

Artificial Intelligence

Introduction and Course Definition

Course Information

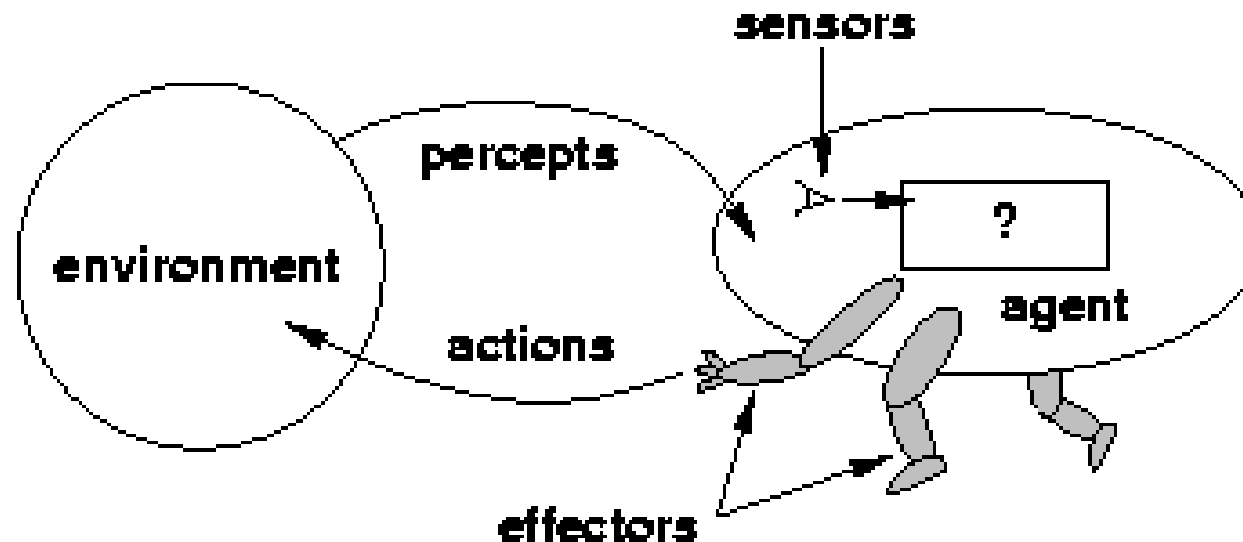
- ▶ Instructor:
 - ▶ Roya Choupani
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- ▶ Course Webpage: ceng466.cankaya.edu.tr
- ▶ Text Book: S. Russell, and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice-Hall, 3rd ed.

What Is Artificial Intelligence

- ▶ “The art of creating machines that **perform** functions that require **intelligence** when performed by people” (Kurzweil, 1990).
- ▶ “The branch of computer science that is concerned with the automation of **intelligent behavior.**” (Luger and Stubblefield, 1993)

Intelligent Agents

- ▶ An agent is something that perceives and **acts** in an environment
- ▶ An ideal agent always takes actions that **maximizes its performance**
- ▶ An agent adopts a **goal** and searches the **best path** to reach that goal



Artificial Intelligence Applications

- ▶ Image Tagging: AI can be used to recognize objects in images.
- ▶ Images can be grouped according to their tags



