…machines that perceive and understand, improving prediction, turning data into hypotheses and discoveries, and determining just how much and how efficiently machines can learn…

I'm Reza Ghanadan. I joined DARPA as a program manager in 2013. My background is electrical engineering and computer science. I am interested in data analytics, autonomy, machine learning and artificial intelligence in information and cyber-physical systems.

At DARPA, I have been investigating the mathematical foundations and applications of these technologies to complex science and engineering problems, ranging from precision genomics and neuroscience, to robotics and human-machine collaboration.

Ever since my first job as an electrical engineer designing intelligent systems at AT&T Bell Labs, I have been captivated by how we can use observation data with feedback to make machines adaptive, and behave the way we want them to.

Today, using data and feedback to adaptively model the world is as important as ever, whether it's for personalizing a human-machine experience, such as with driverless cars and robotics, or for optimizing personalized medicine with precision genomics and drug discovery.

I am currently managing four on-going programs at DARPA:

1. In the MSEE program we are creating technologies that move us from machine vision to machine perception, and turning that into understanding with an analytic representation that can support and enable visual reasoning for adaptive autonomy.
2. In the GRAPHS program, we are designing new mathematical modeling, algorithms, and methods for large and complex networks of information for fast and accurate predictive analytics.
3. In the SIMPLEX program, we are conceiving new mathematical and computational tools to accelerate the path from data to hypothesis and discovery. Core to this process are revolutionary advances in knowledge representation, which is at the heart of data analytics, machine learning, and AI. We are applying these tools to complex systems such as genomics, neuroscience, material science, anthropology, and autonomy.
4. In the program called Fundamental Limits of Learning (or Fun LoL), we are addressing how the quest for the ultimate learning machine can be measured and tracked in a systematic and principled way. What are the key trade-offs between data accuracy and task complexity? How "efficient" is a given learning algorithm for a given problem?

The journey from data to knowledge, and to scientific discovery and engineering applications is challenging and increasingly more complex. At DARPA, by focusing on fundamentals, I am hoping to accelerate that journey by making it more principled, tractable, and fun!

Thank you, and I look forward to hearing your breakthrough ideas.

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