

Comparing First Generation Drama Engines

What is a “Drama Engine”?

- An engine capable of interpreting domain language code to support interaction with dramatically interesting characters
- A way to creatively author character AI
- A system that supports the self-organization of social contexts in the player’s mind, reflected to some degree in the game
- The artistic and commercial future of play

Approaches To A Wicked Problem

Engine Designs	Homogenous Characters	Heterogeneous Characters
Generative System	<i>Storytron</i>	<i>Façade's Architecture</i>
Emergent System	<i>Drama Princess</i>	<i>Rocket Heart</i>

Storytron

- World is composed of sentences in toy language, together they “generate” a story
- Linguistic “Deikto” Interface – Turn-Based
- Business model based on subscriptions
- No animation, no spatial relationships
- Static facial feedback
- Special actor “Fate” manages discourse
- Characters are defined by bounded (-1,1) floats, traits are constant, perception of traits is variable

Reacting To Verbs Involves Adjusting Variables

The screenshot shows a software interface for defining a verb. The main window is titled "Dictionary.xml" and contains a menu bar with "Swat", "Editors", "File", "Edit", "Lizards", "Audience", "Word Sockets", and "Flags". Below the menu bar, the word "contradict" is entered in a text field. To its right are several controls: a "timeToPrepare" field with a value of 1, a "timeToExecute" field with a value of 1, an "expression" dropdown menu set to "thoughtful", and a "Trivial_Momentous" slider set to -0.50. Below these controls is a row of buttons: "Consequences", "SetGlobal", "SetTrait", "SetProp", "SetStage", "Info", "Procedure", and "SetKnowledge".

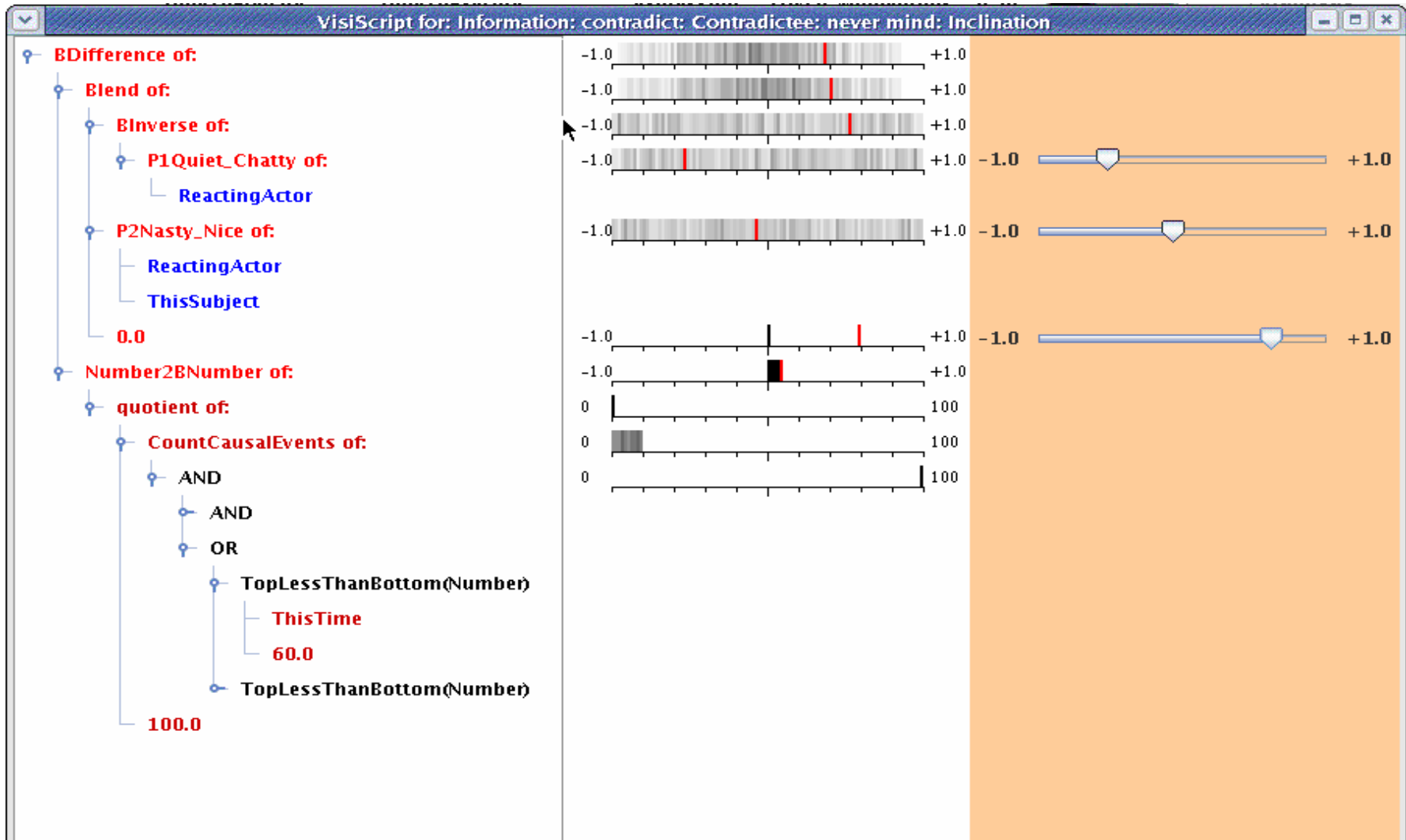
On the left side, there is a "Verbs" list with categories: "Other", "Information", and "System". Under "Information", the verb "contradict" is selected. In the center, a "Role" section is highlighted in yellow, containing a dropdown menu set to "Contradictor" with plus and minus icons, and several buttons: "AssumeRoleIf", "EmotionalReaction", "AdjustP2Nasty_Nice", "AdjustP2Meek_Bossy", and "AdjustFearful_Angry". Below the "Role" section is an "Option" section with a dropdown menu set to "ask to clarify" with plus and minus icons, and buttons for "DirObject", "Acceptable", "Desirable", and "Inclination".

