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A Method For Safely Scheduling Computing Task Offloads For Autonomous Vehicles

Tech ID: 34217 / UC Case 2023-779-0

BRIEF DESCRIPTION

EnergyShield is a pioneering framework designed to optimize energy consumption through safe, intelligent offloading of deep neural network computations for autonomous vehicles.

FULL DESCRIPTION

EnergyShield introduces a groundbreaking approach to manage the computational demands of neural network controllers in autonomous vehicles. By offloading tasks to edge computing resources in a provably safe manner, it ensures that the vehicle's safety and performance are not compromised. This is achieved through a novel safety monitor that acts as a "shield," allowing for energy-efficient computations without sacrificing the reliability required by mission-critical systems.

SUGGESTED USES

- » Autonomous driving systems requiring real-time, safe, and energy-efficient computation.
- » Embedded systems in autonomous vehicles, unmanned aerial vehicles (UAVs), drones, and robotics with limited computational resources.
- » Edge computing platforms seeking to support mission-critical applications with stringent safety requirements.

ADVANTAGES

- » Ensures formal safety properties of autonomous systems while enabling low-power offloading optimizations.
- » Designed with a comprehensive perspective, making it adaptable and effective.
- » Introduces a novel use of safety filters as runtime monitors to guide offloading decisions.
- » Achieves energy efficiency gains without compromising on safety guarantees.
- » Offers a scalable and generic methodology applicable across various controllers, safety functions, and autonomous systems.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12565232	03/03/2026	2023-779

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OTHER INFORMATION

CATEGORIZED AS

- » **Computer**
 - » Software
- » **Sensors & Instrumentation**
 - » Position sensors
- » **Transportation**
 - » Automotive
- » **Engineering**
 - » Other

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