Artificial Intelligence Applications

- ▶ **Speech to Text:** This application converts our spoken words into text



Artificial Intelligence Applications

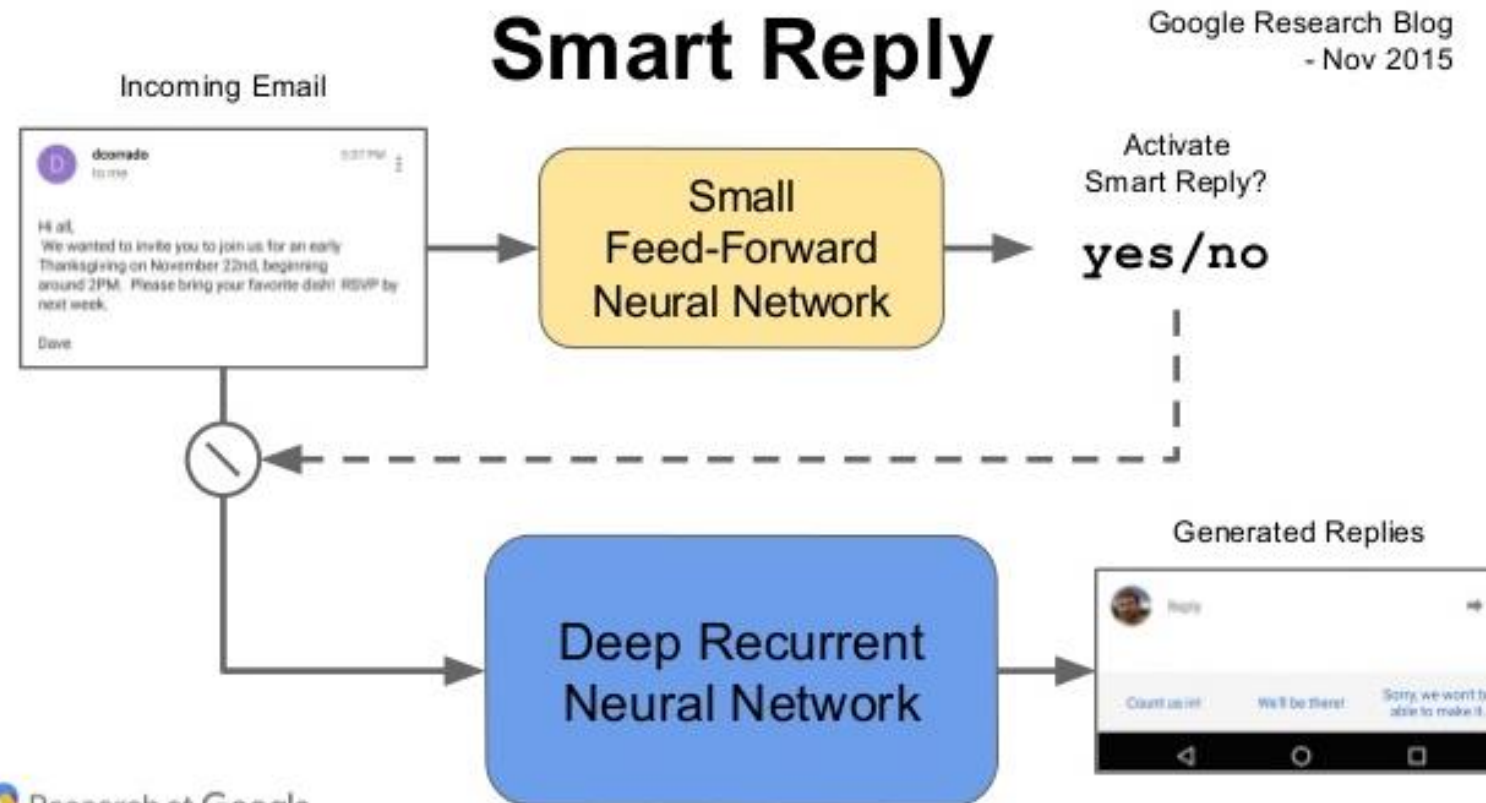
- ▶ Ranking web pages: Which web page has the closest content to the given query?