On the right side, there is a vertical list of categories: "Arithmetic", "Logical", "Constant", "Global", "ThisEvent", "PastEvent", "Chosen", "OuterTrait", "Mood", "P1", "P1Weight", "P2", "UP2", "P2Weight", "Prop", "Stage", "Verb", "History", "Picking", "Word", "Knowledge", "WordSocketSetter", and "WordSocket".

At the bottom, there is a "VisiScript" section with a tree view showing a hierarchy of relationships: "BProduct of:" (expanded), "BInverse of:", "BNumber2UNumber of:", "BDifference of:", "P1Nasty_NiceWeight of:", "ReactingActor", "P1Stupid_SmartWeight of:", "ReactingActor", "BNumber2UNumber of:", and "Trivial_Momentous of:" (expanded) with "ThisVerb" listed below it.

The Windows taskbar at the bottom shows the "start" button, several open applications (Gmail, a web browser), and the system clock showing 5:18 PM.

Every Way Of Reacting To A Given Verb Is Weighed By Inclination Equations The Author Designs, a Character's Personality Traits are Taken as Input



Jane Rejects Fred's Advances, Violence and Gossip Result

VNC: x11

Applications Actions

Storyteller

Jane acts

You decide

Jane → yell at → you

I → Do What?

- insult
- ignore
- take a swing at
- cry

Done

The situation

You	Jane	A
are in	ic	revolver

start | Gmail - SWAT acco... | http://images.appl... | Gmail - First Dialog... | Storytron Screensh... | VNC: x11 | 6:34 PM

