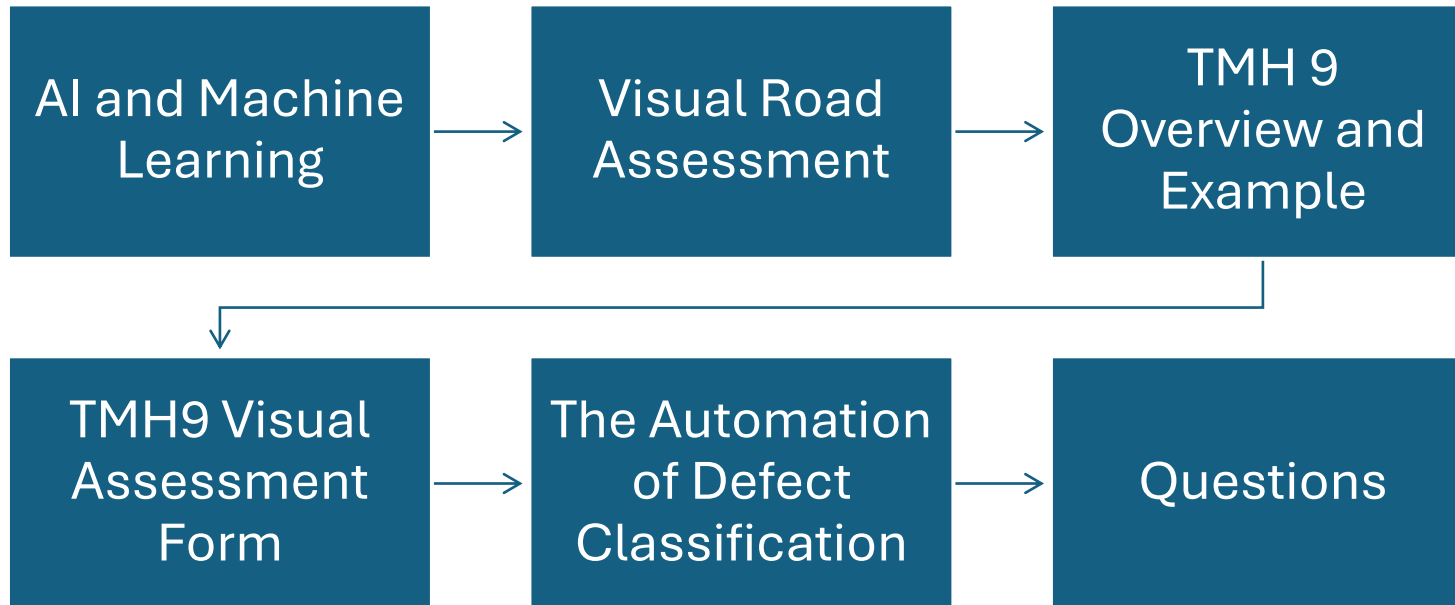
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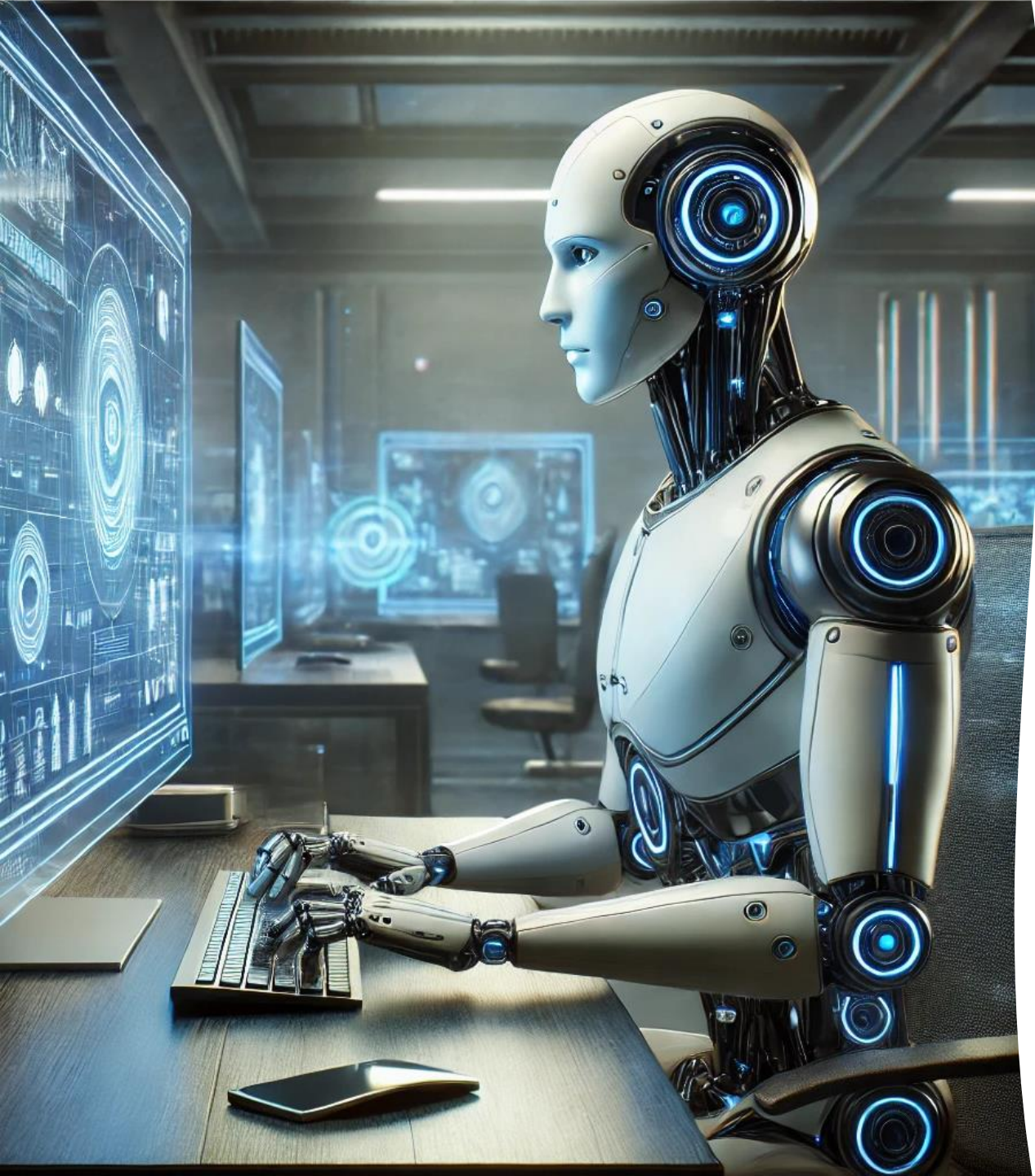