RankBrain in Google Search Ranking



Artificial Intelligence Applications

- ▶ Creating automatic reply to emails



Artificial Intelligence Applications

- ▶ Image description: Describing the contents of images

Generating Image Captions from Pixels



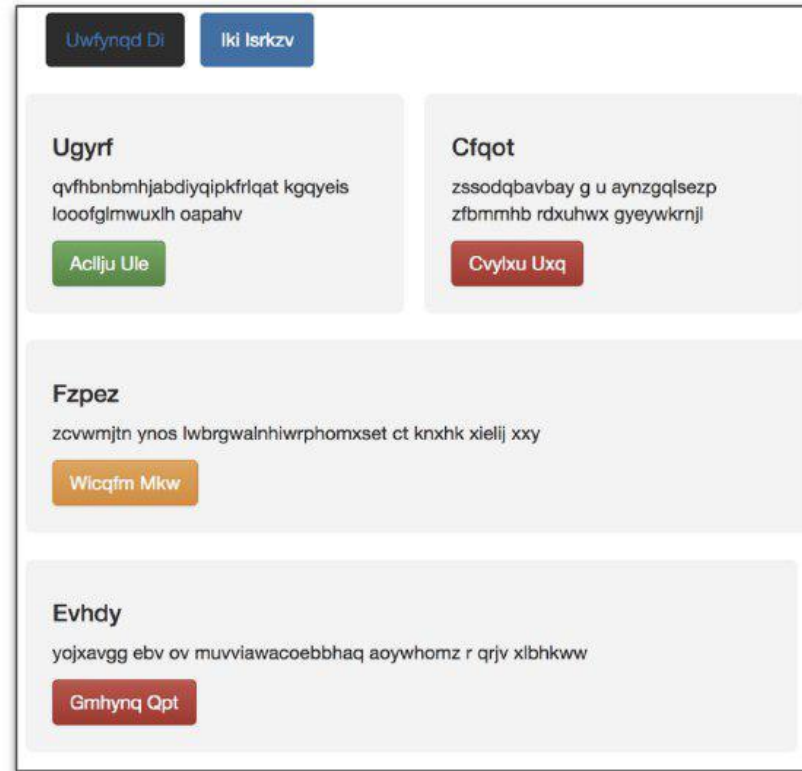
Human: A young girl asleep on the sofa cuddling a stuffed bear.

Model sample 1: A close up of a child holding a stuffed animal.

Model sample 2: A baby is asleep next to a teddy bear.

