Thanks to NASA Your Vehicle Might Soon Predict Traffic Unexpectedness

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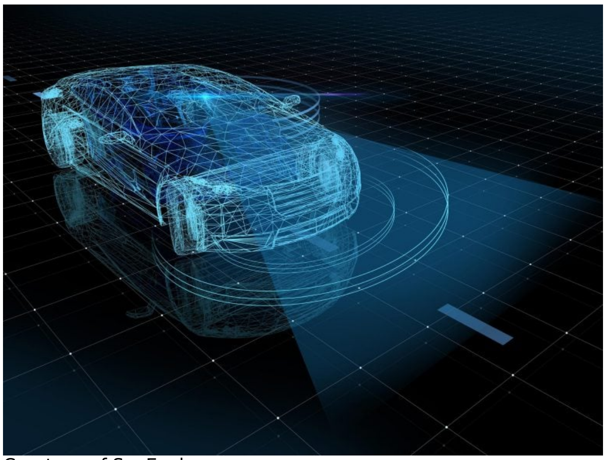
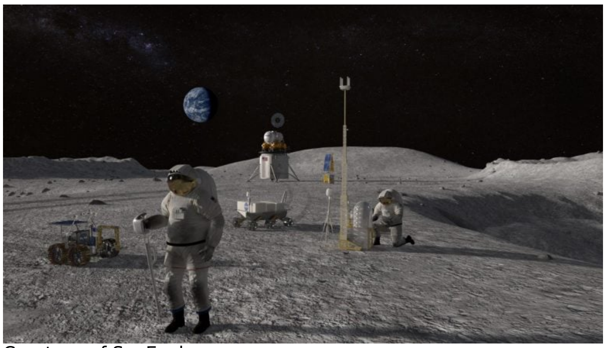


Courtesy of SynEvol
Credit: NASA

Envision a scenario where your car could talk to traffic lights, nearby cars, and road networks while you're driving. These live dialogues would enable your vehicle to foresee upcoming events, like a truck decelerating to take a turn or an obscured traffic light changing to red. Simultaneously, the system could direct you to the closest charging or fuel station and ready your brakes and windshield wipers for impending rain according to weather reports.

Enabling this type of smart travel necessitates effortless communication among a diverse array of systems, including private firms and government entities, each utilizing their own unique technology. The difficulty lies in discovering a method for all of them to safely exchange data in real-time, while ensuring security, privacy, and effectiveness.



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At NASA's Ames Research Center in California's Silicon Valley, engineers have created an innovation: the Data & Reasoning Fabric (DRF). DRF is a software framework that encompasses infrastructure, tools, protocols, and policies aimed at facilitating secure data sharing and decision-making among various machines and organizations. Initially developed to assist autonomous drones in making intricate decisions, the technology is currently being modified for application in various fields, including smart, connected transportation.

This implies that at some point, DRF-based technology might enable your vehicle to securely and safely obtain traffic information from adjacent stoplights and exchange data with other cars on the road. In this situation, DRF acts as the choreographer for a complicated dance of shifting objects, guaranteeing that each one moves fluidly in relation to the others toward a common objective. The system is built to establish a unified environment that merges data from systems that would typically be unable to communicate with one another.

"DRF is designed for behind-the-scenes use," stated David Alfano, head of the Intelligent Systems Division at Ames. "Businesses are creating autonomous technology, yet their systems are not built to be compatible with competitors' technology." The DRF technology connects these systems, enabling them to operate together seamlessly.

One application of this innovative system is traffic improvements. The technology has the potential to improve our application of autonomy to meet human requirements on Earth, in the sky, and even on the Moon.

To demonstrate the technology's effects, the DRF team collaborated with the city of Phoenix on an aviation initiative aimed at enhancing the transport of vital medical supplies from city areas to rural communities that have limited access to these resources. A self-operating system detected the locations requiring supplies and guided a drone to swiftly and securely collect and deliver them.

"Everything must align, requiring considerable effort." "The DRF technology offers a platform that enables suppliers, healthcare facilities, and drone pilots to collaborate effectively," stated Moustafa Abdelbaky, senior computer scientist at Ames. “The aim isn’t to eliminate human participation, but to assist humans in accomplishing more.”

The DRF technology is a component of a broader initiative at Ames aimed at creating concepts that facilitate autonomous operations while incorporating them into public and commercial sectors for enhancing safety and efficiency.

"At NASA, we're constantly acquiring new knowledge." "When a project concludes, there’s a positive aspect—it's an opportunity to recognize a new insight gained, a fresh application, or a new business prospect to expand on that work," stated Supreet Kaur, lead systems engineer at Ames. "By utilizing all the insights gathered from these experiments, we can enhance the strength of future research."

Sectors such as contemporary mining utilize a range of autonomous and sophisticated vehicles and equipment, yet these systems encounter the issue of needing to communicate effectively to function within the same space. The "choreography" of the DRF technology could assist them in collaborating, enhancing efficiency. Scientists engaged with a mining firm to understand the challenges they face while employing autonomous machinery, aiming to identify areas where DRF could offer potential solutions.

"If one company creates an autonomous drill while another develops the haul trucks, those two machines are operating to two distinct rhythms." “Currently, they must be separated manually for safety,” stated Johnathan Stock, chief scientist for innovation at the Ames Intelligent Systems Division. "The DRF technology can synchronize their independent operations, allowing these mining companies to implement autonomy universally for a safer and more efficient business."

Additional testing of DRF on machinery similar to that found in mines could take place at the NASA Ames Roverscape, a terrain featuring challenges like inclines and stones, allowing for an evaluation of DRF’s movement patterns.

Stock also anticipates DRF enhancing operations on the Moon. Self-driving vehicles might carry materials, perform drilling, and excavate, as launch vehicles arrive and depart. These operations will probably involve systems from various companies or sectors and may be coordinated by DRF.

As autonomous systems and technologies expand across various markets on Earth, in orbit, and on the Moon, DRF researchers are prepared to take the stage to ensure everything operates seamlessly.

"When all are moving to the same rhythm, operations flow smoothly, and greater things can be achieved."