VNC: x11

Applications Actions

Storyteller

Hannah acts

You decide

Hannah → what's new? → you

I → tell re inner trait → Hannah

Jane → Meek_Bossy → somewhat bossy

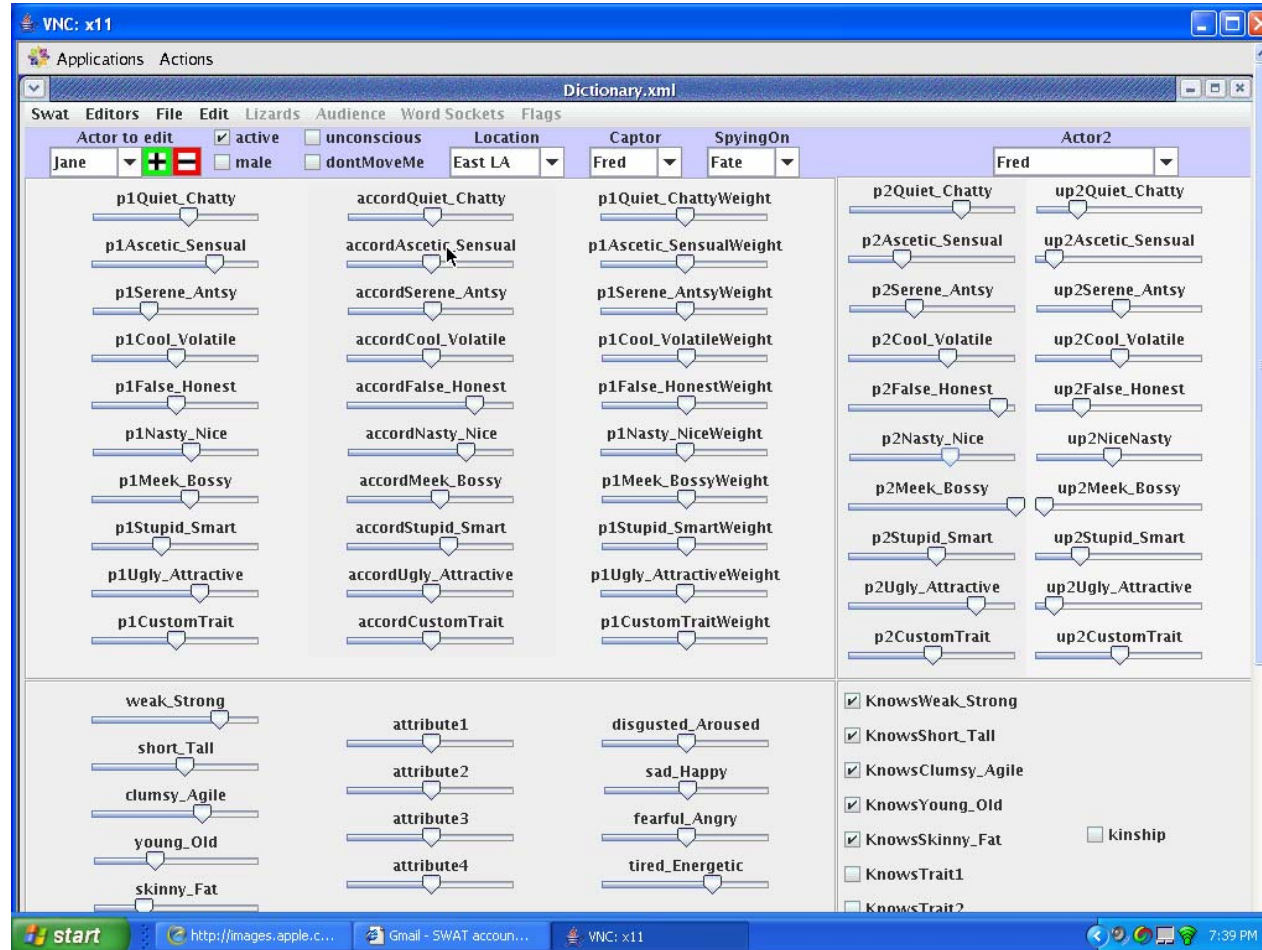
Done

The situation

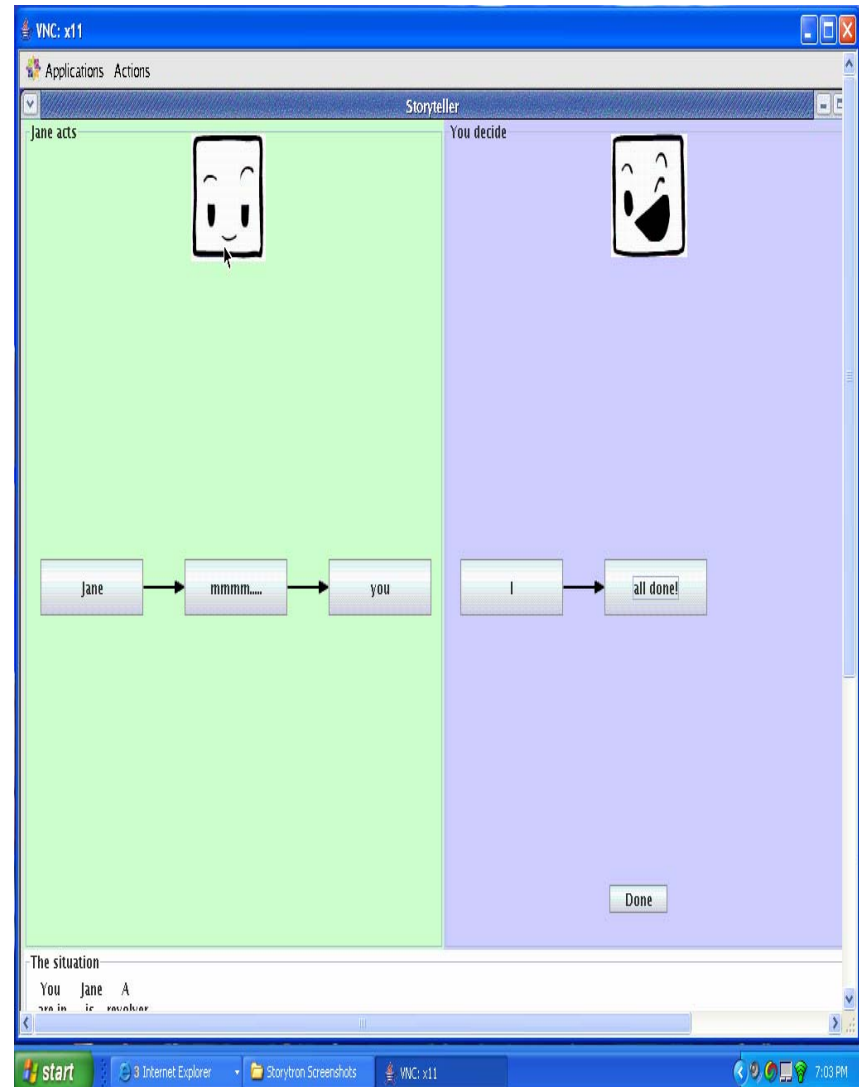