Artificial Intelligence Applications

► Converting scratch design to web page



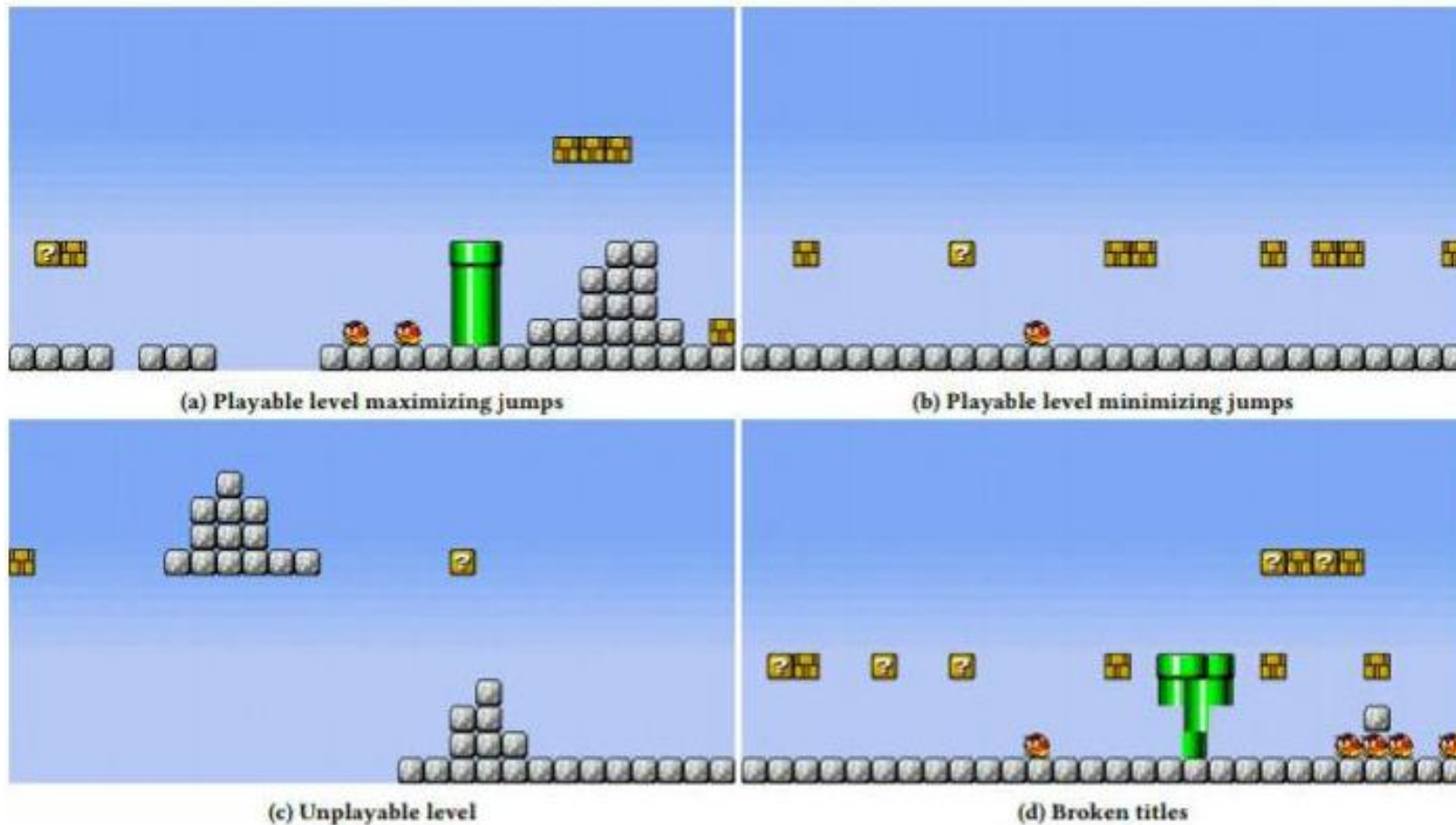
Artificial Intelligence Applications

- ▶ Self driving cars



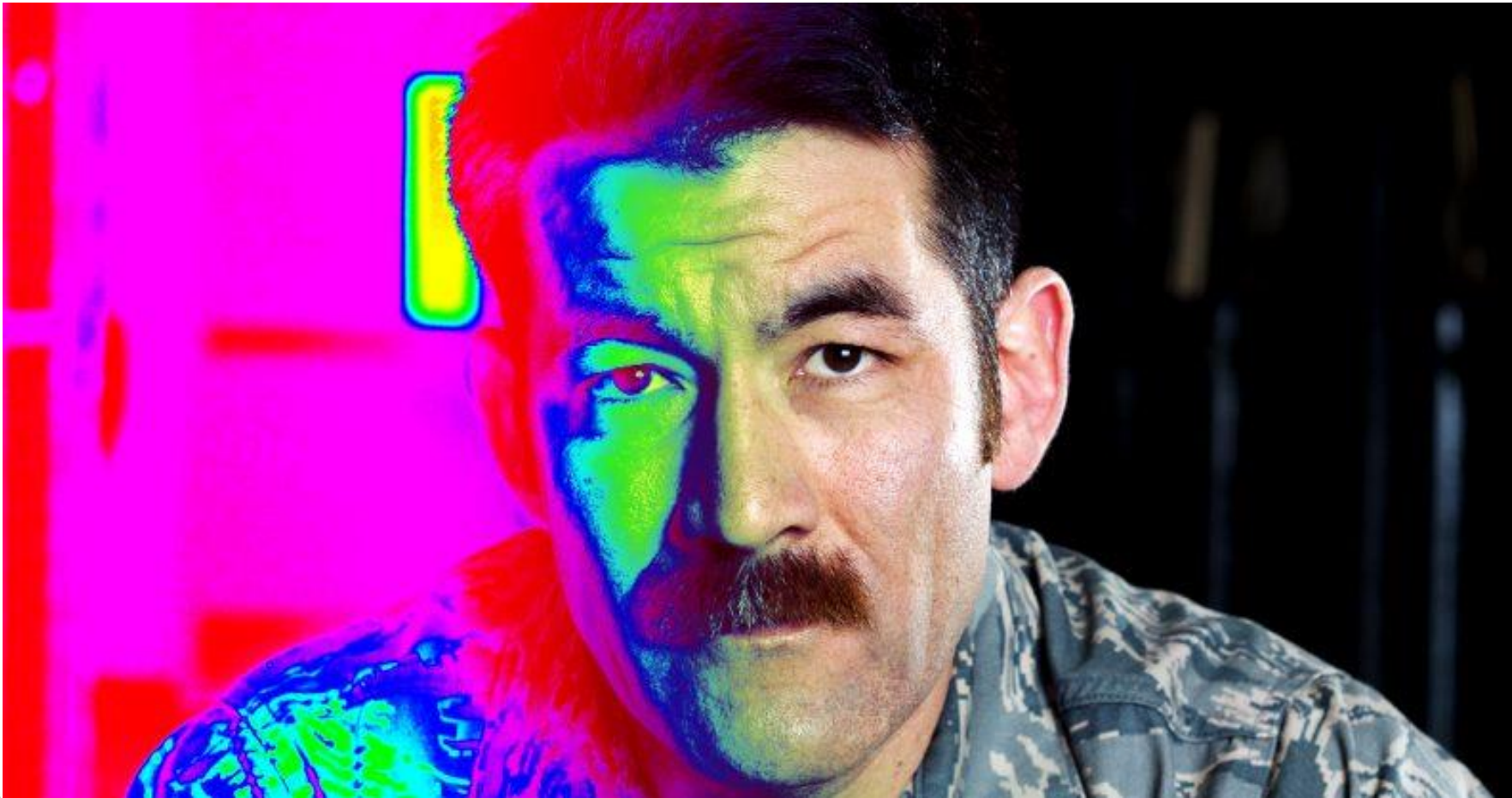
Artificial Intelligence Applications

- ▶ Creating new stages in computer games



Artificial Intelligence Applications

- ▶ Identification from infra-red images



Artificial Intelligence Applications

- ▶ Harmony of colors in manipulated images



Artificial Intelligence Applications

- ▶ Learning styles: An intelligent application can find out the style of paintings, music, or movies.

1 Upload photo

The first picture defines the scene you would like to have painted.



2 Choose style

Choose among predefined styles or upload your own style image.



3 Submit

Our servers paint the image for you. You get an email when it's done.



