

# Introduction to Artificial Intelligence

Lirong Xia



Rensselaer

Thursday, January 18, 2018

# Basic information about course

- Mon Thur 2:00-3:50pm, EATON 214
- Text: Artificial Intelligence: A Modern Approach
- Course website: google “Lirong Xia” and follow the link
- Instructor: Lirong Xia
  - TBD, Lally 306
- TA 1: Chunheng Jiang
- TA 2: Avi Weinstock

# Prerequisites and Policy

- Comfortable **programming** in Python 2
- Some knowledge of **algorithms**
  - Must have taken Intro to Algorithms
- Familiar with **probability**
  - Must have taken FOCS
- If you have a **nonstandard computer science background**, talk to me first
- No electronics in classroom except for polling

# Grading

- Exam 1: 30%
- Exam 2: 30%
- Projects: 25%
  - must do it yourself, must acknowledge discussions
- Written Homeworks: 15%
  - must do it yourself, must acknowledge discussions
- Bonus
  - 1% for in-class signup
- Late policy
  - official excuses are allowed
  - otherwise, 3 tokens, each for 24 hours, only 1 is allowed for each case
  - otherwise no partial credit

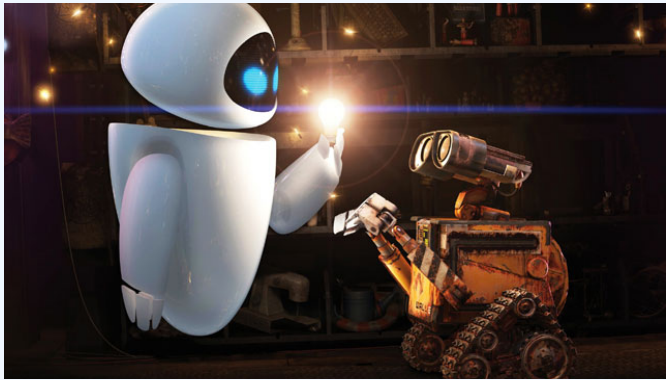
# Goal of the course

- Learn about **Artificial Intelligence**
  - Increase your **AI Literacy**
  - Prepare you for **Topics Courses** and/or **Research**
- **Breadth over Depth**

# Goal of today

- What is AI?
- AI history
- State of the art
- A walk through the **syllabus**

# What is AI?



# Science and Engineering

- Humans have achieved many wonders in the physical world.
- How about in the spiritual world?
- AI is one of the **great intellectual adventures** of the 20th and 21st centuries.
  - What is a mind?
  - How can a physical object have a mind?  
Is a running computer (just) a physical object?
  - Can we build a mind?
  - Can trying to build one teaches us what a mind is?



# Some State-of-the-Art AI

- iRobot Roomba automated vacuum cleaner
- Automated speech/language systems
- Spam filters using machine learning
- Usable machine translation through Google
- Watson wins at Jeopardy
- Deep Blue beats Kasparov
- AlphaGo

