

Design of computer video games

3. Game characters' development

Boyan Bontchev

Agenda

- Introduction to game characters' development - definitions and basic concepts.
- Types and archetypes of player characters
- Description of the character
- Visual and verbal development of gaming hero.
- Non-player characters, or NPC (computer-controllable characters)
- Development of NPC and the role of artificial intelligence - strategies and behavior
- Examples

References

- Main reference:

- Adams, E. Fundamentals of Game Design, Third Edition, Pearson Education, Inc., ISBN-13: 978-0-321-92967-9, 2014

- Other references:

- Cited on the slides

Character development - main goal

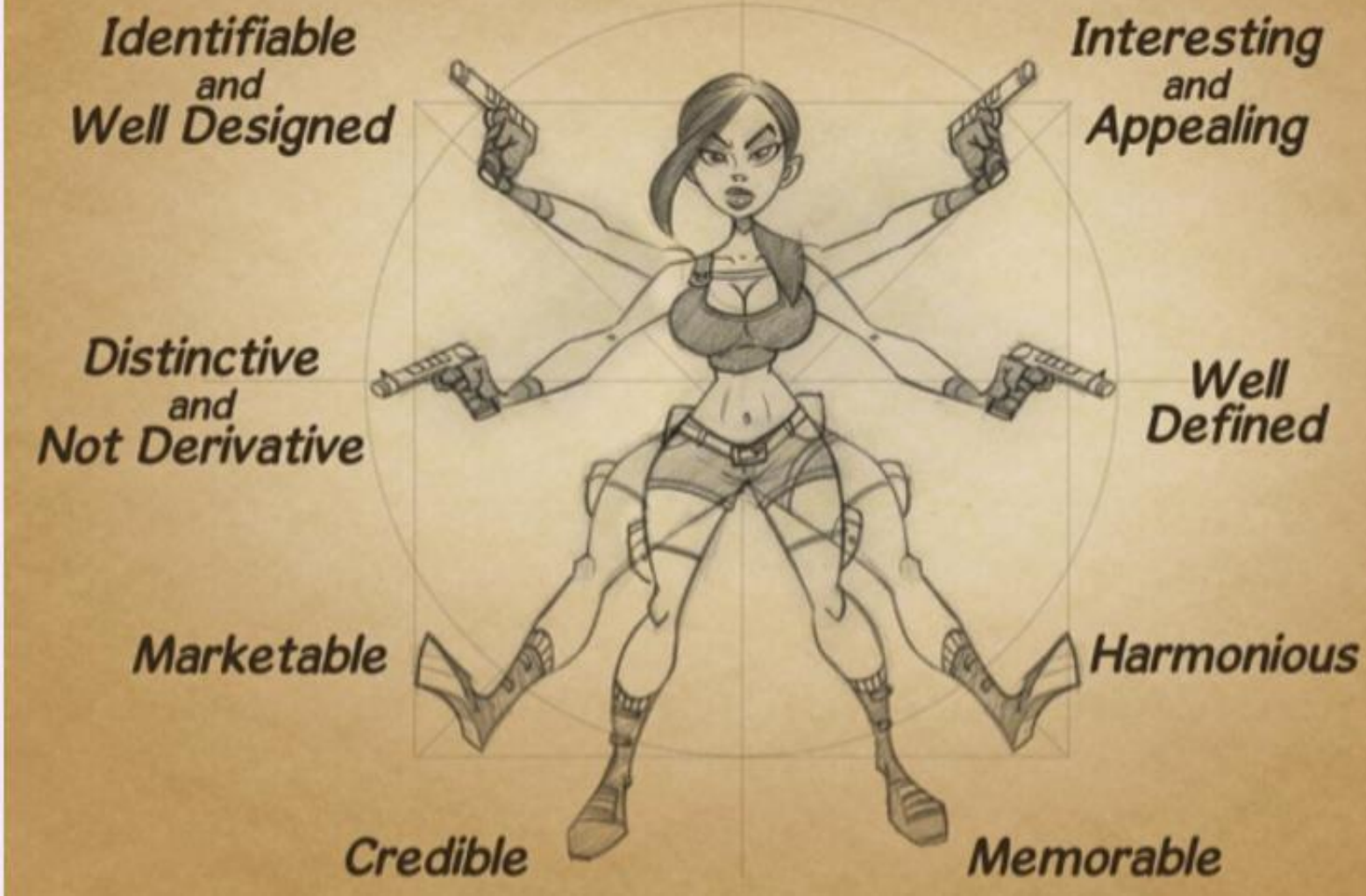
To design compelling and believable characters:

1. Visual
2. Behavioural
3. Audible



Source: <https://www.pinterest.com/oscartocino/vector-characters/>

GOALS OF CHARACTER DEVELOPMENT



Source: Character Development for Video Games, Kshiraj Telang, Senior Game Artist at King

Character development - purpose

- Character design is very important for:
 - action games (especially fighting and platform subgenres)
 - adventure games
 - action-adventure hybrids
 - role-playing games - all use characters extensively to entertain.
- Players need well-designed characters to identify with or oppose to them



Character development - needs

- A character need not be attractive in the conventional sense of being pleasant, but he must be competently constructed:
 - well drawn or/and
 - well described
- A good character should also be credible
- A good character is the most financially valuable part of any video game's intellectual property
- Customers identify many games by their key characters (like *PacMan* or *Lara Croft and the Guardian of Light*) and create call *mindshare* (consumer awareness of a product or brand)



Player vs avatar

- *Avatar* - refers to a character in a game who serves as a protagonist under the player's control. (in Sanskrit and in the Hindu religion refers to the bodily incarnation of a god.)
- Most action and action/adventure games provide exactly one avatar
- Many RPG allow the player to manage a party of characters and switch control from one to another
- The player usually sees the avatar onscreen more than any other character if the game is presented in the third person.



Source: *The Psychology of Video Game Avatars*,

<http://www.psychologyofgames.com/2013/11/the-psychology-of-video-game-avatars/>

Design of computer
video games

Fixed avatars (supplied by the game) 1/3

- Non-specific avatars - the designer didn't specify anything about them
 - in text games
 - in FPS video games with no mirrors like in:
 - *Myst* (1993) - <https://www.youtube.com/watch?v=e-8CFun3nEw>
 - Gordon Freeman (who does not speak and is never even seen in the game, but only on the box), the hero of *Half-Life* (1998) - <https://www.youtube.com/watch?v=JoV9o6b91Sc>