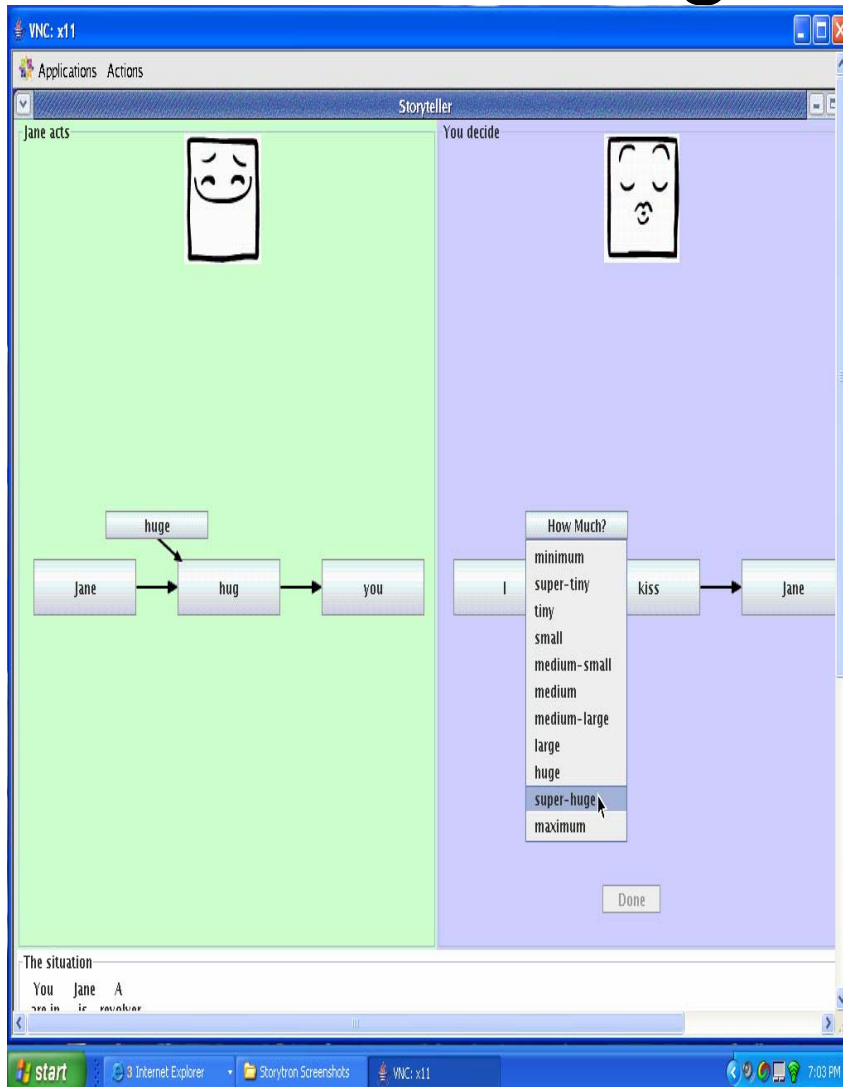
You	Jane	Attila	Hannah	A	A
is	is	is here	candlestick	revolver	
are	here	here	is here	is here	
in					
Fact					

start | Gmail - SWAT acco... | http://images.appl... | Gmail - First Dialog... | Storytron Screensh... | VNC: x11 | 6:34 PM