A Second Example



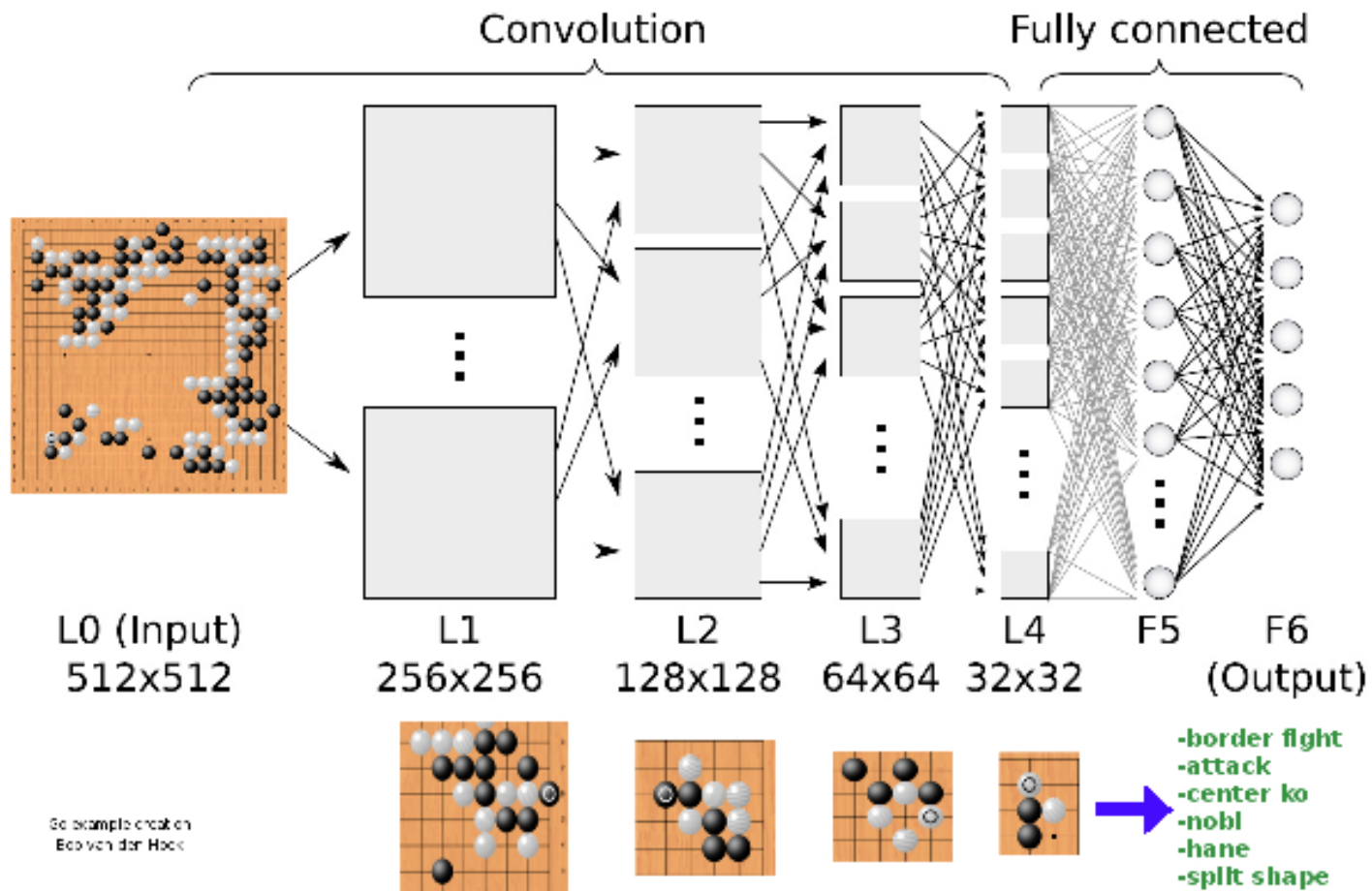
Artificial Intelligence Applications

► Designing clothes



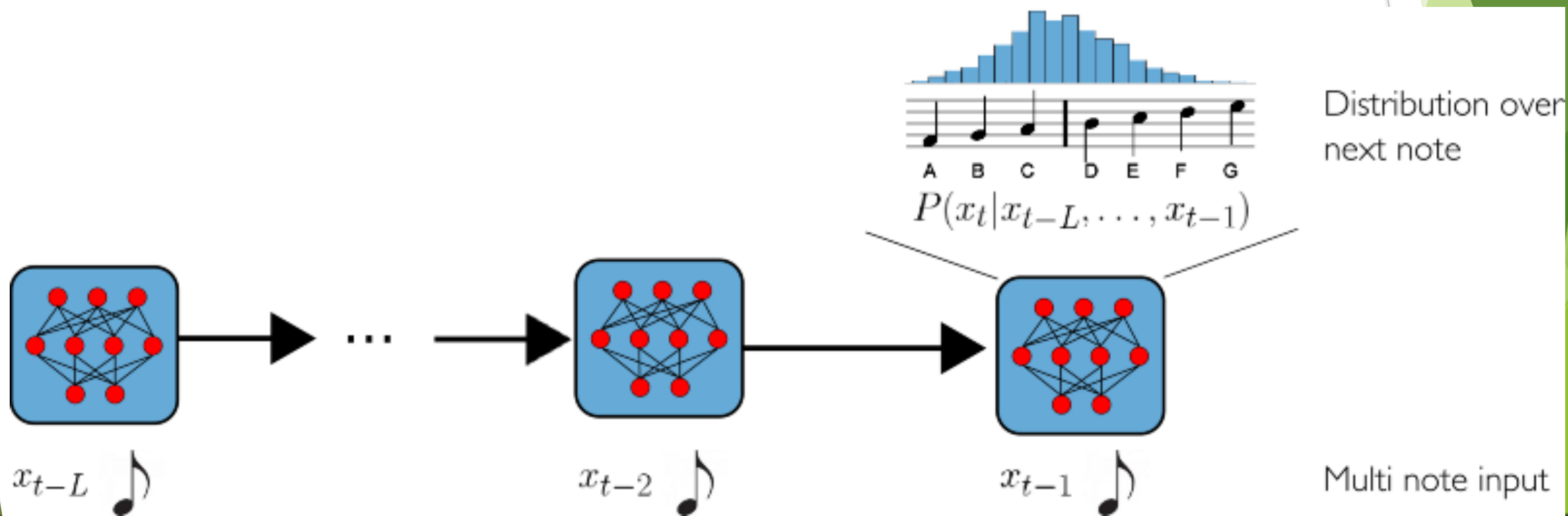
Artificial Intelligence Applications

► Playing games