Fixed avatars (supplied by the game) 2/3

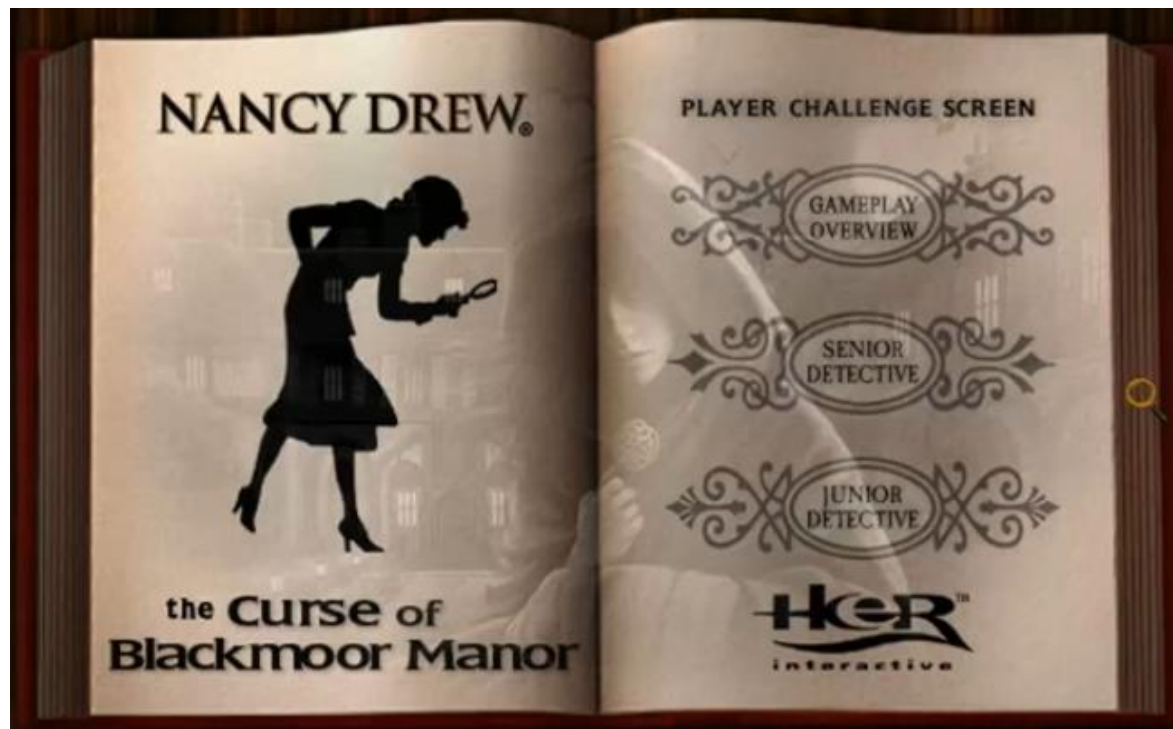
- Specific avatars

- Max Payne (since 2008) -

- <https://www.youtube.com/watch?v=YvnXEUzTPyY>

- Nancy Drew (1998 – present) -

- <https://www.youtube.com/watch?v=cYJlzgbbnfE>



Fixed avatars (supplied by the game) 3/3

- Semi-specific avatars

- Only partially characterized (cartoon-based), with flat behavior – Mario and Luigi
- Typical for action game avatars – Lara Croft



Player-designed avatar characters

- MMO RPG almost always allow to design their own avatar, incl.:
 - physical attributes - race, sex, body type, hair, clothing, etc.
 - skills, like strength and dexterity
 - mental attributes
- See the video “Lord of the Rings Online Character Creation” - https://www.youtube.com/watch?v=TxfO9_pQhCg



Character physical types 1/2

- human (humanoid), nonhumanoid, or hybrids
- *cartoonlike game characters:*

- cool
- tough
- cute
- goofy
- ...



Character physical types 2/2

- hypersexualized characters
 - *males*
 - *females*



Avatar control mechanisms

- *Two types of control:*
 - *indirect* player's control – he/she doesn't steer the avatar around but points to where he wants the avatar to go (Nancy Drew and the avatars in all other point-and-click adventure games and RPG)
 - *direct* player's control – he/she steers their bodies through the game world, running, swimming, jumping, and fighting as necessary (Lara Croft and Mario)
- *Discussion: pro's and con's?*

Protagonist in the game

- The main character in the story
- Example: Mario
 - His character?



Antagonist in the game

- The character (or obstacle) that is against the main character
- Example: Wario
 - His character?



Co-protagonist in the game

- The secondary main character
- Example: Luigi (supports Mario)
 - His character?



Source: Game Development Essentials, by Jeannie Novak

Character Development Levels



Hero characters...

- ... accompanied by sidekicks
- sidekicks offer several benefits:
 - allow us to give the player additional moves and other actions that would not be believable in a single character;
 - they extend the emotional range of the game by adding different personality from the hero;
 - can give the player valuable information when needed (like in *The Legend of Zelda: Ocarina of Time*, <https://www.youtube.com/watch?v=mw-VLN8xVgU&list=PLFdQ3YMJDN9iPuBLo7SS920G-Q42szf87>)



Role, attitudes, and values

- Place of birth
- Childhood
- Family life
- Education
- Finances
- Taste in clothes, books, movies, food, etc.
- Activities, hobbies...
- Particular personality traits
- ... a character background paper, or *backgrounder*, for each one

