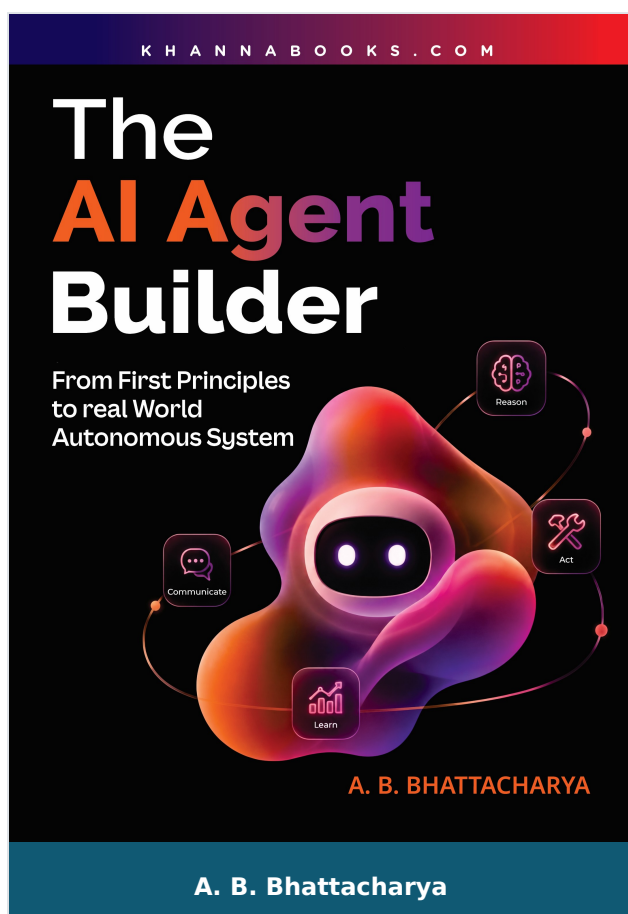




## The AI Agent Builder (From First Principles to real World Autonomous System)

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## Product Description

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The AI Agent Builder: From First Principles to Real-World Autonomous Systems is a comprehensive guide that introduces the concepts, architecture, development, and deployment of AI agents through a balanced combination of theoretical foundations and practical implementation. Intended for students, researchers, developers, and AI practitioners, the book explains agent architectures, large language models, memory systems, reasoning, planning, tool integration, multi-agent collaboration, safety, evaluation, deployment, and real-world applications.

## Salient Features

- **AI Agent Foundations:** Explains the evolution of AI agents, agent architectures, environments, perception, reasoning, action, and large language models through a structured first-principles approach.
- **Practical Agent Development:** Covers memory systems, planning strategies, reasoning techniques, tool integration, autonomous execution, and multi-agent collaboration with exercises and project-based learning.
- **Modern AI Technologies:** Introduces APIs, function calling, external knowledge integration, vector databases, retrieval-augmented generation, and scalable deployment methods for intelligent autonomous systems.
- **Safety and Evaluation:** Explains performance benchmarking, reliability testing, hallucination detection, AI safety principles, prompt injection protection, guardrails, and responsible deployment practices.
- **Real-World Applications:** Demonstrates AI agent implementations for research assistance, customer support, data analysis, productivity, and other practical domains through representative application scenarios.
- **Practice-Oriented Learning:** Reinforces understanding through practical exercises, project ideas, short-answer questions, and multiple-choice questions that

strengthen conceptual and implementation skills.

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## Author

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### A. B. Bhattacharya

Prof. A. B. Bhattacharya did his MSc and PhD degree from the University of Calcutta in Physics and Post-doc from the Massachusetts Institute of Technology (MIT), Cambridge, USA. He worked in close collaboration with the leading laboratories like Lincoln Laboratory; Milestone Hill Observatory; Earth, Atmospheric and Planetary Sciences division of MIT and many other well recognized laboratories in India and abroad. He served as Professor & Head of the Department of Physics, University of Kalyani; Dean of Research and Head of the ECE Department, Techno India University; Pro Vice Chancellor of JIS University and Director of Brainware University. He has published 32 text books for Science and Engineering students, two popular books for general readers and over 400 research articles in reputed International Journals. Under his supervision 24 scholars received their doctoral degree. He is a fellow of the Institute of Electronics and Telecommunication Engineers and member of many scientific organizations. India International Friendship Society awarded him the prestigious "Shiksha Ratna Award" and Certificate of Excellence for meritorious services, outstanding performance and significant contribution to education. The International Institute of Success Awareness honored him with their globally recognized "Glory of India Gold Medal" for his outstanding contribution to the national stature of India. A few words from the certificate issued by Prof. Williams of MIT may be quoted "Our collaborative effort was directed at the wavelength dependence of radar echoes observations with the Millstone Hill UHF radar in Westford. He made use of the Charles River Data System computer in the Weather Radar Laboratory for these calculations. His results help to make a convincing case that the volume reflectivity associated with lightning is a diminishing function of radar wavelength, contrary to contemporary thinking". Dr.