Autonomous Categorization Comparison

SAE Autonomous Levels J3016_201401

0 : No Automation	1: Driver Assistance	2: Partial Automation	3: Conditional Automation	4: High Automation	5: Full Automation
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving-assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Brad Templeton Electronic Frontier Foundation

ADAS			Self-driving		
No driver assist	Partial driver assist	Full driver assist	Given that self-driving technology operates properly only under certain conditions, the suggestion is that SAE levels be replaced by a taxonomy of operating domains. That is, classifications of the type of conditions that vehicles will properly operate within under a wide assortment of factors such as speed, traffic isolation, weather conditions, school zones, paved/unpaved, etc.		

Alex Roy The DRIVE

Human-Assistance Systems				Geotonomous	
System requires human input at some level. Ranked by letter grade (A-F) on human convenience and/or performance.				Self-driving, but limited by location to a particular regulatory and/or safety-tested domain.	

CARMERA

Level 0		Level 2		Level 4	
Vintage and classic cars that are for recreational driving.		Life-saving, advanced driver assistance features that can be implemented today.		Highly transformational self-driving that is realistic given operational design domain constraints (geofences, weather conditions) and redundancies (tele-operation, IoT signaling infrastructure).	

Levels of Automation (LoA) Inagaki, Sheridan

LoA 1	LoA 2	LoA 3	LoA 4	LoA 5	LoA 6	LoA 6.5	LoA 7	LoA 8	LoA 9	LoA 10
Computer offers no assistance: human must make all decisions and actions.	Computer offers a complete set of decision/action alternatives.	Computer narrows the selection down to a few.	Computer suggests one alterative.	Computer executes that suggestion if the human approves.	Computer allows the human a restricted time to veto before automatic execution.	Computer executes automatically after telling the human what it is going to do.	Computer executes automatically, then necessarily informs the human.	Computer executes automatically, then informs the human after execution only if asked.	Computer executes automatically then informs the human after execution only if it, the computer, decides to do so.	The computer decides everything and acts autonomously, ignoring the human.

Toyota Research Institute (TRI)

Guardian capability

No protection		Some protection		Fully protected	
Car does not protect occupants from any human mistakes.		Car prevents some crashes based on driver errors or external factors.		Car protects occupants from every type of crash, regardless of human errors or external factors.	

Chauffeur capability

All human	Human monitoring and fallback		Human fallback		All car
Car takes no responsibility for the driving task.	Human is responsible for monitoring environment and acting as fallback.		Human is responsible for acting as fallback.		Human driver has no responsibility at all.

Third Law

Driver-centric classification

Manual	Assisted		Automated		
Person controls all aspects of a vehicle's behavior.	Person and vehicle collaborate in the driving task. The human driver must be aware of the car's limitations. While the car may take over more aspects of driving under certain circumstances, the person using such a car has the responsibility for knowing what systems are automated and the limits of that automation. OEM must also clearly communicate the car's capabilities to the driver.		The car can be expected to drive itself without human intervention. Its performance is not guaranteed on every road surface, so the car may need to exclude areas of travel where it is not tested or certified to perform acceptably. The occupants of the car need not know anything about the driving task.		

Capability classification

0	100	200	300	400	500	600	700	800	900	1000
Ranked score of autonomous capabilities, generated by weighted sum of all conceivable self-driving tasks and scaled from 0 to 1000. The score 0 means 100% fully human controlled under all conditions and 1000 means 100% fully computer controlled under all conditions.										