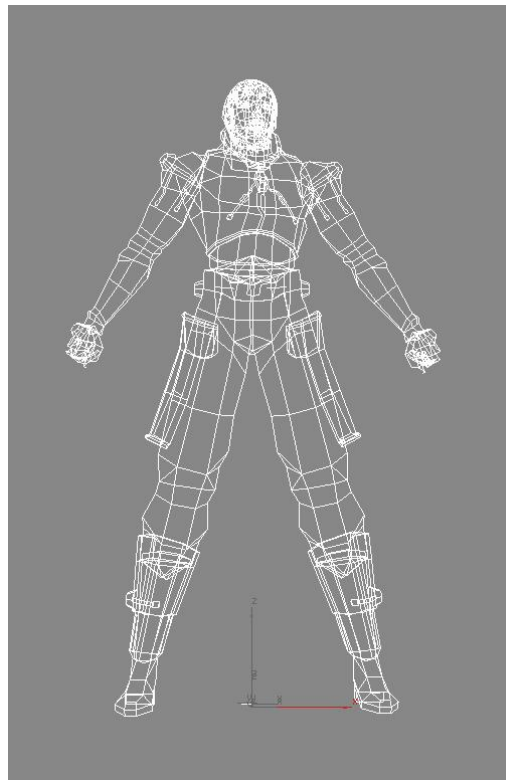
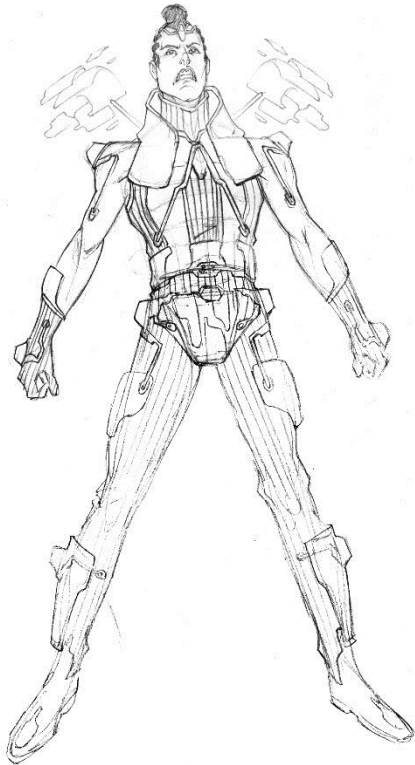
Source: Steve Meretzky, "Building Character: An Analysis of Character Creation," 2001

Character's attributes

- Attributes are symbolic or numerical variables that can change as the player plays the game.
- Types:
 - *Function*:
 - Functional attributes - form part of the game's core mechanics; designers should deciding on appropriate values for them
 - Non-functional attributes
 - *Status* attributes – change frequently and by large amounts, e.g. like *hit points* (or health) which changes during a fight
 - *Characterization* attributes – change rarely or not at all, e.g. like constitution (overall degree of hardiness and resistance to injury or poison)

Visual character development

Techniques



Source: Game Development Essentials, by Jeannie Novak

Verbal character development

Dialogue

- Reveals character
- Reveals emotion
- Advances the plot
- Reveals conflict
- Establishes relationships
- Comments on action

Source: *Game Development Essentials*, by Jeannie Novak

Character movement

- **Signature**
- **Idle**
- **Walking cycle**



**Mario's
walking cycle
reflects his
personality**

Character archetypes 1/2

- Carl Jung – proposed archetypes appearing in myths and legends as universal patterns in regardless of culture or historical period as universal aspects of the human mind
- Archetypes vs stereotypes (<http://scholar-blog.blogspot.bg/2005/07/archetypes-and-stereotypes.html>):
 - *Archetype – an ideal example (prototype) of a type used as a pattern*
 - *Stereotype - a conventional, formulaic, and oversimplified form/character*
- Joseph Campbell (*The Hero with a Thousand Faces*, 1949)
 - refined the concept of hero's journey and defined 8 archetypes

Character archetypes 2/2

1. Hero - the public experiences the story through his eyes
2. Mentor - teaches the hero how to survive and to use his abilities
3. Herald - announces the need for change in the hero's life
4. Ally - supports the hero
5. Threshold Guardian - tests the hero before great challenges
6. Shapeshifters - can change their character at will
7. Shadows - villains in the story
8. Trickster - adds fun and humor to the story

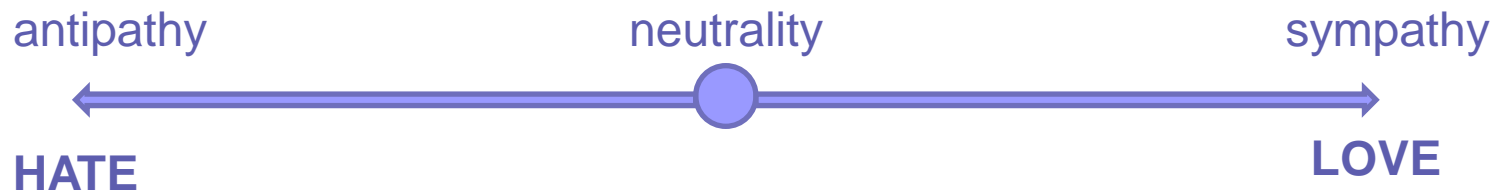
For more, read *The Eight Character Archetypes of the Hero's Journey*, 2014, by Chris Winkle, <http://mythcreants.com/blog/the-eight-character-archetypes-of-the-heros-journey/>

