# Narratives and Interactive Storytelling

## Lecture 04 – Narrative Interaction

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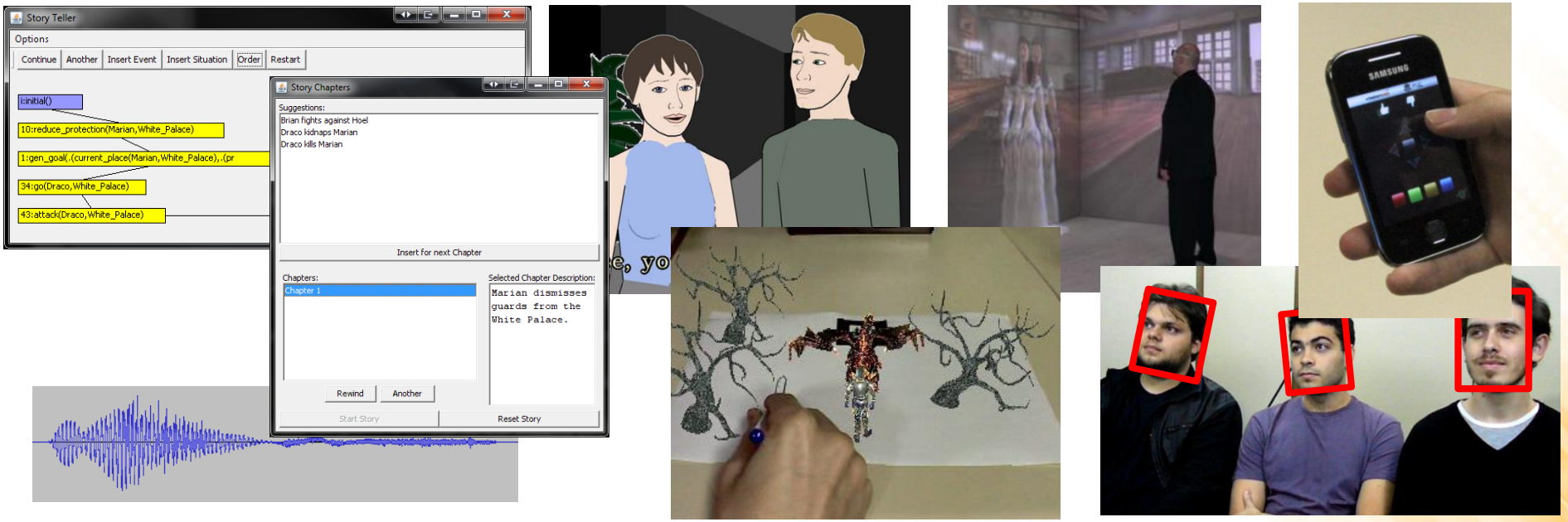
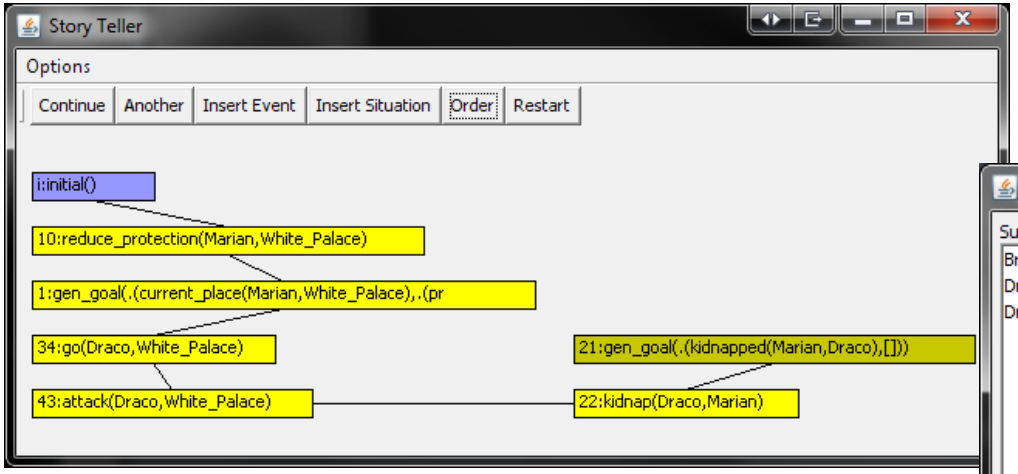
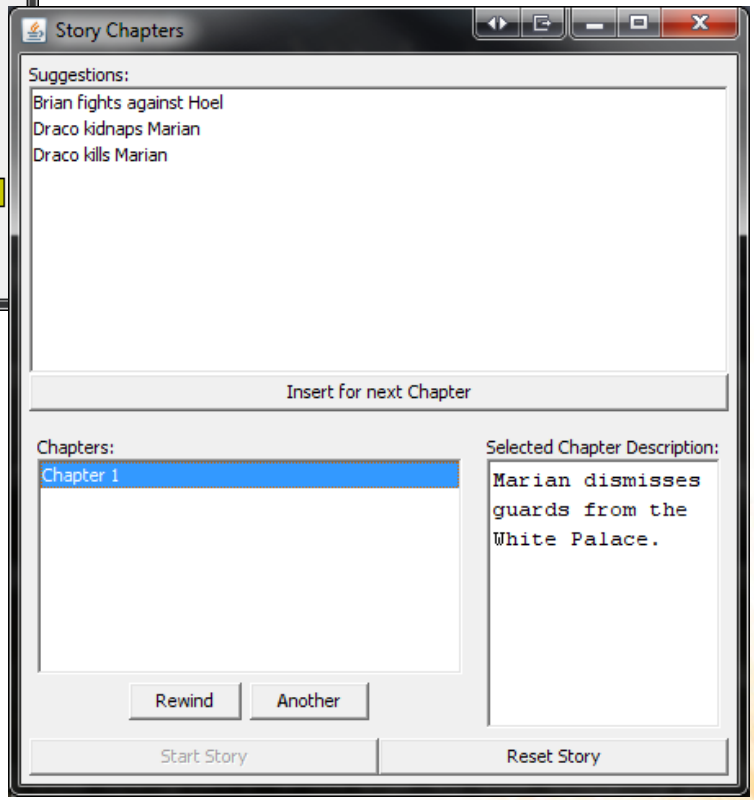
# Narrative Interaction

