

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

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| 1. | 课程名称 Course Title | 人工智能及金融应用 Artificial Intelligence and Applications in Finance |
| 2. | 授课院系 Originating Department | 金融系 Department of Finance |
| 3. | 课程编号 Course Code | FIN311 |
| 4. | 课程学分 Credit Value | 3 |
| 5. | 课程类别 Course Type | 专业选修课(金融学) Major Elective Courses 专业基础必修课(金融工程) Subject-Foundation-Required |
| 6. | 授课学期 Semester | 秋季 Fall |
| 7. | 授课语言 Teaching Language | 中英双语 English & Chinese |
| 8. | 授课教师、所属学系、联系方式 (如属团队授课, 请列明其他授课教师) Instructor(s), Affiliation & Contact (For team teaching, please list all instructors) | 王新杰, 助理教授, 金融系 慧园 3 栋 320 室 xinjie.wang@sustc.edu.cn 0755-8801-8602 WANG, Xinjie, Assistant Professor, Department of Finance Rm.320, Block 3 Wisdom Valley. |
| 9. | 实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact | 待公布 To be announced |
| 10. | 选课人数限额(可不填) Maximum Enrolment (Optional) | 40 |

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| 11. 授课方式 Delivery Method | 讲授 Lectures | 习题/辅导/讨论 Tutorials | 实验/实习 Lab/Practical | 其它(请具体注明) Other (Please specify) | 总学时 Total |
| 学时数 Credit Hours | 48 | | | | 48 |

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| 12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements | 计算机系统设计及应用 A (CS209A) |
| 13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite | |
| 14. 其它要求修读本课程的学系 Cross-listing Dept. | |

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

介绍人工智能的一些基本概念，以及基本理论，如智能体，知识表达，逻辑，搜索等。重点强调构建金融智能系统所必须的相关技术等。

To introduce the basic concepts in artificial intelligence (AI), as well as basic theories, such as intelligent agents, knowledge representation schemes, logic, search, etc. The emphasis is on development of financial intelligent systems by using related AI technologies.

16. 预达学习成果 Learning Outcomes

完成该课程之后，学生应该了解人工智能的一些基本概念，以及构建智能系统所必须的基本理论和相关技术；并且能够应用所学到的理论和技术来构建简单的金融智能系统。

After completing this course, students should master basic theories and technologies of artificial intelligence. In addition, they should be able to apply such theories and technologies to develop simple financial intelligent systems.

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）

Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

Part 1: Introduction（导论）

Lecture 1 (2 hours) Introduction to the foundations and history of artificial intelligence（简单介绍人工智能的基础和历史）

Lecture 2 (2 hours) Structure and rationality of intelligent agents（代理人的基础知识，结构，合理性的定义）

Part 2: Problem solving（问题解决）

Lecture 3 (2 hours) Solving problems by searching（应用搜索办法解决问题）

Lecture 4 (2 hours) Beyond classic search: local search, simulated annealing and genetic algorithm（超越传统搜索，包括有局域搜索，退火算法，基因算法）

Lecture 5 (2 hours) Constraint satisfaction problems (在有限制条件下的优化问题。考虑空间态和搜索方法的相互联系)

Lecture 6 (2 hours) Logical agents, deriving new representations about the world (逻辑代理人, 从新的角度来考虑世界的表达和推演)

Lecture 7 (2 hours) Classical Planning, how an agent can take advantage of the structure of a problem to construct complex plans of action (经典规划, 代理人如何能利用问题的结构来构建复杂的行动)

Lecture 8 (2 hours) Planning and acting in the real world (现实世界的规划, 更复杂的代理和更加交互的结构)

Lecture 9 (2 hours) Knowledge Representation, using first-order logic to represent the most important aspects of the real world (知识表现, 如何使用一阶逻辑来表达真实世界最重要的方面)

Lecture 10 (2 hours) Quantifying uncertainty, how agent can tame uncertainty with degrees of belief (量化不确定性, 代理人使用意见的程度来降低不确定性)

Lecture 11 (2 hours) Probabilistic reasoning, how to build network models to reason (概率推理, 如何使用网络模型来推演)

Lecture 12 (2 hours) Probabilistic reasoning over time, interpret the present, understand the past and predict the future (概率推理时间推演, 解释现在, 理解过去和预测未来)

Lecture 13 (2 hours) Making simple decision, making decisions so that it gets what it wants (简单决定, 代理人如何做出决定来达到目的)

Part 3: Learning

Lecture 14 (2 hours) Learning from examples, improving the behaviour through diligent study of their own experience (从例子中学习, 通过学习自己的经历来提高行为)

Lecture 15 (2 hours) Knowledge in learning, examining the problem of learning when you know something already (知识中的学习, 已知知识的学习)

Lecture 16 (2 hours) Learning probabilistic models, learning as a form of uncertain reasoning from observations (学习概率模型, 从不确定的推理来看待学习)

Lecture 17 (2 hours) Reinforcement learning, how an agent can learn from success and failure, form reward and punishment (强化学习, 代理人如何从成功, 失败, 收益和处罚中学习)

Part 4: Communicating, perceiving and acting

Lecture 18 (2 hours) Natural language processing, making use of the copious knowledge (自然语言处理, 使用自然语言的丰富知识)

Lecture 19 (2 hours) Natural Language for communication (交流的自然语言处理)

Lecture 20 (2 hours) Perception, linking computers to the raw, unwashed world (感知, 连接计算机到真实世界)

Lecture 21 (2 hours) Robotics, agents endowed with physical effectors (机器人技术)

Lecture 22 (2 hours) Applications in Finance I (金融应用 I)

Lecture 23 (2 hours) Applications in Finance II (金融应用 II)

Lecture 24 (2 hours) Final presentation (期末报告)

18. 教材及其它参考资料 Textbook and Supplementary Readings

指定教材:

Stuart J. Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 3rd Ed. Pearson, 2011.

课程评估 ASSESSMENT

| 19. 评估形式 Type of Assessment | 评估时间 Time | 占考试总成绩百分比 % of final score | 违纪处罚 Penalty | 备注 Notes |
|---|--------------|----------------------------------|-----------------|-------------|
| 出勤 Attendance | | 10 | | |
| 课堂表现 Class Performance | | 10 | | |
| 小测验 Quiz | | | | |
| 课程项目 Projects | | 40 | | |
| 平时作业 Assignments | | | | |
| 期中考试 Mid-Term Test | | | | |
| 期末考试 Final Exam | | | | |
| 期末报告 Final Presentation | | 40 | | |
| 其它(可根据需要 改写以上评估方 式) Others (The above may be modified as necessary) | | | | |

20. 记分方式 GRADING SYSTEM

- A. 十三级等级制 Letter Grading
 B. 二级记分制 (通过/不通过) Pass/Fail Grading

课程审批 REVIEW AND APPROVAL

21. 本课程设置已经过以下责任人/委员会审议通过
 This Course has been approved by the following person or committee of authority



南方科技大学
SOUTHERN UNIVERSITY OF SCIENCE AND TECHNOLOGY

