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General Comment

See attached file(s)

Attachments

NSF AI RFI Comments University of Arkansas

UNIVERSITY OF ARKANSAS

Division of Research and Innovation

Response to 2025 National Artificial Intelligence Research and Development Strategic Plan

Submitted by Dr. Margaret Sova McCabe, Vice Chancellor of Research and Innovation at the University of Arkansas

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Priority Areas for Federal Investment in AI Research and Development

The following areas summarize the priorities identified by the University of Arkansas artificial intelligence research community. In each of these specific areas, the continued investment into fundamental advances in artificial intelligence algorithms, architectures, and computing paradigms are vital to drive research forward.

Research into AI Standards, Security, and Reliability

To safeguard national security and economic infrastructure, AI must be predictable, explainable, and secure. Many existing AI models perform well under standard conditions but degrade unpredictably in edge cases.

We recommend federal investment in the development of enforceable standards and performance benchmarks for AI deployed in transportation, energy, and defense systems. Particular attention should be given to long-term system reliability and trustworthiness, especially in safety-critical settings where maintenance, monitoring, and operational readiness depend on AI outputs.

AI Systems with Reasoning, Adaptability, and Robustness in Dynamic Environments

Federal support should prioritize AI systems capable of contextual awareness, mission-phase adaptation, and operational robustness under uncertainty. Such systems are essential for high-stakes applications, including autonomous vehicles, aerospace, defense, and critical infrastructure, where human intervention is limited or infeasible.

A practical example is the integration of AI in health monitoring for mission-critical systems such as power electronics, where AI must not only predict failure progression but do so under noise, partial data, and changing conditions. Ongoing research efforts on our campus, such as the development of an AI-driven driving simulator suite reflect this priority, with applications across engineering disciplines and institutional partners. These efforts train AI workforce talent, and explore dynamic scenario modeling in support of human-in-the-loop autonomy.

Physically-Embodied AI with Strategic Implications

Next-generation autonomy depends on physically-embedded AI, tightly integrated into the control systems of robots, drones, and intelligent infrastructure. Such systems require real-time, edge-based intelligence in resource-constrained or communication-isolated environments.
Illustrative applications include smart power modules capable of in-situ health monitoring and autonomous fault response, or AI-driven robotic platforms performing distributed tasks. Federal investment should support interdisciplinary research uniting sensing, actuation, and embedded learning in field-deployable systems.

National-Scale Infrastructure for Trustworthy Data Sharing

We propose strategic investment in privacy-preserving data trusts, high-quality open datasets, and synthetic data validation tools. As AI model size alone is no longer the primary driver of capability, reliable and equitable AI systems will increasingly depend on data quality and access.
Creating secure, shareable data infrastructure—especially in transportation, health, and climate-resilient infrastructure—can accelerate AI's societal value while maintaining public trust and protecting sensitive information.

Explainable AI for Reliability Assurance in Mission-Critical Systems

We urge the addition of a new strategic priority: explainable AI for reliability assurance. In domains such as aerospace and defense, AI systems must provide interpretable, transparent insights into degradation, fault detection, and failure prevention. These needs are distinct from commercial applications and align with the federal government's long-term stewardship role in critical technology reliability, cost efficiency, and human safety.

Cross-Cutting Recommendations

- **Support for AI R&D Infrastructure:** Investments should prioritize high-performance computing access, collaborative platforms, and training pipelines across academia and government labs.
- **Workforce Development:** Targeted funding for interdisciplinary AI training—spanning engineering, computer science, and public policy—is needed to cultivate the next generation of researchers and practitioners.
- **AI in Cybersecurity and Public Sector Applications:** Federal attention should remain focused on AI use for cybersecurity, cyberspace operations, and modernization of government services beyond commercial market incentives.