I Want To Get In Jane's Head, So I Open Her Up In The Editor



After Adjusting Her Opinion Of Fred Things Go Better



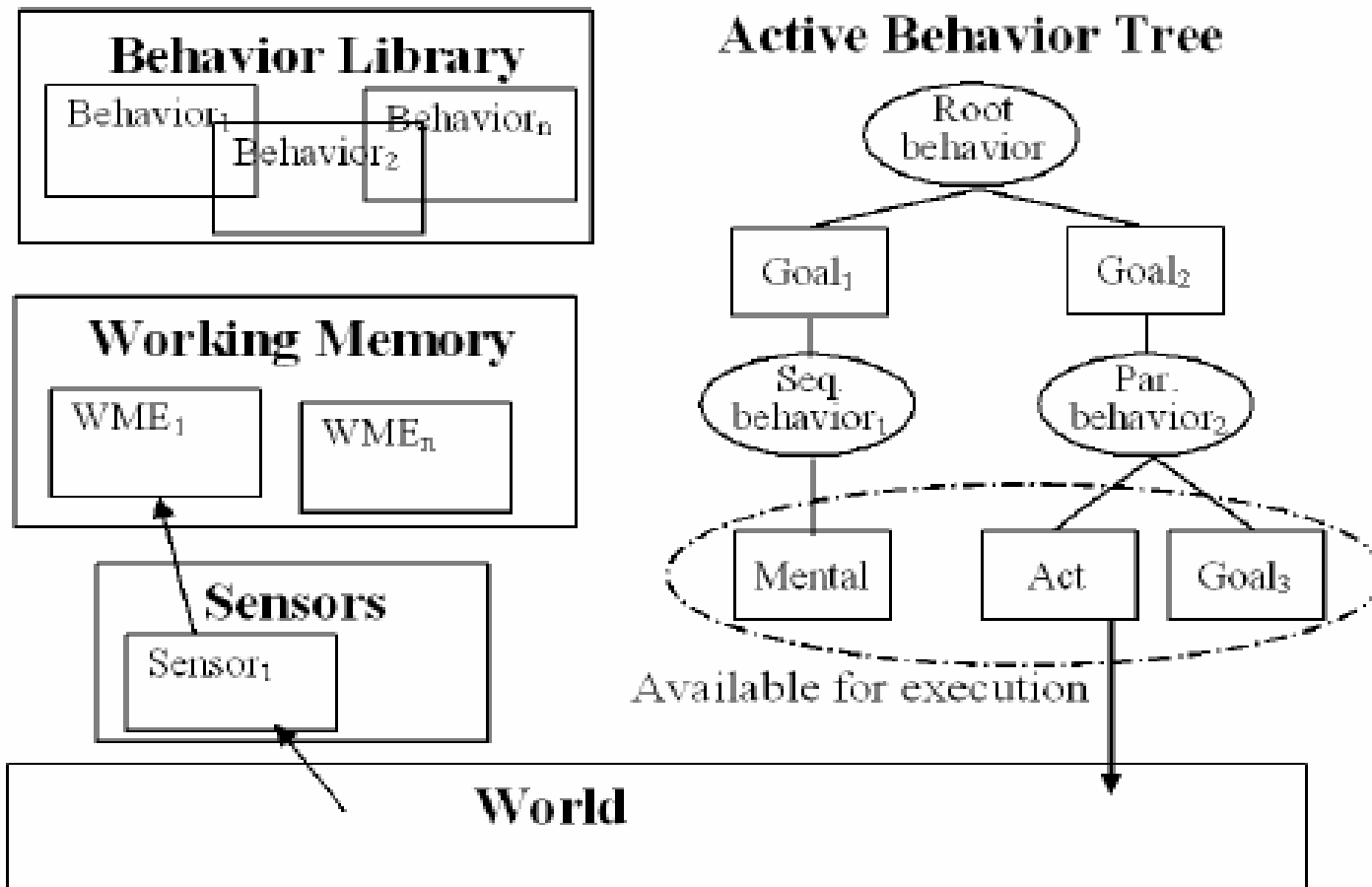
Storytron Limitations

- Each verb requires a minimum of five scripts per Boolean role, plus one script per variable adjusted and three or five scripts per reaction option
- Content demands tend toward limited Local Agency, but powerful Global Agency due to generative recombination
- Balancing and debugging potentially staggering due to highly coupled nature of content
- Graphically spare front-end limits feedback