AI and Machine Learning in Road Pavement Defect Classification

By Zuzile Makhubu

OVERVIEW





Machine learning consists of algorithms that are trained using data sets, to be able to perform human like tasks. Such as categorizing, data analysis, predictive analytics and forecasting.




VISUAL ROAD ASSESSMENT

Visual assessments for routine road maintenance in South Africa are conducted by engineers who will go to the site in question with a manual handbook called the TMH 9.

Hey ChatGPT,
show me a
picture of a
road surface
with crocodile
cracks



Figure B.3-11: Visual assessment of degree of potholes

Potholes					
	1				
	X	2	3	4	5
	< 250 mm diameter and ~ 25 mm deep.				
	3				
	1	2	X	3	4
	> 250 mm diameter and > 50 mm deep.				
	5				
	1	2	3	4	X
	> 500 mm diameter and > 75 mm deep				



VISUAL ASSESSMENT : FLEXIBLE PAVEMENTS												
ROAD AUTHORITY :			ROUTE CLASS :	1	2	3	4	5				
REGION / DISTRICT :			TRAFFIC :	VL	L	M	H	VH				
ROAD NO :			GRADIENT :	Flat		Med		Steep				
SEGMENT (FROM - TO) :			TERRAIN :	Flat		Rolling		Mount				
PANEL DIMENSIONS :	LENGTH		m		WIDTH		m					
ENGINEERING ASSESSMENT												
SURFACING	TEXTURE	COARSE	MEDIUM	FINE	VARYING							
	VODS	MANY	FEW	NONE	VARYING							
	CURRENT SURFACING :	DEGREE		EXTENT								
		MINOR	WARNING	SEVERE	ISOLATED	EXTENSIVE						
		0	1	2	3	4	5	1	2	3	4	5
SURFACING FAILURES												
SURFACING PATCHING												
SURFACING CRACKS												
AGGREGATE LOSS												
BINDER CONDITION (DRY / BRITTLE)												
BLEEDING / FLUSHING												
STRUCTURAL	DEGREE	EXTENT										
	MINOR	WARNING	SEVERE	ISOLATED	EXTENSIVE							
	0	1	2	3	4	5	1	2	3	4	5	
BLOCK CRACKS												
LONGITUDINAL CRACKS												
TRANSVERSE CRACKS												
CROCODILE CRACKS												
PUMPING												
RUTTING												
UNDULATIONS / SETTLEMENT												
SHOVING												
PATCHING												
POTHOLE												
FUNCTIONAL ASSESSMENT												
ROUGHNESS	Very Good	Good	Moderate	Poor	Very Poor							
SKID RESISTANCE	potholes	patching	undulations	gen uneven	corrugations							
SURFACE DRAINAGE	Very Good	Good	Moderate	Poor	Very Poor							
SHOULDER (UNPAVED)	Adequate		Inconsistent		Inadequate							
	rutting		shoulders		alignment		side drains					
	None	Safe	Inconsistent		Unsafe							
	eroded	overgrown	inclined		too high		too narrow					
EDGE BREAK	0	1	2	3	4	5	1	2	3	4	5	
SHORT TRANSVERSE CRACKS												
EDGE DROP-OFF												
SUMMARY												
OVERALL PAVEMENT CONDITION	Very Good	Good	Moderate	Poor	Very Poor							
COMMENTS:												
OTHER PROBLEMS	service crossings	trees	moles	mechanical damage	Off-carriageway drainage							
ASSESSOR :			DATE :									

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A person in a dark hoodie and jeans walks away from the viewer on a paved road. To their right, a blue and silver humanoid robot with glowing orange and yellow lights on its chest, shoulders, and knees walks in the same direction. The background shows a vast, flat landscape under a sunset sky with warm orange and yellow hues. The text "WHAT IF WE COULD AUTOMIZE VISUAL ROAD ASSESSMENTS ?" is overlaid in a large, white, outlined font across the center of the image.

WHAT IF WE COULD
AUTOMIZE VISUAL
ROAD ASSESSMENTS ?

Figure B.3-11: Visual assessment of degree of potholes

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REFERENCES



- <https://coursera.org/share/5eb97c042e8a79f3fd8d09339fd7efc5>
- TMH9 Part B – Flexible Pavements
- <https://chatgpt.com/c/3bdf600b-1570-41b3-81e9-69fb0327bd8b>
- <https://www.kaggle.com/models?tfhub-redirect=true>

THANK YOU

