Learning Player Preferences for Fun Interactive Stories

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Tell a story

Once upon a time,

there was a

muskrat

_____.

All blanks filled by participants of the AAAI 2010 Workshop on AI and Fun

Tell a story

Every day,

The muskrat sang _____.

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Tell a story

Until one day,

he died _____.

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Tell a story

Because of this,

his brother took up singing

_____,

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Tell a story

and because of that,

everyone fled the forest

_____.

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Tell a story

Finally,

the muskrat's daughter started singing as well _____.

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The End?

Introduction
Decisions in Storytelling

- *Idea*
- *Actors*
- *Time*
- *Place*
- *Actions*
- *Reasons*

What should happen next?

- What?
- Who?
- When?
- Where?
- How?
- Why?

Introduction

Decisions in Storytelling

- *Idea*
- *Actors*
- *Time*
- *Place*
- *Actions*
- *Reasons*

What was	Who	When was it	How was it	Why was *that*
D e c i d e d ?				
	Author	During Telling	Funny? Random	Clever? Spontaneity

Tell me a story

Once upon a time,

there was a

Workshop on AI and Fun .

All blanks filled by participants of the AAAI 2010 Workshop on AI and Fun

Tell me a story

Every day,

David took pictures _____.

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Tell me a story

Until one day,

his camera broke _____.

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Tell me a story

Because of this,

he started drawing instead

_____,

All blanks filled by participants of the AAAI 2010 Workshop on AI and Fun

Tell me a story

and because of that,

no one could understand his presentation

_____.

All blanks filled by participants of the AAAI 2010 Workshop on AI and Fun

Tell me a story

Finally,

David bought a new camera _____ .

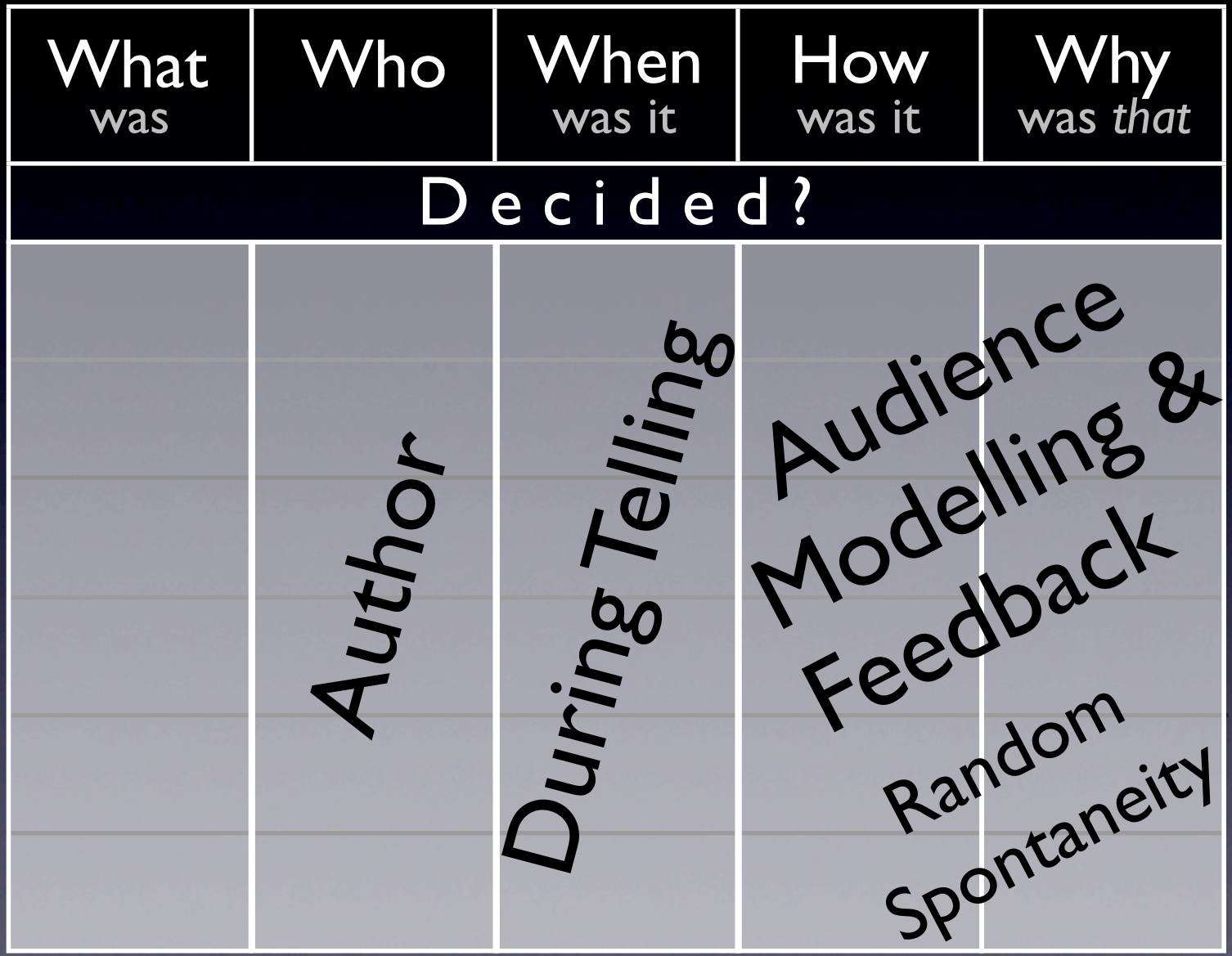
All blanks filled by participants of the AAAI 2010 Workshop on AI and Fun