- **What is narrative interaction?**
  - Is how users interact and change narratives.
  - There are many ways to interact with narratives (e.g.: traditional GUI interfaces, speech recognition, virtual reality interaction, hand-drawn sketches, social networks, …)



# Traditional GUI Interfaces

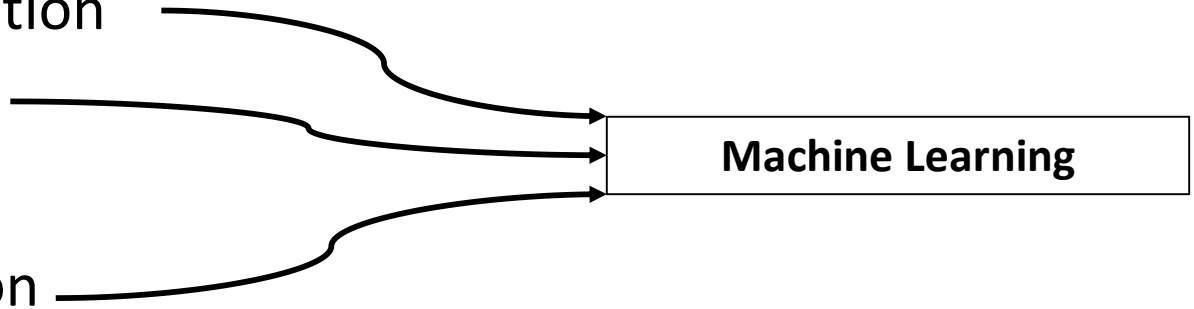


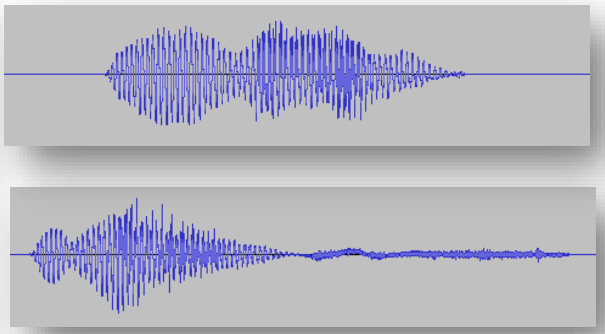



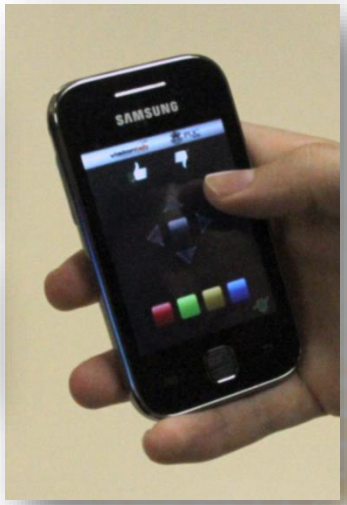

- Users are more used to this type of interface.
- Limits user interaction in multi-user settings.

# Multimodal Interface

- Movement recognition
- Voice recognition
- Mobile interaction
- Emotion recognition






– Video

Lima, E.S., et al. **Multimodal, Multi-User and Adaptive Interaction for Interactive Storytelling Applications.** X Brazilian Symposium on Computer Games and Digital Entertainment (SBGames 2011).

# Paper and Pencil

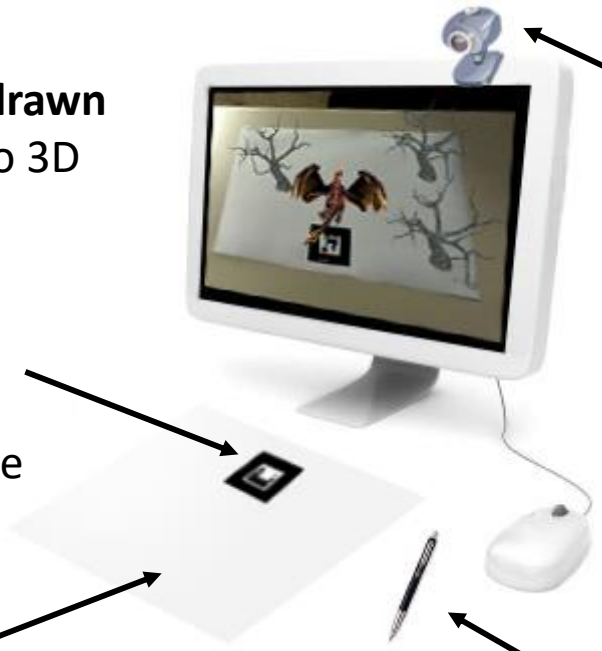
Stories are graphically represented in **augmented reality** over the paper.

The system **recognizes hand-drawn sketches** and converts them to 3D objects in the virtual world.

The entire world may comprise several sheets of paper.

– Video

Users can switch between places by changing the paper shown to the camera.



**Webcam**

**Marker**

**Sheet of Paper**

Users can change the decisions made by virtual characters by **sketching objects on the paper**.

**Pencil**

Users act as gods of the virtual world.

Lima, E.S., et al. **Draw Your Own Story: Paper and Pencil Interactive Storytelling.** International Conference on Entertainment Computing (ICEC 2011).