Façade's Architecture

- A suite of modules and languages
- A high-level “Beat” authoring language
- A language for global “Mix-in” behaviors
- A language for local “Joint Dialogue” behaviors
- A language parser build on top of JESS
- A Drama Manager that uses probability at a high level to sequence “Beats”

A Behavioral Language: Core Content Creation Tool





```
sequential behavior OpenDoor() {
  precondition {
    (KnockWME doorID :: door)
    (PosWME spriteID == door pos :: doorPos)
    (PosWME spriteID == me pos :: myPos)
    (Util.computeDistance(doorPos, myPos) > 100)
  }
  specificity 2;
  // Too far to walk, yell for knocker to come in
  subgoal YellAnd\.....ForGuestToEnter(doorID);
}

sequential behavior OpenDoor() {
  precondition { (KnockWME doorID :: door) }
  specificity 1;
  // Default behavior - walk to door and open
}
```

Relative Proximity And Facial Expressions Give Feedback On Joint Dialogue Behaviors



Façade's Architecture's Limitations

- Learning curve for ABL is steep, authoring environment may improve this
- Content is oriented toward rich Local Agency but limited Global Agency, more Beats may balance this by increasing number of generative recombinations
- Input and feedback are not always clear, due to limitations of language parsing and system ambiguity
- Actors attempts to play off out-of-character inputs rely on a complaint player

Drama Princess

- Behavior and Animation Module for *144*, a retelling of Little Red Riding Hood
- Actors are “empty shells” driven by objects in environment and characterized by a single variable, *enthusiasm*, which weighs changes in *affection* for objects
- Lack of feedback intentional to emphasize player interpretation
- Filters on available behaviors (distance, condition, intimacy, affection) limit actions to a particular context
- Uses probability at a low level to mix behaviors

Affection Rises



Adjusting Enthusiasm

QuestViewer
Tale of Tales - Drama Princess - Test 4 - 47 FPS

Object	Conditions	Actor ID	Active
0 Cube	Cube Condition val	-1	YES
1 Woman	Woman Condition val	0	YES
2 Man	Man Condition val	1	NO
3 Cone	Cone Condition val	-1	YES
4 Sphere	Sphere Condition val	-1	YES
5 Cylinder	Cylinder Condition val	-1	YES
6 Environment	Environment Condition val	-2	YES

Behaviours	Display name	Intimacy	Motion	Idle
0 Idle	idle		NO	YES
1 GoToRandomTarget	walk		NO	NO
2 GoToObjectAndIdle	go to	0.20	NO	YES
3 GoSitDown	sit		YES	YES
4 FaceObject	face		NO	NO
5 Annoy	annoy		NO	NO
6 HangOut	hang out		NO	YES
7 BowToGreet	bow	0.20	YES	NO
8 Wave	wave		YES	NO
9 AvatarControl	wave		NO	NO

Object of	Affection
Cube	0
Woman	0
Man	1.00
Cone	0.24
Sphere	0.42
Cylinder	0.04
Environment	0.20