The End

Introduction

Decisions in Storytelling

- *Idea*
- *Actors*
- *Time*
- *Place*
- *Actions*
- *Reasons*



Hypothesis

If you know about your audience,
you can tell a better story.

Definition

When a story's events are chosen based on feedback from its audience, the telling of that story is Interactive.

How can we make this work?

We need a way to (computationally):

Learn about an audience

Make decisions based on audience feedback

} = AI (Artificial Intelligence)

Learning Player Preferences for Fun Interactive Stories

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Player-Specific Stories via Automatically Generated Events

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Key Features

- ★ Introduces Player Modelling to Interactive Storytelling to mimic human storytellers
- ★ Learns player preferences on-line by observing reactions to story events
- ★ Uses player preferences to dynamically choose subsequent story events
- ★ Suggests courses of action within events which fit the player's preferred style of play

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Framework Overview

- Observe player actions as they relate to in-game events
- Learn player preferences by measuring inclinations toward different styles of play
- From a library of encounters, choose an encounter to occur which allows the player to play in the modelled style
  - *if possible, surreptitiously suggest the event-responding course of action that fits the modelled style ("hinting")*
- Repeat

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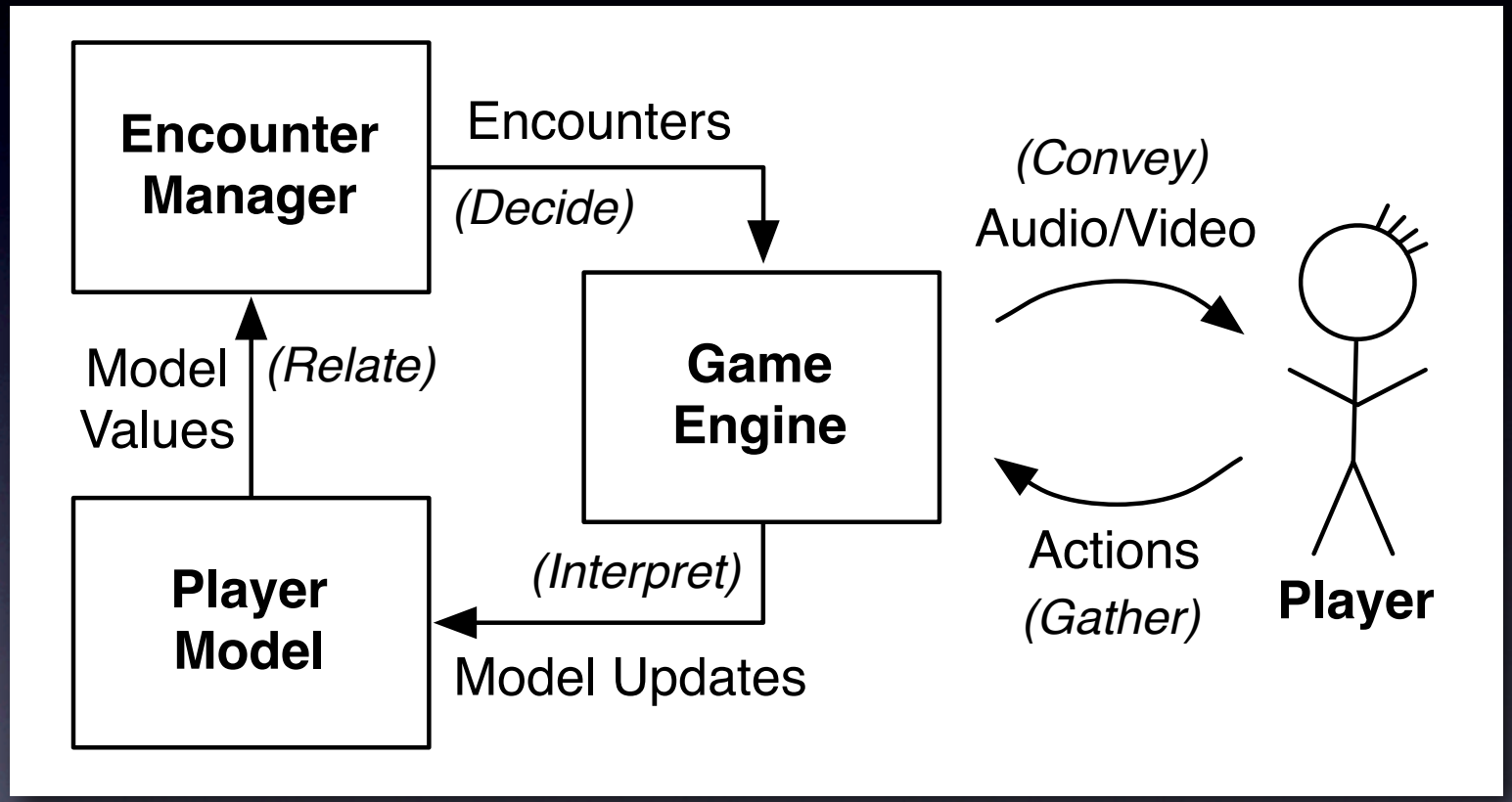
Framework Operation



