Introduction to Artificial Intelligence
Video Games and AI Planning

Janyl Jumadinova
November 7, 2016
AI in (commercial) video games
AI in (commercial) video games

- Path finding
- Realistic motion
- Models of emotion
- Decision making
- Learning
- Nonlinear story telling
- ...

2/15
AI techniques are currently used for the decision making of non-player characters (NPCs) in the commercial video games.
Finite State Machines

NPC behavior based on high-level states
Finite State Machines

- Traditionally one of the first techniques for NPC behavior
- Very simple to understand
- Very simple to implement (e.g., directly using if-then-else statements)
- Subset of MDP
Decision Trees (Behavior Trees)

NPC behavior based on more refined conditions and strategies
Decision Trees (Behavior Trees)

NPC behavior based on more refined conditions and strategies
Decision Trees (Behavior Trees)

NPC behavior based on more refined conditions and strategies (e.g. Halo 2)
Goal Oriented Action Planning (GOAP)

Search in real-time for a strategy that achieves the goal in the current state (FEAR)

- **Move into room**
  - Preconditions: Door open
  - Effects: In room

- **Move to door**
  - Preconditions: -
  - Effects: At door

- **Unlock door**
  - Preconditions: Hold key
  - Effects: Door open

- **Kick door**
  - Preconditions: -
  - Effects: Door open
iThink: STRIPS planning in Unity3D

- https://code.google.com/p/ithink-unity3d/
- Provides a basic framework for specifying and solving STRIPS planning problems inside Unity3D
- Can be used as a realistic testbed to try STRIPS planning in commercial games
Unity

Simplify development of games

- Game Mechanics
  - physics, AI

- Rendering Effects
  - shadows, lighting

- I/O Abstraction
  - input devices
  - output devices
1 – Scene
Scene is same as Hierarchy(2) = same, just diff. views
   Editable (design-time) 3D game objects in the current scene

2 – Hierarchy
   Text list of game objects and sub-objects in the current scene

3 – Inspector
   Properties for currently selected

4 – Game
   Preview how game will look when executing

5 – Project
   Contents of Project ‘assets’ folder (i.e. files in that folder)
   - library of scripts, digital media files, and scenes
Unity
Unity in C#

```csharp
void Start()
{
    //called once. do any initialization here
}

void Update()
{
    //called every frame. move objects here
}
```