Properties	Tasks
Enthusiasm	0.80
Position	0x0
Avatar	1
My Object ID (auto)	1

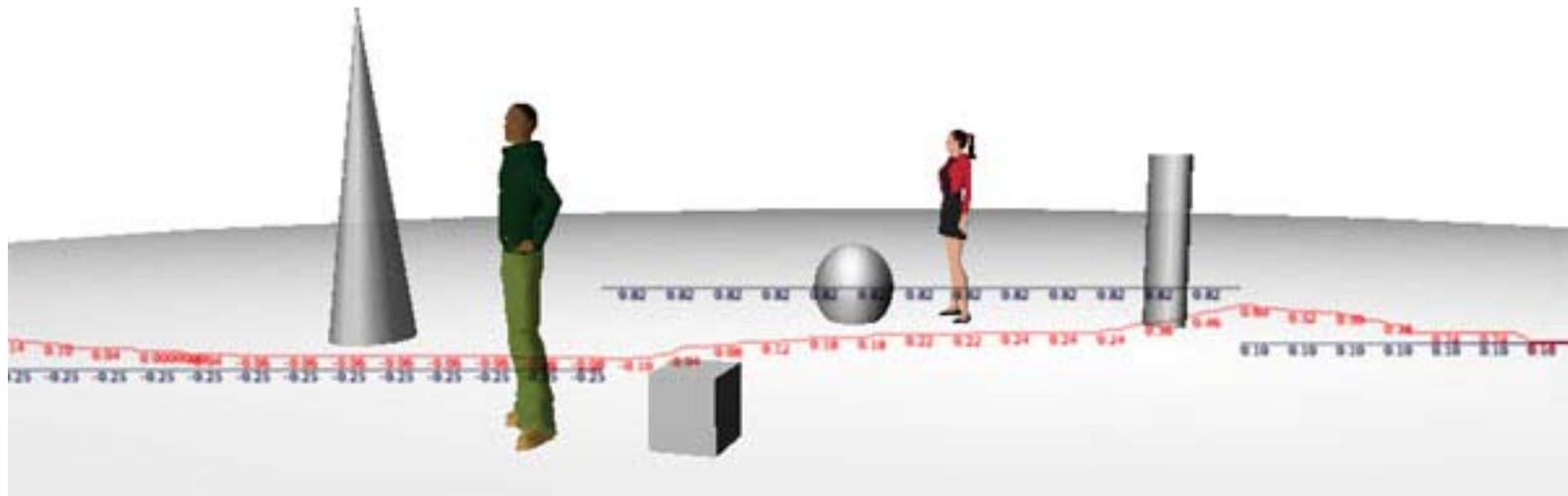
New Object
 New Behaviour
 New Task
 Undo
 Remove Object
 Remove Behaviour
 Remove Task
 Load Configuration
 Copy to groups
 Save to disk
 Load default Configuration
 Save as default Configuration

go to 0
 sit 0
 bow 0.42

Woman

Windows taskbar: start, Downloads, Drama Princes..., DramaPrinces..., Storytron Scr..., QuestViewer, Balancing Exp..., 3:07 PM