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Encounters

An Encounter is...

- A sequence of events that directly involve the player
- Each encounter has at least one course of action available to the player
- Each course of action is tailored to appeal to one or more types of player

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Robin Laws' RPG Player Types

Player Type	Enjoys
Power Gamer	Acquiring items and abilities
Fighter	Fighting
Tactician	Solving logical puzzles
Specialist	Exploiting their character's special skills
Method Actor	Having their personality tested
Storyteller	Complex plots
Casual Gamer	Being with their friends

Based on Peinado, F. and Gervás, P. Transferring Game Mastering Laws to Interactive Digital Storytelling. 2004.

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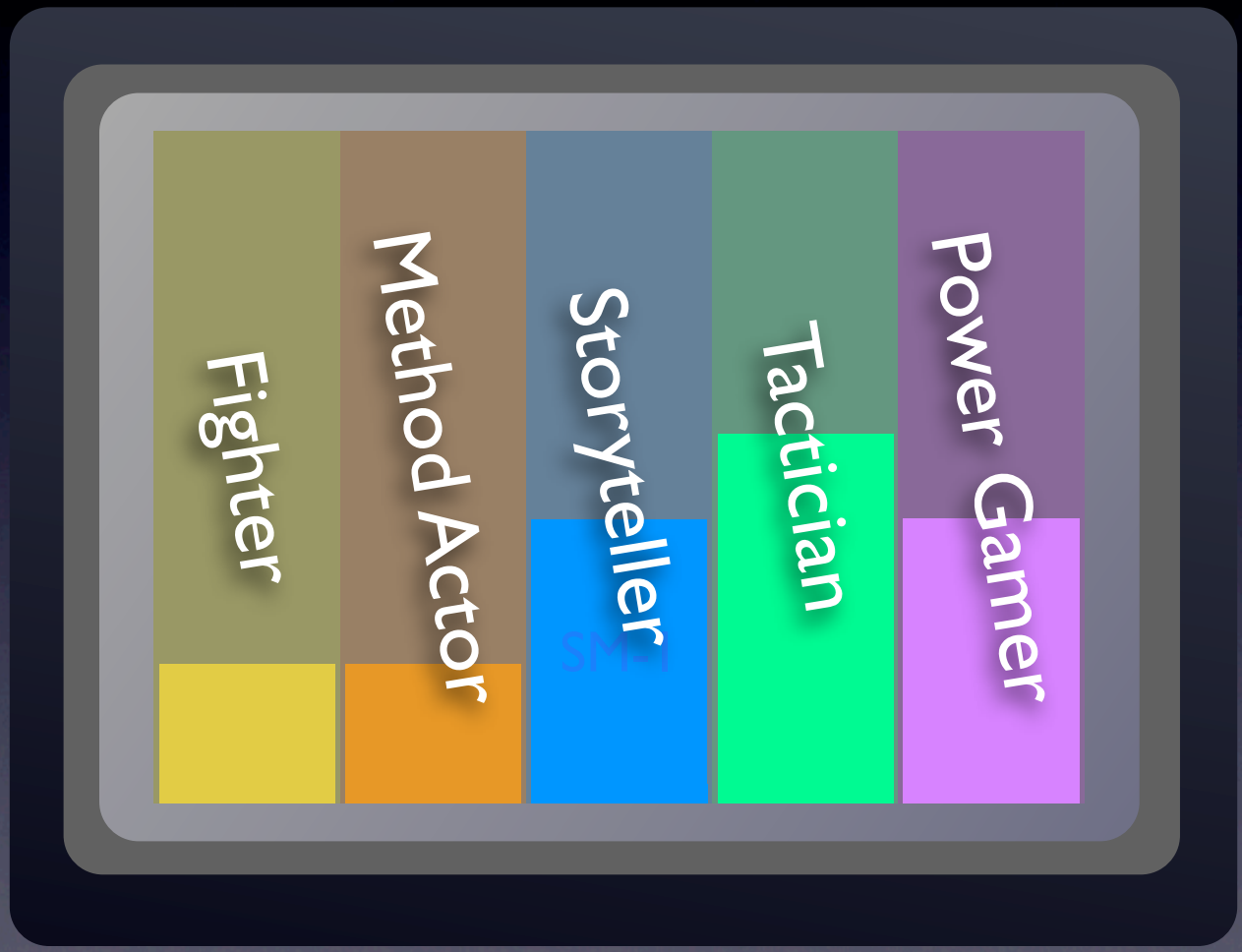
Player Model