# Paper and Pencil

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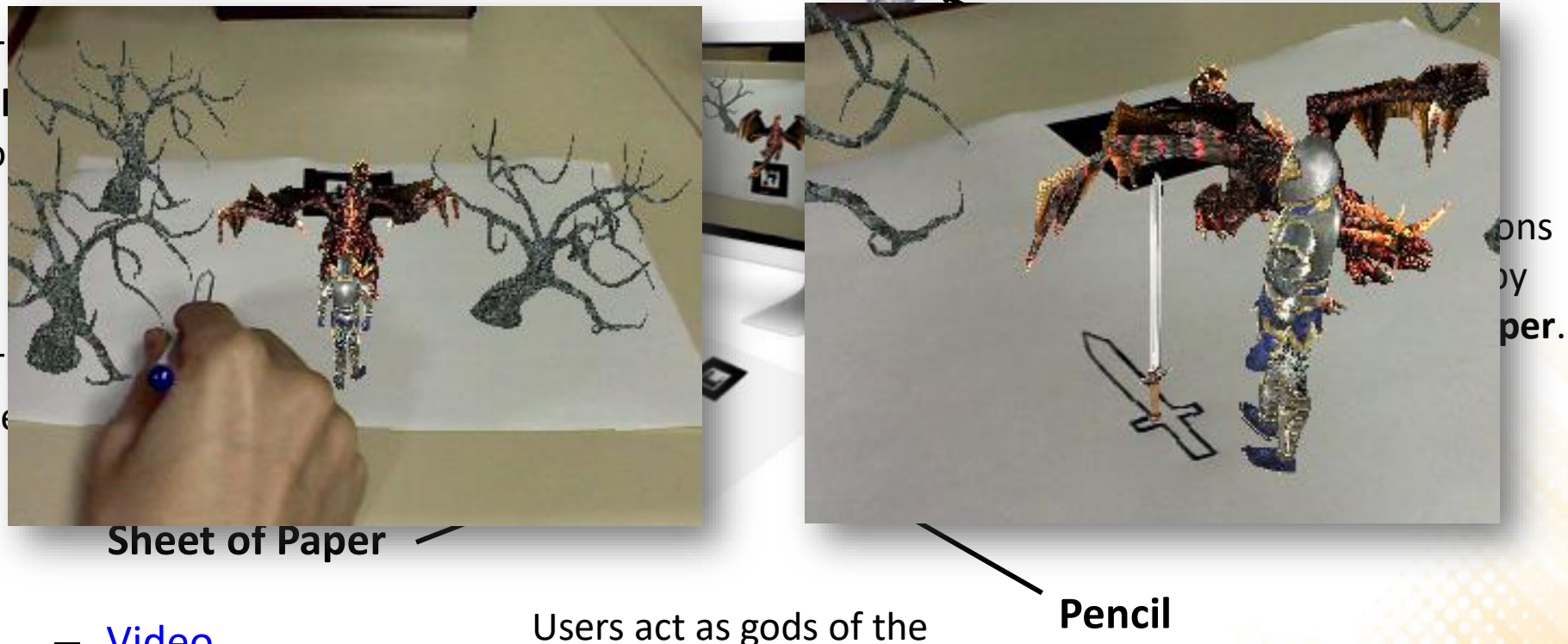


– Video

Users act as gods of the virtual world.