# Other Good AI Challenges

Trading agents



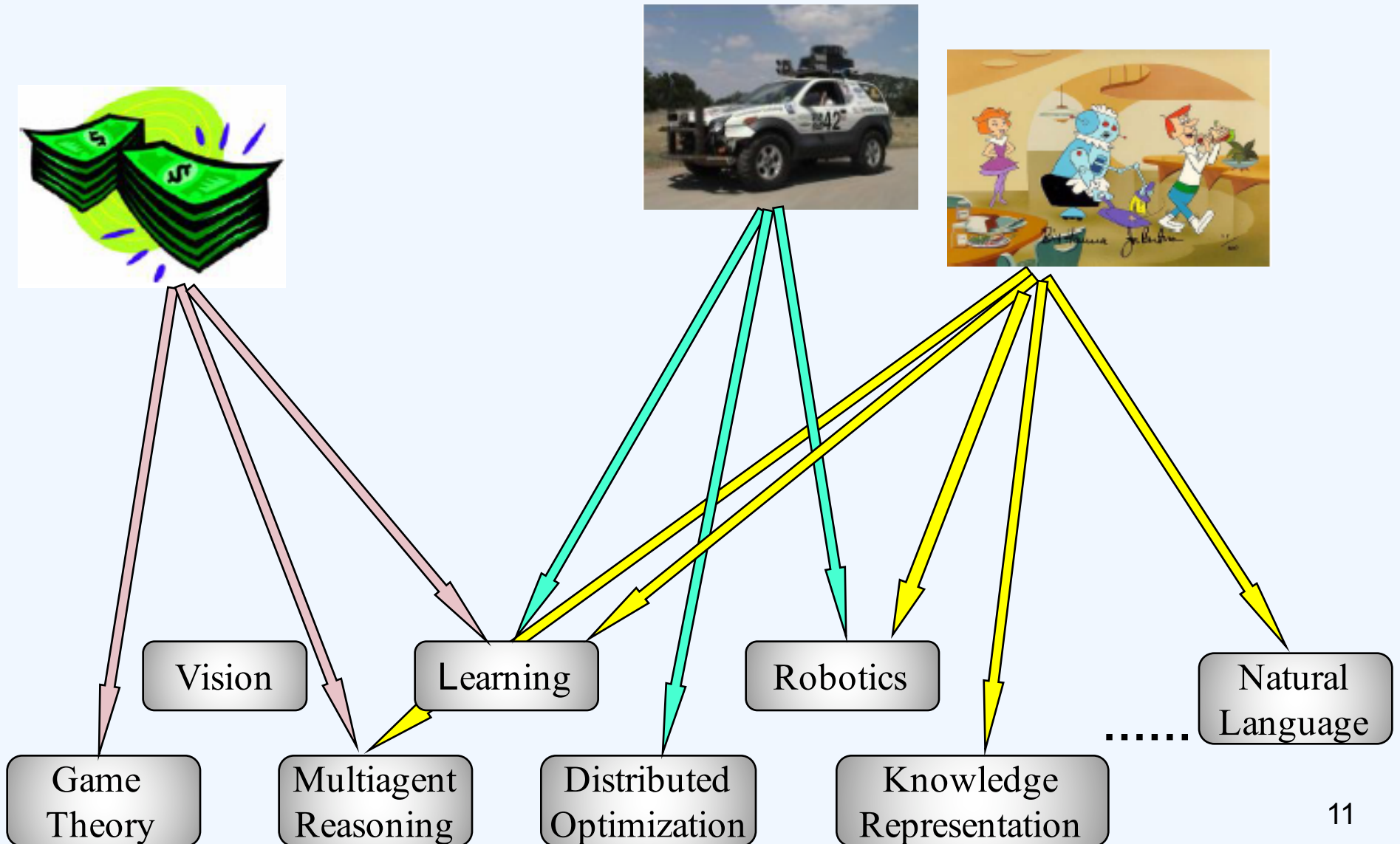
Autonomous vehicles



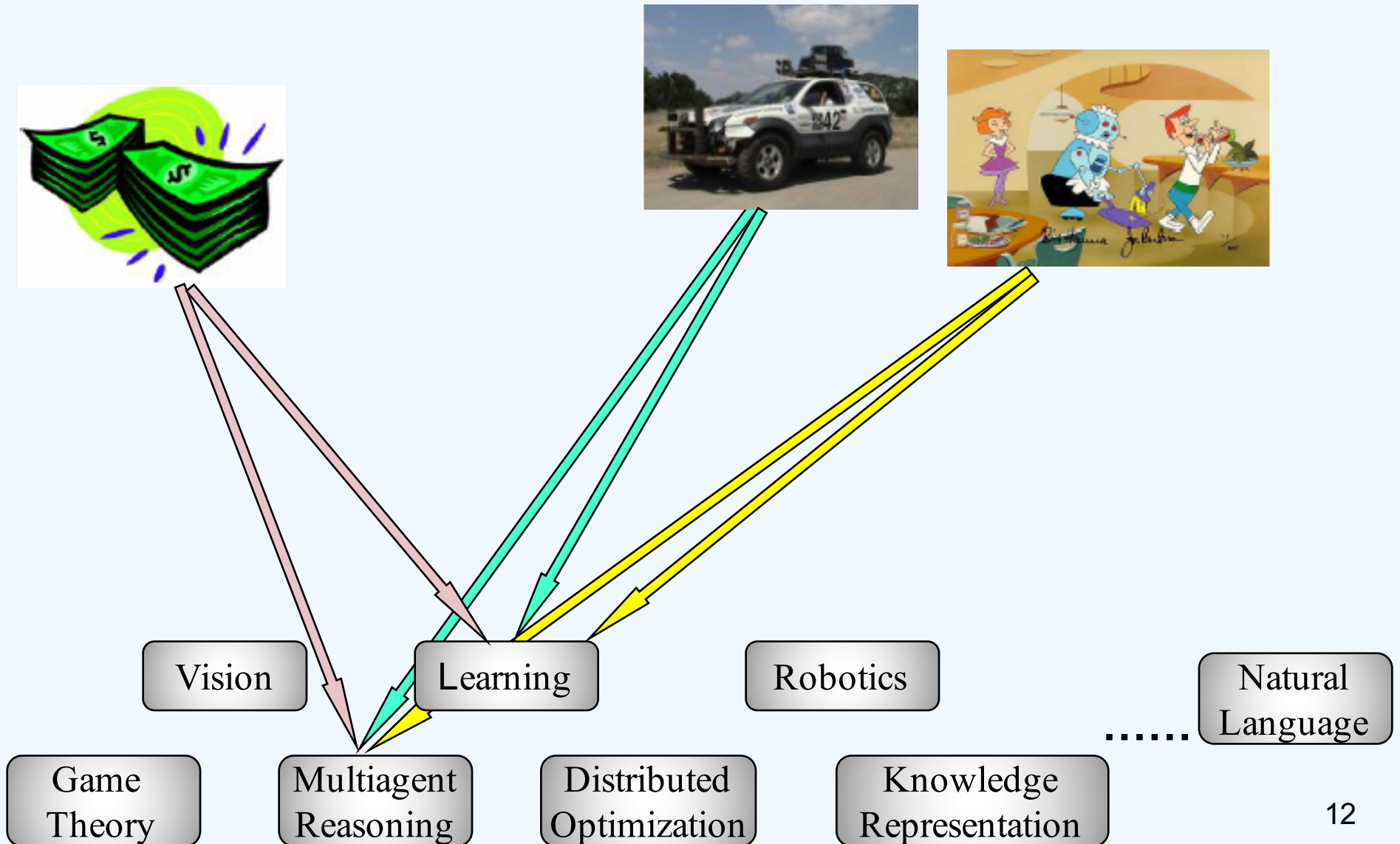
Socially assistive robots



# Challenges Drive Research



# Learning and Multiagent Reasoning



# Ethics/Implications

Robust, fully autonomous agents in the real world

What happens when we achieve this goal



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# A Walk through the Schedule

Official schedule is online

# Topics

## ➤ Search

- Project 1: Pacman search dots in a maze

## ➤ Game playing

- Project 2: Avoid the ghosts

## ➤ Probability, decision theory, reasoning under uncertainty

- Project 4: Ghostbuster

## ➤ Machine learning

- Reinforcement learning (Project 3)
- Classification: recognizing handwritten digits (Project 5)

## ➤ Other topics

- Planning: finding a schedule that will allow you to graduate (reasoning backwards from the goal)
- Game theory

# The Pacman projects

- Use python 2.7, not 3.0
- 0: python tutorial (1 week, due 1-24 11:59pm)
- 1 : search in the maze (2 weeks)
- 2: avoid the ghost (2 weeks)
  - python pacman.py
  - python pacman.py -p ReflexAgent -l testClassic
- 3. reinforcement learning (2 weeks)
  - the technique behind AlphaGo
- 4. ghostbusters (2 weeks)
  - python busters.py -l bigHunt
- 5. classification (2 weeks)
- Late policy: 3 tokens, each for 24 hours



# Assignments

- Join Piazza for discussions, Q/A, etc
- First “programming” assignment
  - Project 0: Tutorial of Python
  - Due date: 1-25 11:59 pm
  - Use Submittity for submission
    - Submission instructions will be available soon

# Acknowledgements

- The slides are based on
  - Pieter Abbeel and Dan Klein's AI course at UC Berkeley
  - Vincent Conitzer's AI course at Duke
  - Peter Stone's AI course at UT Austin
- Project assignments
  - The Pac-man projects (John DeNero, Dan Klein, Pieter Abbeel, and many others)