Larger values indicate stronger inclinations to play in the given style.

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Encounter Selection

System wants an encounter to occur → Examine Encounter Library → ...

→ Retrieve each encounter's suitability data:

Example encounter suitability data:

Fighter	✔ ✔
Tactician	✘
Method Actor	✘ ✘
Storyteller	✘
Power Gamer	✔

} one for each course of action

✔ - this encounter is good for players who prefer this style

✘ - this encounter is bad for players who prefer this style

→ Encounter suitability is defined by the suitability of its courses of action ("branches").

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Encounter Selection

Choose Encounter By Quality

↳ Encounter Quality = $\max_{\text{branches}} \left(\text{suitability(branch)} \bullet \text{PlayerModelData} \right)$

Player Model	
Fighter	25
Tactician	12
Method Actor	3
Storyteller	7
Power Gamer	18

	Branch 1	Branch 2
Fighter	✔ ✔	✘
Tactician	✘	✘ ✘
Method Actor	✘ ✘	✔
Storyteller	✘	✔
Power Gamer	✔	✔

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Encounter Selection

Choose Encounter By Quality

$$\text{Encounter Quality} = \max_{\text{branches}} \left(\text{suitability(branch)} \bullet \text{PlayerModelData} \right)$$

Player Model

Fighter	25
Tactician	12
Method Actor	3
Storyteller	7
Power Gamer	18

	Branch 1	Branch 2
Fighter	2	-1
Tactician	-1	-2
Method Actor	-2	1
Storyteller	-1	1
Power Gamer	1	1
Branch Quality:	43	-21

Encounter Quality: 43

Search can end early if a quality threshold is met

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Encounter Specification: Triggers

Cue Chosen Encounter

The encounter's "trigger function" is started, which watches for the world conditions necessary for the encounter to run.

Example Trigger Conditions

i) There is an actor with the 'child' tag within 10m of the player.

ii) There is an actor with the 'parent' tag further than 50m from the actor found in i).

All conditions satisfied?

Run Chosen Encounter

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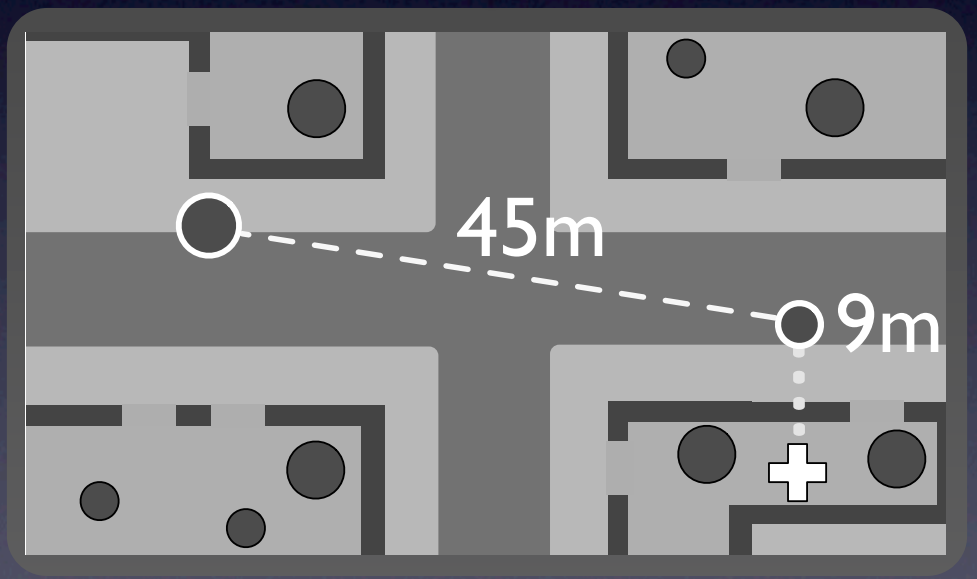
Encounter Specification: Triggers

Cue Chosen Encounter

The encounter's "trigger function" is started, which watches for the world conditions necessary for the encounter to run.



