

Game Theory



Game theory is a way to mathematically describe strategic reasoning — modeling the strategic interaction between two or more players in a situation containing set rules and outcomes. In game theory, a “game” is any mathematical model that correlates different player strategies with different outcomes. This could be used to find reasoning in competitors in a market, or drivers on a highway or predators in a habitat.

Relevance in Computer Science

There is a wide variety of domains in computing where game theory has and will continue to gain traction. In fact, any application area involving automatic interaction and coordination of the following rely on game theory:

- Artificial intelligence
- Chess algorithms
- Cloud/distributed computing
- Machine learning
- Network security
- Recommendation systems
- Resource management
- Robotics
- Social networks
- Spot pricing system
- Wireless networks



Key Takeaway

There are different models within game theory and is ultimately used to find the best outcome. Though it was once primarily used in economics, game theory is being implemented on more efficient, large-scale analyses, and plays an increasingly visible role in computer science in areas as diverse as artificial intelligence, theory, distributed systems, and algorithms.

The prisoner's dilemma

		Prisoner B	
		Confess	Keep quiet
Prisoner A	Confess	Both go to jail for ten years	Prisoner B gets life imprisonment, A goes free
	Keep quiet	Prisoner A gets life imprisonment, B goes free	Both go to jail for one year

		PRISONER 2	
		Confess	Lie
PRISONER 1	Confess	<u>-8</u> , <u>-8</u>	0, -10
	Lie	-10, 0	<u>-1</u> , <u>-1</u>

Nash Equilibrium of Prisoner's Dilemma

Industry Opportunities

Software Engineer – Robotics AI

- Amazon Web Services
- Blue Origin
- Facebook
- Johns Hopkins Applied Physics Laboratory
- NVIDIA Corporation
- Path Robotics, Inc

Network Architect

- Johns Manville
- Amazon.com Services LLC
- Sony Corporations of America

Internet of Things (IoT) Security Scientist / IoT Developer / IoT Architect

- Chewy
- HID Global
- Lockheed Martin
- TeamViewer
- Siemens

Wireless Sensor Network Engineer

- Booz Allen Hamilton
- Leidos
- Samsung