Course : Autonomous Agents and Collective Intelligence, designing Distributed Ecosystems with LLM

Design and deploy scalable multi-agent systems integrating LLMs

Practical course - 3d - 21h00 - Ref. LLM

Price : 2010 € E.T.

NEW

Suivez cette formation pour concevoir et déployer des écosystèmes multi-agents intelligents. Vous apprendrez à orchestrer, coordonner et superviser des agents autonomes capables de résoudre des tâches complexes et distribuées, grâce à des exercices pratiques et des projets concrets.

Teaching objectives

At the end of the training, the participant will be able to:

- Identify the key concepts of intelligent agents and LLM-driven architectures.
- Compare symbolic agents, LLM-powered and co-pilots to choose the right solution.
- Implement a LangChain agent with tools, memory and reasoning chains.
- Design a coordinated multi-agent system using roles, communication and workflows.
- Apply ontologies and semantic reasoning to standardize and share knowledge.
- Orchestrate and supervise multi-agent ecosystems, ensuring performance, security and scalability.

Intended audience

Developers, software architects, AI engineers, researchers, R&D managers and any professional involved in complex projects in Python, LLM or distributed systems.

Prerequisites

Python language skills. Good knowledge of LLMs. Basic knowledge of LangChain. Good knowledge of software and agent-oriented architecture.

PARTICIPANTS

Developers, software architects, AI engineers, researchers, R&D managers and any professional involved in complex projects in Python, LLM or distributed systems.

PREREQUISITES

Python language skills. Good knowledge of LLMs. Basic knowledge of LangChain. Good knowledge of software and agent-oriented architecture.

TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more.
Participants also complete a placement test before and after the course to measure the skills they've developed.

Course schedule

1 Foundations of intelligent agents and the role of LLMs

- Definition: agent, autonomy, environment, perception, action, objectives.
- Symbolic agent vs. LLM-powered. Difference between agents, chains and co-pilots.
- Difference between agents, chains and co-pilots.
- Overview of agent architectures (BDI, planners, prompt-based).
- Language model as a planning and reasoning engine.
- Limitations: hallucinations, coordination, computational cost.

2 LangChain agents and tool-based reasoning

- Architecture of a LangChain agent.
- Components: tools, memory, output parser, AgentExecutor.
- Examples of tools: calculation, search, files, APIs.
- Management of reasoning chains and the environment.

Hands-on work

Creation of a simple agent with tools. Agent that answers questions, uses a search tool, performs a calculation. Management of reasoning chains and environment.

3 Multi-agent theories and frameworks

- Agent types: specialized, hierarchical, competitive, collaborative.
- Different approaches to coordination: by task, by role, by message.
- Communication models: blackboard, publish/subscribe, direct dialog (JSON).
- Some frameworks: LangChain Multi-Agent, CrewAI, AutoGen, ChatDev, AutoGPT.
- Structuring complex workflows: delegation, roles, dependencies

4 Ontologies and semantic reasoning

- Standardizing shared knowledge.
- Integrating business ontologies into a multi-agent system.
- Reasoning from knowledge graphs (RDF, Neo4j).
- Long memory for inter-agent coordination.

Hands-on work

Conception d'un système à 3 agents spécialisés. Exemple : analyste de données, rédacteur de rapport, vérificateur juridique. Coordination par rôle et par objectif. Utilisation de mémoire longue.

5 Planning, supervision and safety

- Implementing chain-of-thought for LLM planning.
- The limits of LLMs: noise, instability, infinite loops.
- Control strategies: scoring, pruning, critical agents.
- Supervision and monitoring of interactions (logging, replay, auditability).
- Governance and security: sandboxing, compliance, critical agent or human-in-the-loop (HITL).

Dates and locations

TEACHING AIDS AND TECHNICAL RESOURCES

• The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
• At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
• A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at psh-accueil@orsys.fr to review your request and its feasibility.

REMOTE CLASS
2026 : 9 Mar., 15 June, 14 Sep., 23 Nov.

PARIS LA DÉFENSE
2026 : 2 Mar., 8 June, 7 Sep., 16 Nov.