All conditions satisfied?

No

Time-out exceeded?

No

Yes

Encounter terminates

Run Chosen Encounter

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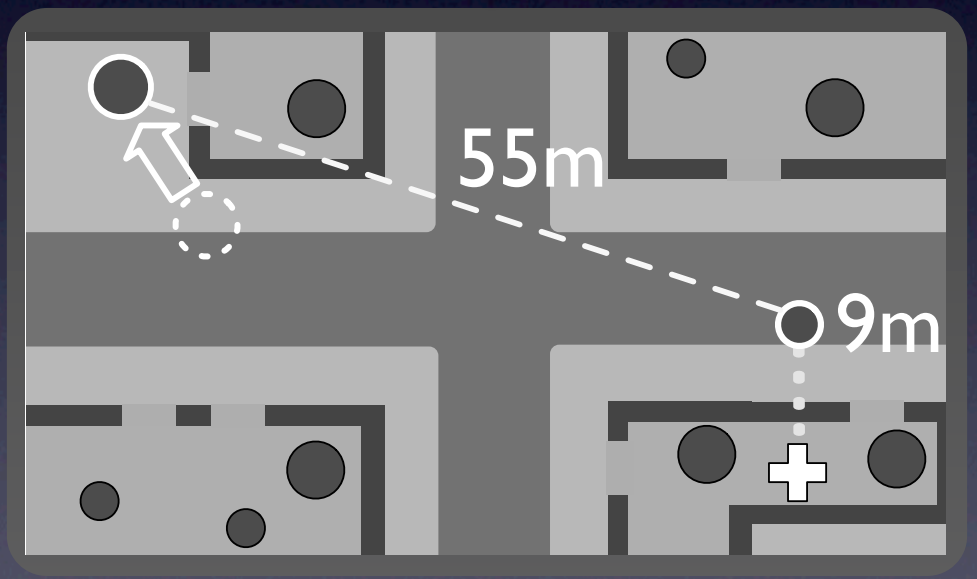
Encounter Specification: Triggers

Cue Chosen Encounter

The encounter's "trigger function" is started, which watches for the world conditions necessary for the encounter to run.



All conditions satisfied?

Yes

Run Chosen Encounter

No

Time-out exceeded?

No

Yes

Encounter terminates

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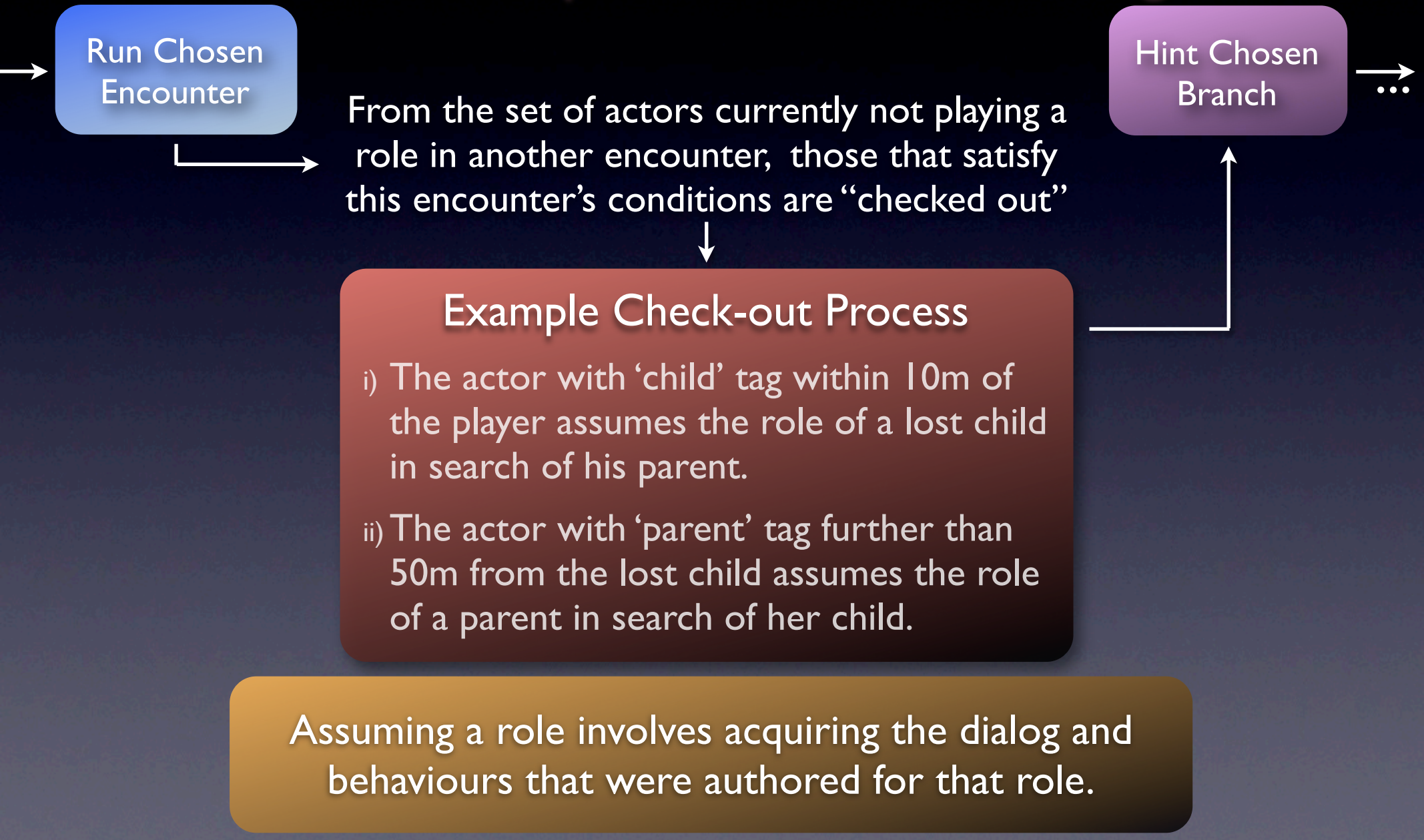
Encounter Specification: Role Passing