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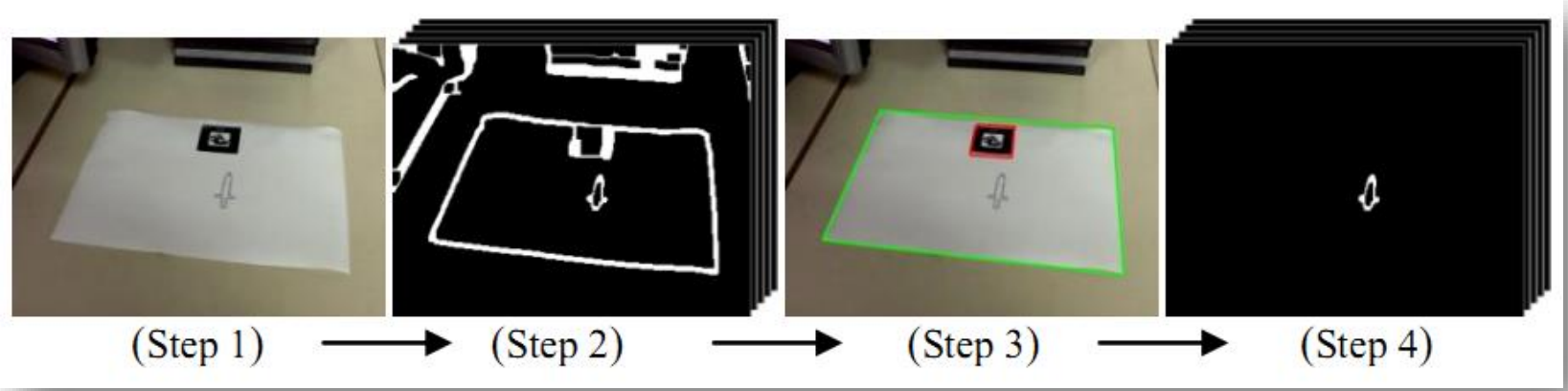
# Paper and Pencil

- Pre-processing phase:



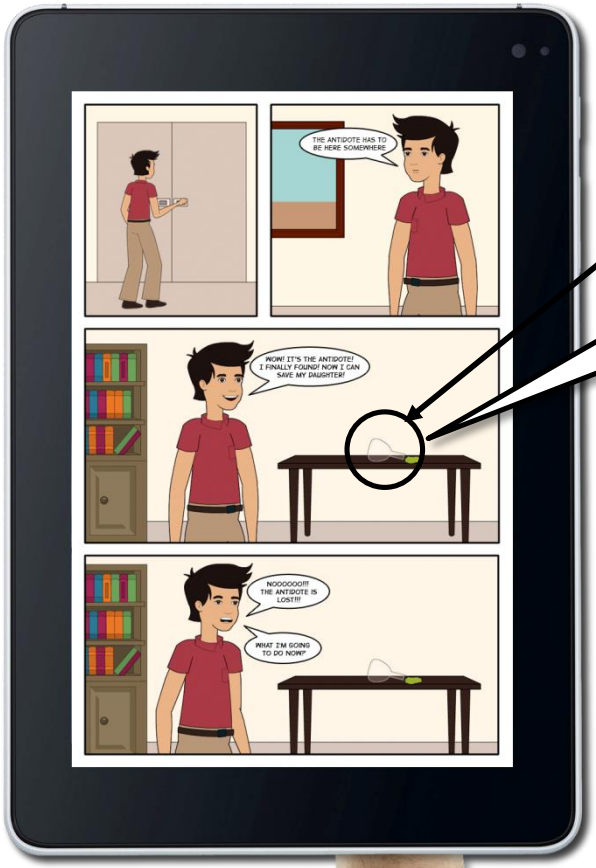

- Support Vector Machine (SVM):
  - Input: numerical features extracted from the sketches.
  - Output: vocabulary of drawings recognized by the system.

# Interactive Comics

- Interactive Objects:

**World State:**
healthy(anne)
healthy(john)
healthy(jimmy)
wasinfected(emma)

at(jimmy, house)
at(emma, house)
at(anne, house)
at(john, hospital_room)