Character dimensionality 1/2

- **Zero-dimensional** characters - exhibit only discrete emotional states. Example: the orcs in *The Lord of the Rings* feel only two motions: hate and fear

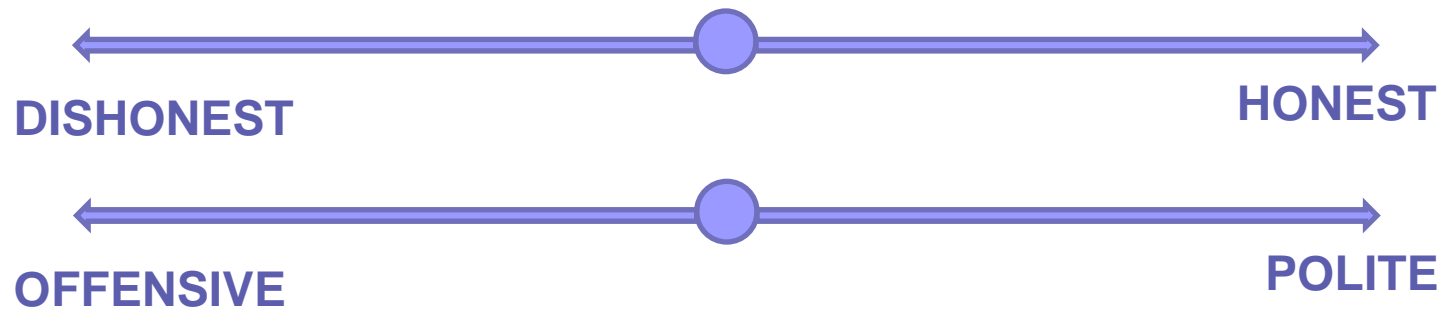


- **One-dimensional** characters - have only a single variable to characterize a changing feeling or attitude. Example: the dwarf Gimli in *The Lord of the Rings*



Character dimensionality 2/2

- **Two-dimensional** characters - described by multiple orthogonal variables that express their multiple, non-conflicting impulses. Example: Denethor in *The Lord of the Rings*



- **Three-dimensional** characters - can have conflicting impulses that produce inconsistent behavior, like: high levels of both love and hate = psychopathy
Example: Frodo and Gollum in *The Lord of the Rings*

NPC

- Non-Player Character (NPC) – any **character** that is **not** controlled by a **player**
- any thing/been in the game world that is modeled for
 - perceiving (processing the state of the environment),
 - making decisions (deciding what to do based on perception) and
 - acting (can potentially have player interaction and/or partially control the world)