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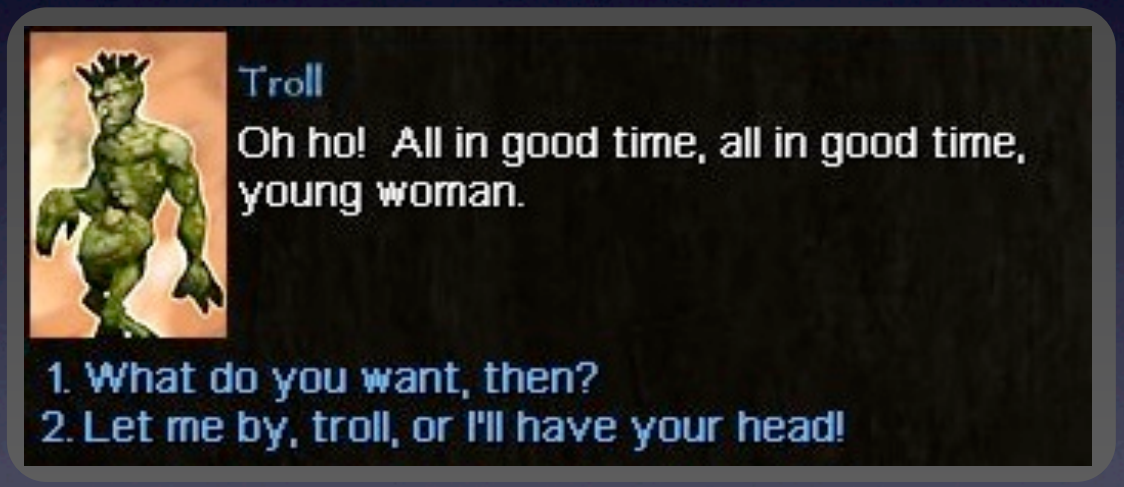
Encounter Refinement: Hinting

Hint Chosen Branch

To maximize potential learning about the player, all branches should remain possible. To maximize player fun, surreptitiously direct them along the chosen branch.