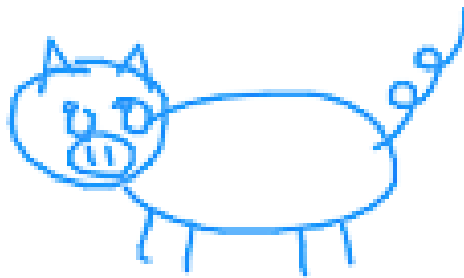
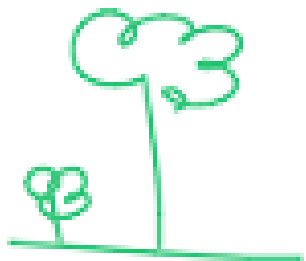
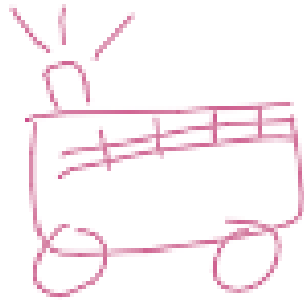
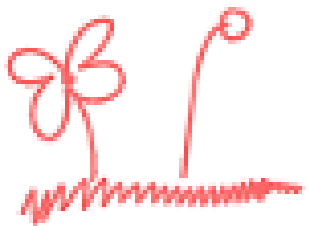
Artificial Intelligence Applications