Using AI for NPC

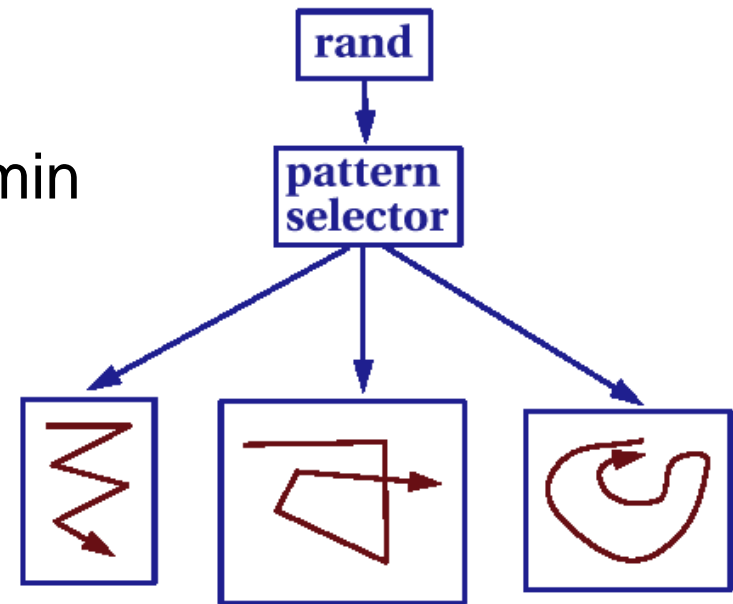
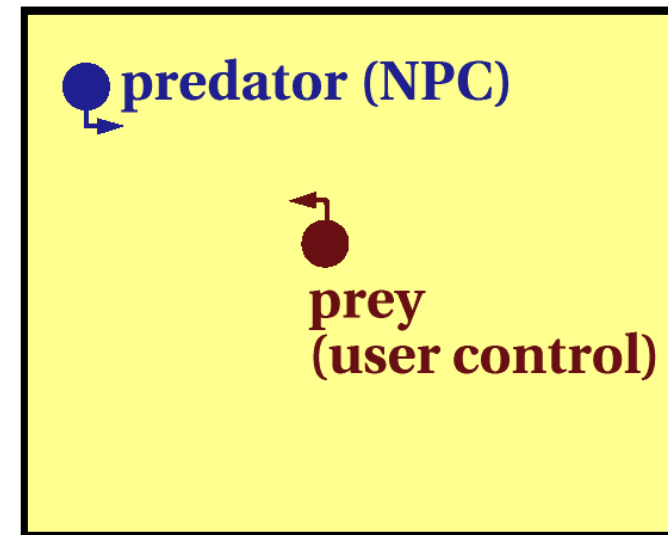
- It can be incredibly complex
 - Large fight in a tactical shooter
- It can be pattern based
 - Behaviors of a sentry in Metal Gear Solid
 - Behaviors of any boxer in Punch Out
- It can be ... well, stupid
 - Goombas or Koopas in Super Mario Bros. 3

Source: CS 4730 Course – Computer Game Design, Univ. of Virginia

Chase/Evade

- Consider a very simple AI task
- Algorithm for the predator?

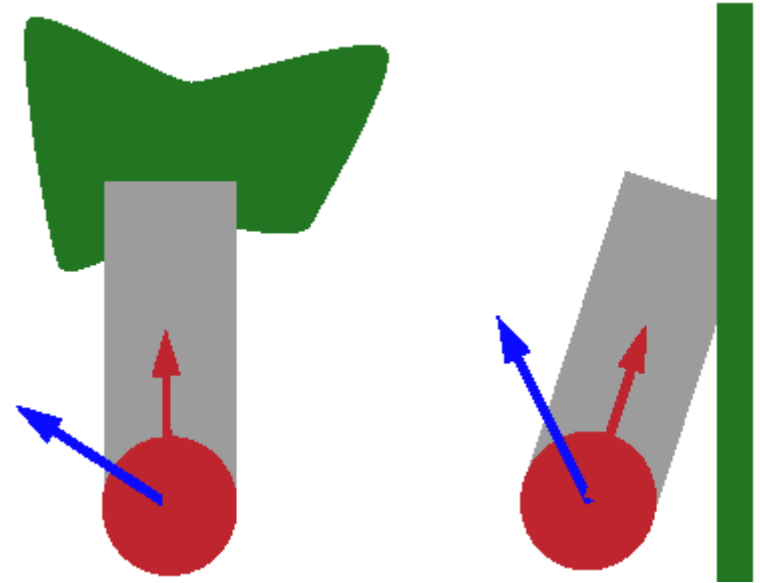
- Enhancements for chase:
 - Speed Control
 - Velocity, acceleration max/min
 - Limited turning radius
 - Randomness
 - Moves
 - Patterns



Based on: CS 4730 Course – Computer Game Design, Univ. of Virginia

Steering behaviors

- Pursue
- Evade
- Wander
- Obstacle avoidance
- Wall/path following
- Queuing
- Combine behaviors with weights
- What could go wrong?