Relationships Evolve Over Time



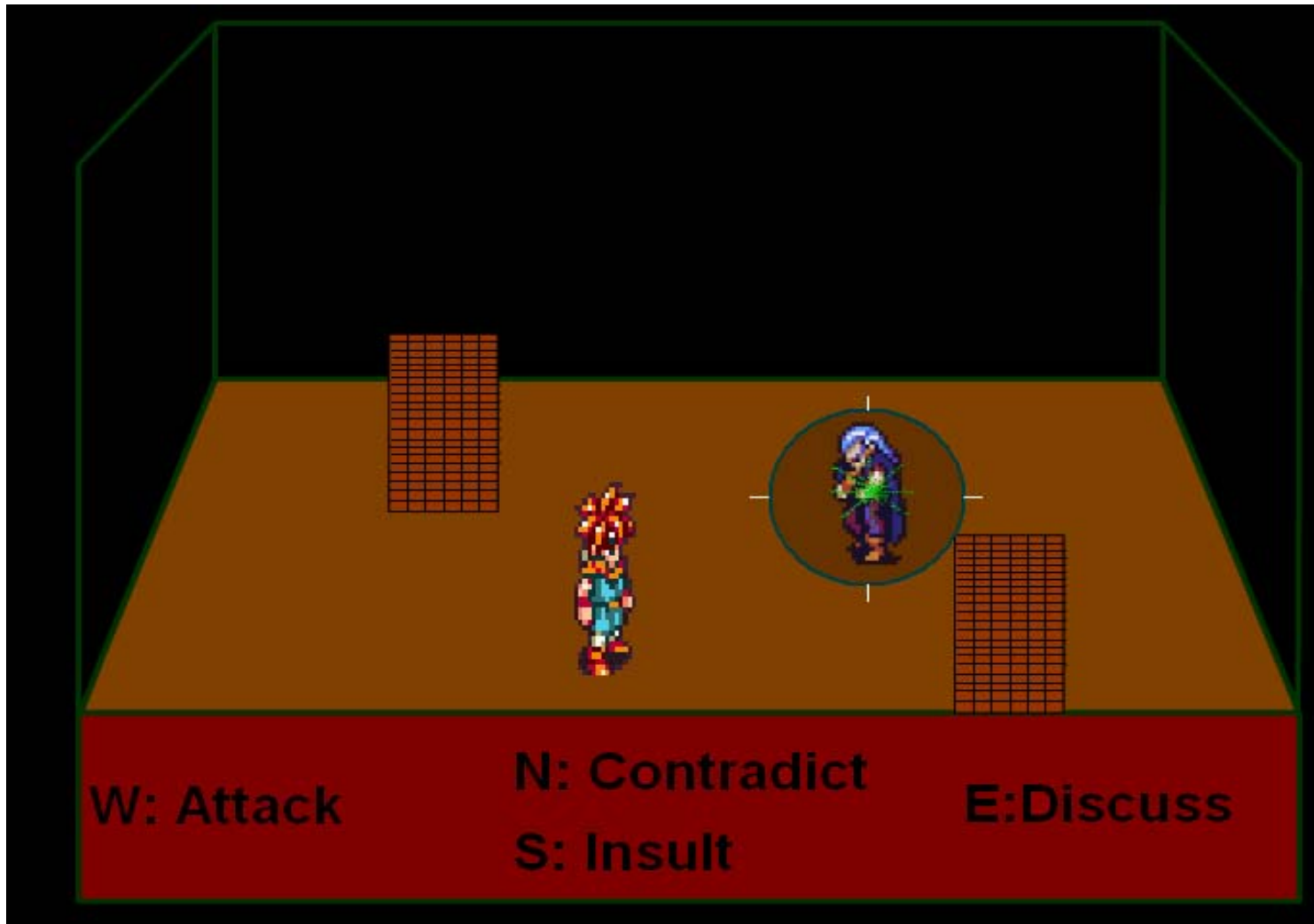
Limitations of Drama Princess

- Oriented toward free-form play, can't support goals or strategy
- Randomness implies a lack of control, which implies a short-live novelty and little re-play value, though casual players may enjoy it occasionally to relax
- Lack of behavioral complexity and language implies shallow social play
- Little to no Global Agency

Rocket Heart

- Characters behave in procedurally unique ways and have unique relationships in a goal context
- Designed to nest inside more traditional forms of gameplay and interface with game engine
- Game actions can alter code for character's relationship actions
- Actions are conducted in context of relationship, but can mismatch to dramatic effect
- Hinges on carefully arranged, cascading feedback, based on periodic shifts in relationships and reacting actions
- Tactile interface provides context-sensitive options

An Argument Between Rivals



Anna: A Shy Romantic

```
relationship Romance "Bob" + 25
sparkmod Romance * 0.5
watch Romance 3h
{
    action "romance"
}
watch Relations "command" "Bob"
{
    mood + 25
    do event
}
schedule
{
    ~learn "Mr. Tengumi"
    @T 1000 - 1400
}
schedule
{
    ~lunch "Bob"
    @T 1230 - 1300
}
schedule $romance
{
    ~romance "Bob"
    @P "Bob"
    # 5
}
```

```
relationship Friend "Coco" + 20
watch Work
{
    if (romancing)
        continue
    if (! this.exists)
        relationship Work + 10
}
watch Romance > 50
{
    kill this
    schedule $romance
    {
        ~romance target
        @P target
        # 25
    }
}
```

Rocket Heart Limitations

- Requires supporting gameplay for involving play complexity
- Characters tend toward over-the-top behavior, limiting potential aesthetics to Shogo-sequel theatrics, and potential audiences to the casual web and mobile spaces
- Balancing behaviors with game context and other actors is difficult
- Tends toward more Local than Global Agency, more strongly than Facade

Conclusions On The Outset Of The First Generation

- Emergent systems are much faster to create than Generative systems (five months versus five years)
- Procedurally unique characters richen Local Agency, while balancing and content limits constrain Global Agency, visa versa for homogenous, data-differentiated characters
- Generative systems can provide social play that stands on its own, while emergent systems are augmentative to more traditional forms of play
- Once a system has been established and tested, the time involved in producing content becomes much lower than spatial level design in traditional games
- Procedural and/or modular art assets make drama game development significantly cheaper than lineated games

What Would Entail A Second Generation Drama Engine?

- Clearly and thematically designed input schemes that are “consistently inconsistent” – matching feedback that can be inferred from character cues to a degree of ambiguity that is balanced with the game
- Leveraging of available forms of social feedback (language, gestures, relative proximity, facial expressions, posture) in a complementary suite
- Leveraging new forms of input to make context-sensitive verb choices more intuitive and less mechanical (e.g. Wii and PS3 motion sensors)
- Successful experimentation with background social simulation to cue characters based on a greater culture, or to allow the player to influence said culture indirectly (candidates include Boid’s algorithm, Memetic algorithm’s driven by authored heuristics)