Update Player Model



Hinting Storyteller Branch

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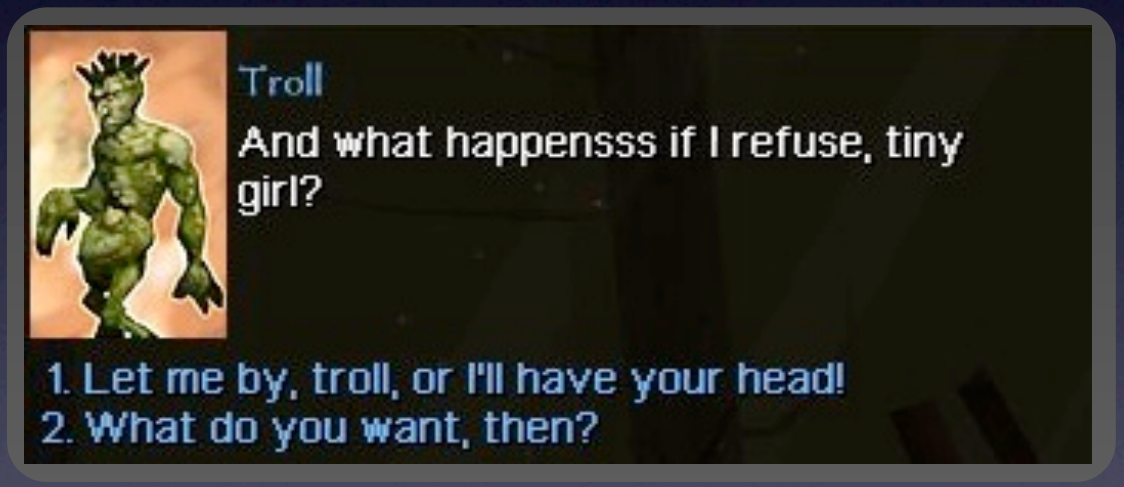
Encounter Refinement: Hinting

Hint Chosen Branch

To maximize potential learning about the player, all branches should remain possible. To maximize player fun, surreptitiously direct them along the chosen branch.

Update Player Model



Hinting Fighter Branch

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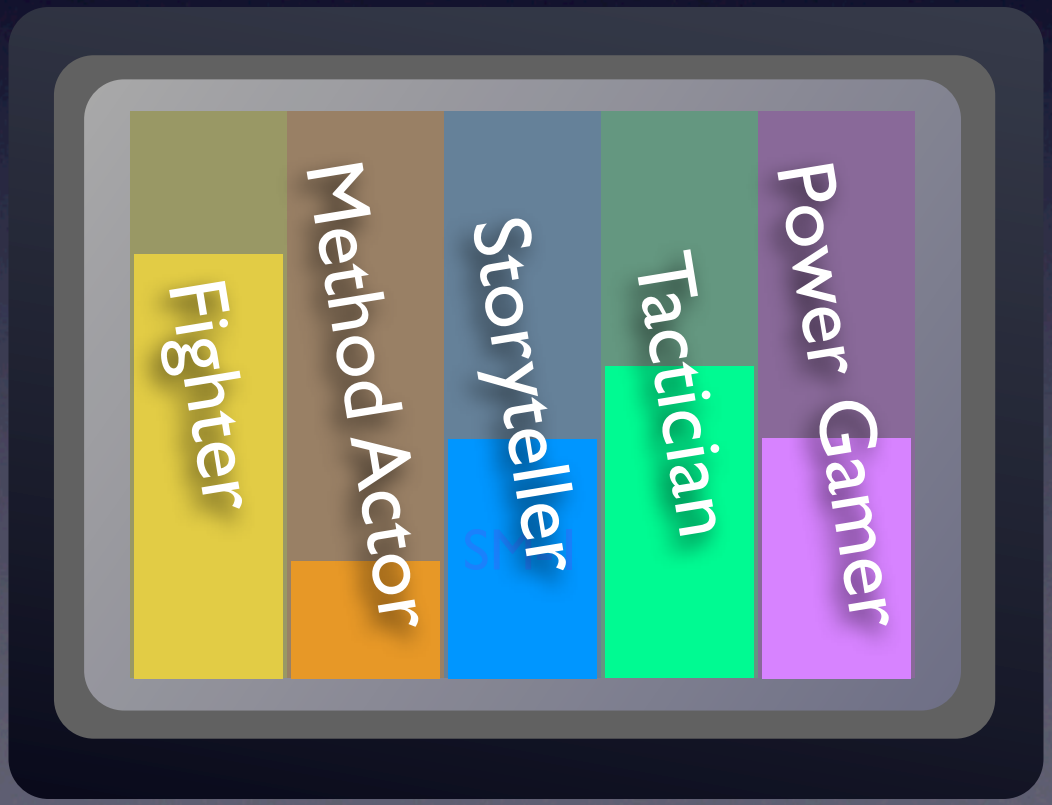
Modelling the Player

Update Player Model

By observing player responses in dialog along with their reactions to encounter events, knowledge of their player type can be refined.