Source: CS 4730 Course – Computer Game Design, Univ. of Virginia

Reaction-based AI strategies

- Reaction-Based

- Fast, but limited capabilities

- Implementations

- Finite-state machines (FSM)

- Rule-based systems

- Set pattern - an unchanging series of occurrences

- Probabilistic FSM

Based on: CS 4730 Course – Computer Game Design, Univ. of Virginia

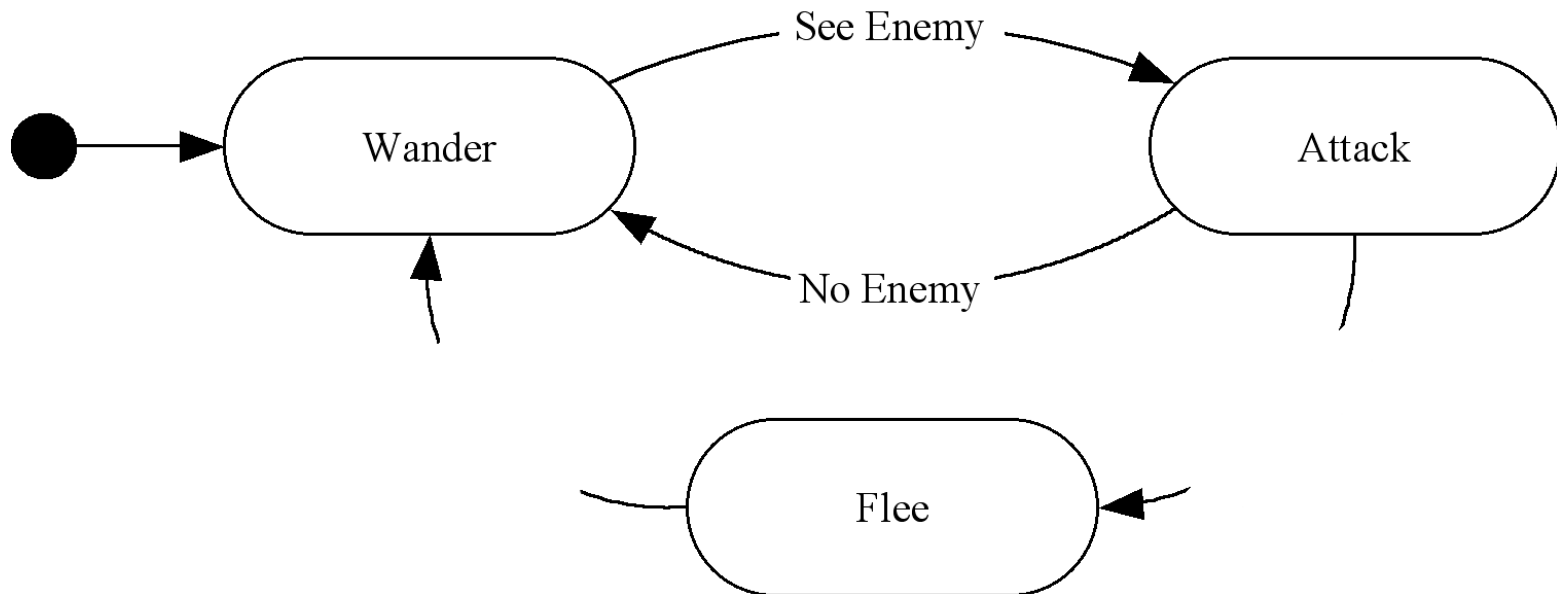
Deliberation-based AI strategies

- Deliberation-based
 - Much slower, but more adaptable
- Implementations
 - A* - (A-Star) pathing algorithm (Dijkstra); in weighted graphs: starting from a specific node of a graph, it constructs a tree of paths starting from that node, expanding paths one step at a time, until one of its paths ends at the predetermined goal node
 - Roadmaps
 - Genetic Algorithms