► Composing music



Artificial Intelligence Applications

► Drawing



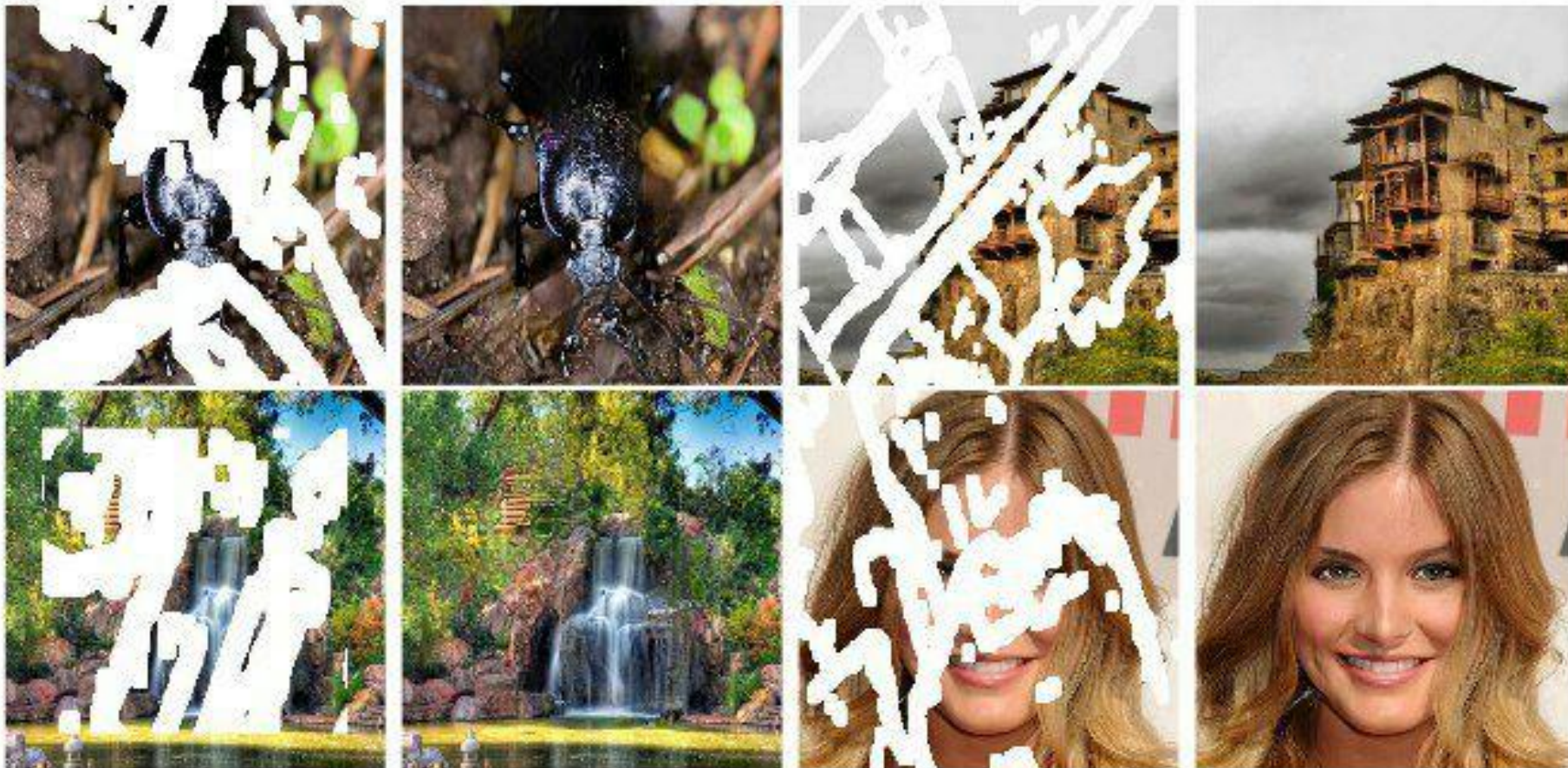
Artificial Intelligence Applications

- ▶ Opening eyes in photos



Artificial Intelligence Applications

► Image in-painting



Artificial Intelligence Applications

- ▶ Synthesize videos

Synthesizing Obama: Learning Lip Sync from Audio

Supasorn Suwajanakorn
Steven M. Seitz
Ira Kemelmacher-Shlizerman

University of Washington

SIGGRAPH 2017

<http://grail.cs.washington.edu/projects/AudioToObama/>

Course Syllabus

- ▶ Introduction: What Is AI?
- ▶ Agents and Environments
- ▶ The Nature of Environments
- ▶ The Structure of Agents
 - ▶ Agent programs
 - ▶ Simple reflex agents
 - ▶ Model-based reflex agents
 - ▶ Goal-based agents
 - ▶ Utility-based agents
 - ▶ Learning agents

Syllabus (Continued)

- ▶ Solving Problems by Searching
- ▶ Searching for Solutions
- ▶ Uninformed Search Strategies
- ▶ Informed (Heuristic) Search Strategies
- ▶ Advanced Search Strategies
- ▶ Knowledge-Based Agents
- ▶ Reasoning
- ▶ First-Order Logic
- ▶ Making Simple Decisions
- ▶ Learning
- ▶ Introduction to Machine Learning

Grading Policy

- ▶ Midterm 35%
- ▶ Final 35%
- ▶ Term Project 30%

Questions?