Repeat



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User Study

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User Study

- Test Group
  - player-specific stories
- Control Group
  - static stories, balanced with test group
- Deception
  - participants were unaware of potential adaptation
  - "evaluate student-created stories"

$$Fun_{Adaptive} > Fun_{Static}$$

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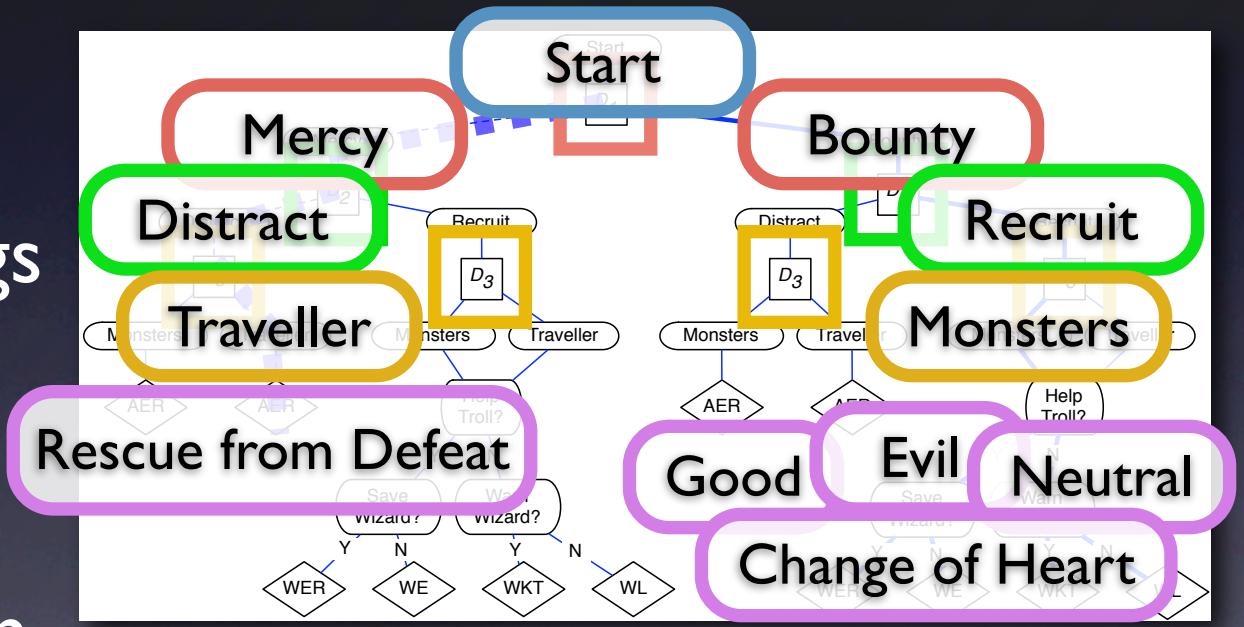
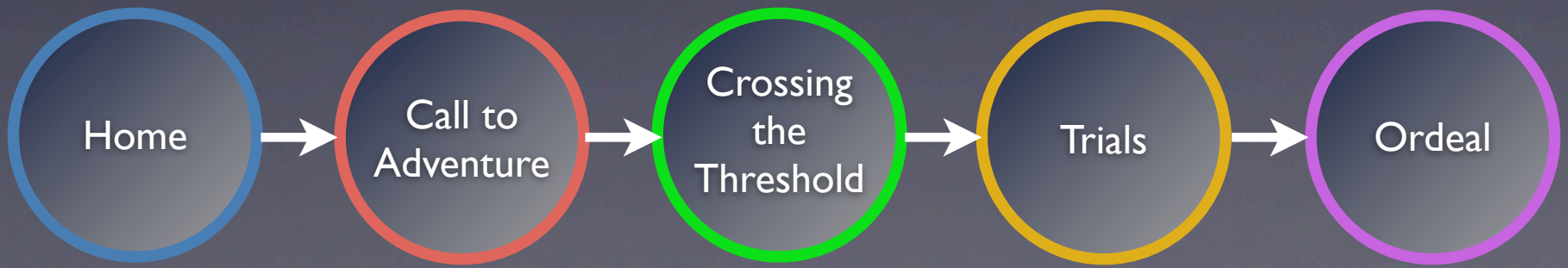
User Study

- 76 participants
- 9 encounters
- 5 possible endings
- 3 decision points
- 8 static stories
- 1 adaptive system





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Results

Player-Specific Stories are more Fun: 93% Confidence

In comparison to an average video game of similar length that you've played in the past (or your expectation of one), how enjoyable was your game experience?

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What should we do now?

- What other aspects of our players' experiences can we improve?
  - Agency is unique to interactive settings
  - Work with psychologists to learn more
- What set of principles should drive the creation of fun interactive stories?
  - Work with and co-train authors

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Take-home Message

- AI systems can be treated as decision-making proxies for experience creators
- Decisions concerning story content should be delayed for as long as possible

If you know about your audience, you can tell a better story.

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Player-Specific Stories via Automatically Generated Events

www.playpassage.com