Based on: CS 4730 Course – Computer Game Design, Univ. of Virginia

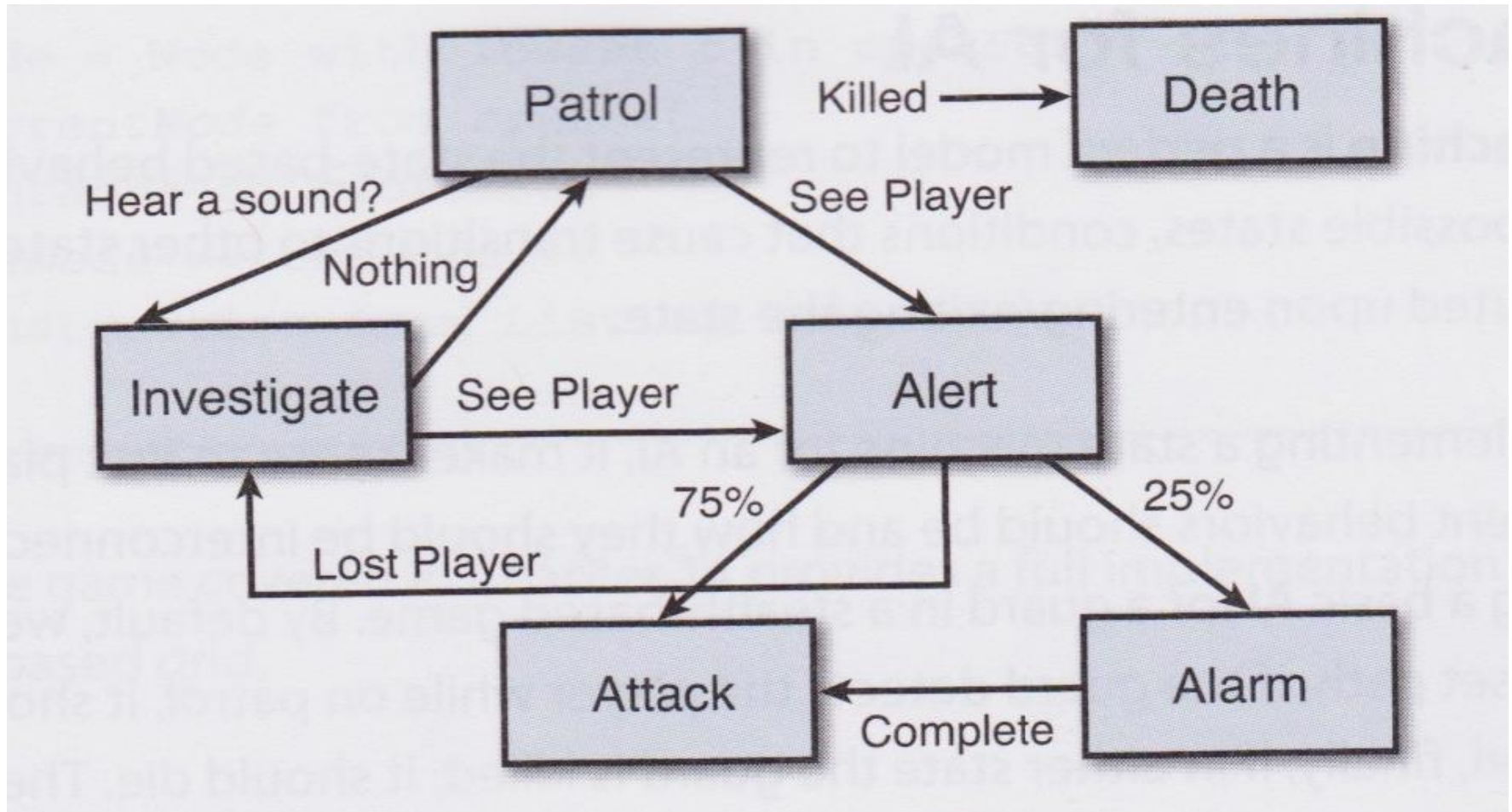
FSM

- An abstract construct for determining the behavior of an NPC
- Any given behavior state is represented along with rules for transitioning between states
- Example: bad guys in Metal Gear Solid



Based on: CS 4730 Course – Computer Game Design, Univ. of Virginia

A more complex FSM



Source: CS 4730 Course – Computer Game Design, Univ. of Virginia

Problems with FSM's

- Too predictable
 - Sometimes a good thing, sometimes not
- Limited
 - Can have a very small set of options available at any one time

Source: CS 4730 Course – Computer Game Design, Univ. of Virginia

Probabilistic FSM's

- We can change the personality of an NPC by adjusting the state probabilities
- Other aspects:
 - Sight
 - Memory
 - Curiosity
 - Fear
 - Anger
 - Sadness
 - Sociability
- Modify probabilities on the fly?

	Aggressive	Passive
Attack	50%	5%
Evade	5%	60%
Random	10%	10%
Flock	20%	20%
Pattern	15%	5%

Goal-based NPC

- The NPC has a central goal to achieve and a set of operations it can use
- It will selectively choose an operation based on which will get it closer to the goal at that moment
- Goal could be nearly anything
 - A particular score
 - Health of the PC

Instead conclusions

CHARACTER DESIGN PROCESS