**interactive object**

**Effect:**
¬at(antidote, hospital_room)

# Social Interaction

- Interaction through **Social Networks**



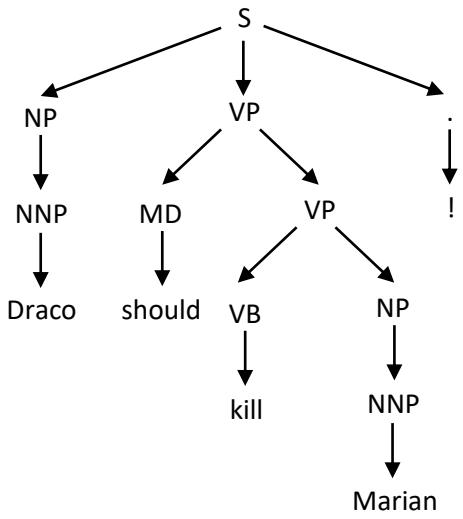
- Interaction By Comments
- Interaction By Preferences
- Interaction By Poll


Lima, E.S., et al. **Social Interaction for Interactive Storytelling.** International Conference on Entertainment Computing (ICEC 2012).

# Natural Language Interaction

- **Syntax Parser:** Stanford Parser [1]

***Example:*** *"Draco should kill Marian!"*




Phrase Structure Tree

**nsubj(kill-3, Draco-1)**
aux(kill-3, should-2)
root(ROOT-0, kill-3)
**dobj(kill-3, Marian-4)**

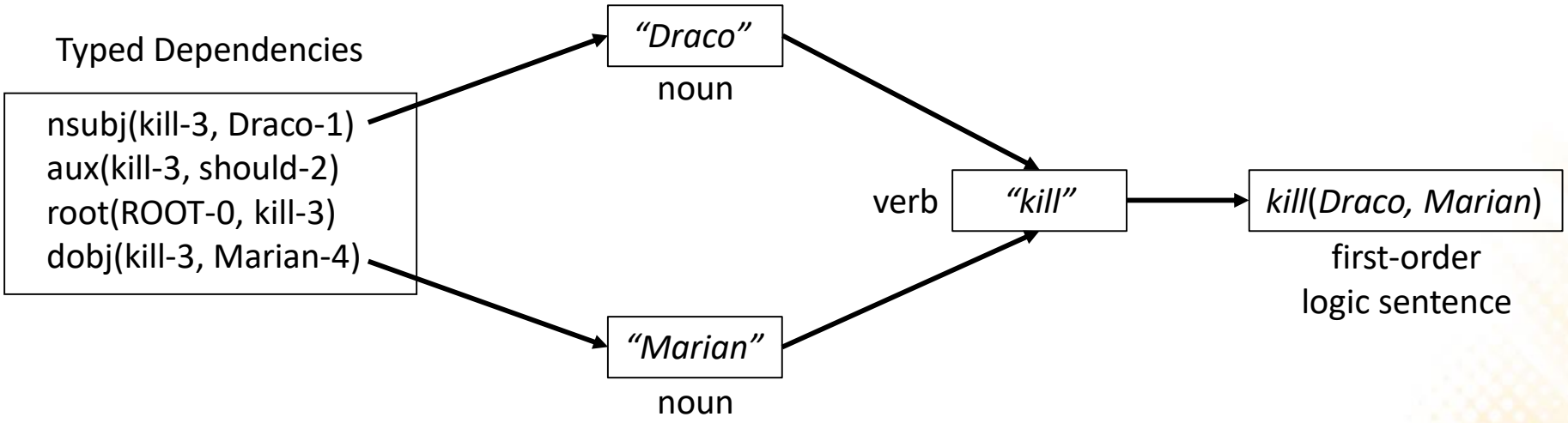
Typed Dependencies

[1] http://nlp.stanford.edu/software/lex-parser.shtml

# Natural Language Interaction

- Extracting “subject – direct object” relationships:

***Example:*** *“Draco should kill Marian!”*

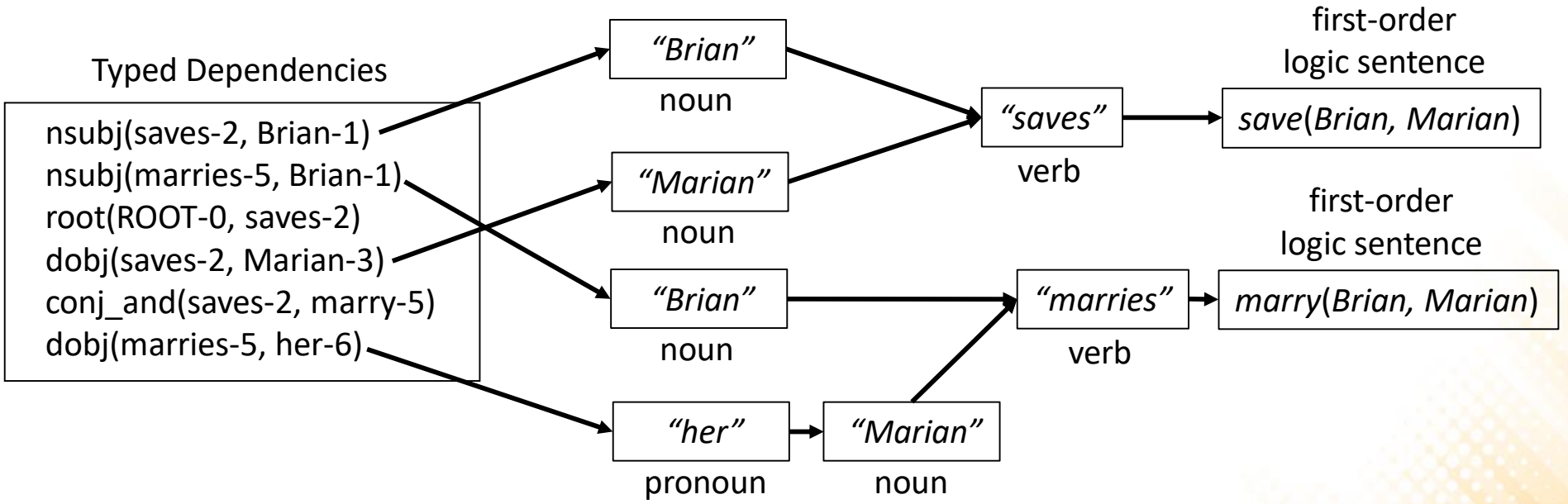



nsubj = nominal subject
dobj = direct object

# Natural Language Interaction

- Anaphora resolution:

***Example:*** *"Brian saves Marian and marries her."*

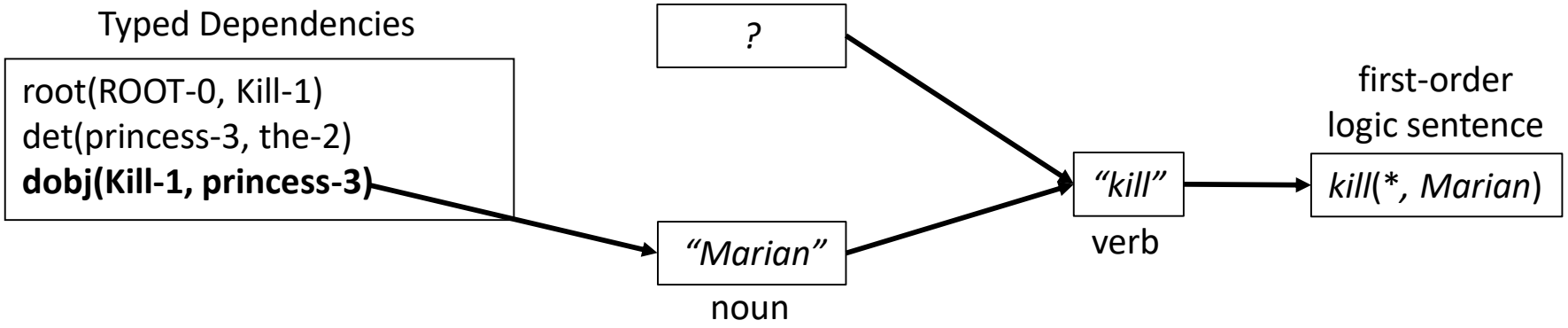



Stanford Deterministic Coreference Resolution System

# Natural Language Interaction

- Omitted Subject:

***Example:*** *"Kill the princess!"*



# Interaction by Preferences


- Natural Language Processing
  - Sentiment Analysis

# Interaction by Preferences

- List of words – each word $W_i$ is associated with a numerical score $W_i^S \in [-1.0, +1.0]$.

$$St(C_x) = \frac{1}{n}\sum_{i=1}^{n} W_i^S \quad if \quad (W_i \in C_x)$$

*if* $St(C_x) > H$ *then* $C_x$ *= positive commentary*

*if* $St(C_x) < L$ *then* $C_x$ *= negative commentary*

*otherwise* $C_x$ *= neutral commentary*

***Example:*** *$C_1$ = "No!! I love the princess… :("*

Words score:

"no" = -1.0
"love" = +0.8
":(" = -1.0

$$St(C_1) = \frac{-1.0 + 0.8 - 1.0}{3} = -0.4$$

$L = -0.3$
$H = +0.3$

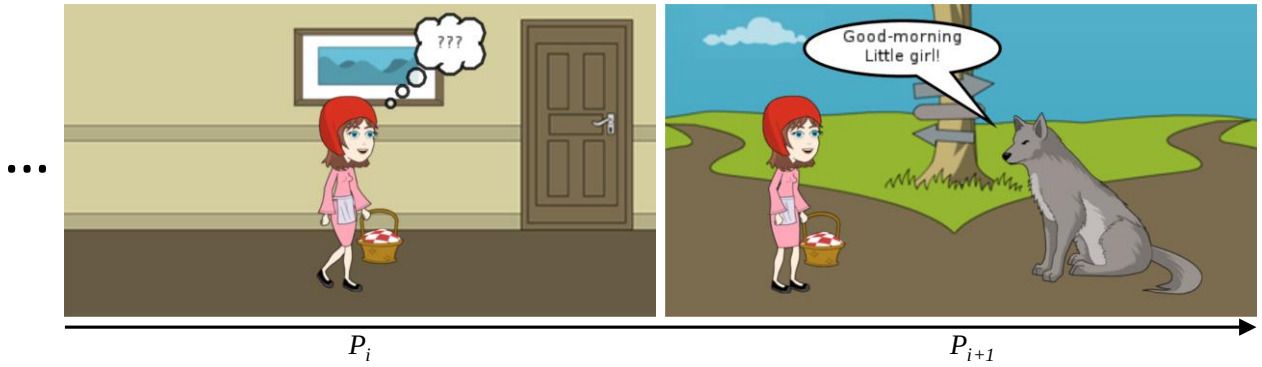
*$C_1$ = negative commentary*

# Mobile Interaction


Lima, E.S., et al. **A Multi-User Natural Language Interface for Interactive Storytelling in TV and Cinema.** XI Brazilian Symposium on Computer Games and Digital Entertainment (SBGames 2012).

# Project Task: Interaction with Comics

**Storyline A** – Without user interaction




**Storyline B** – User interacts and changes the girl's decision


Windows: http://www.inf.puc-rio.br/~elima/is/ComicsViewer.zip

MacOS: http://www.inf.puc-rio.br/~elima/is/ComicsViewer.app.zip

# Comics Viewer: Context Overview

- General structure:

```
<ComicsViewer>
  <StoryNetwork>
    ...
  </StoryNetwork>
  <Variables>
    ...
  </Variables>
  <Interactions>
    ...
  </Interactions>
  <Resources>
    ...
  </Resources>
  <Operators>
    ...
  </Operators>
</ComicsViewer>
```

All events of the story and the connections between the events.

Variables of the world state.

Definition of the user interaction points.

Images to represent characters, objects and environments.

Definition of how each event is visually represented.

# Comics Viewer: Interactions

- Interactions:

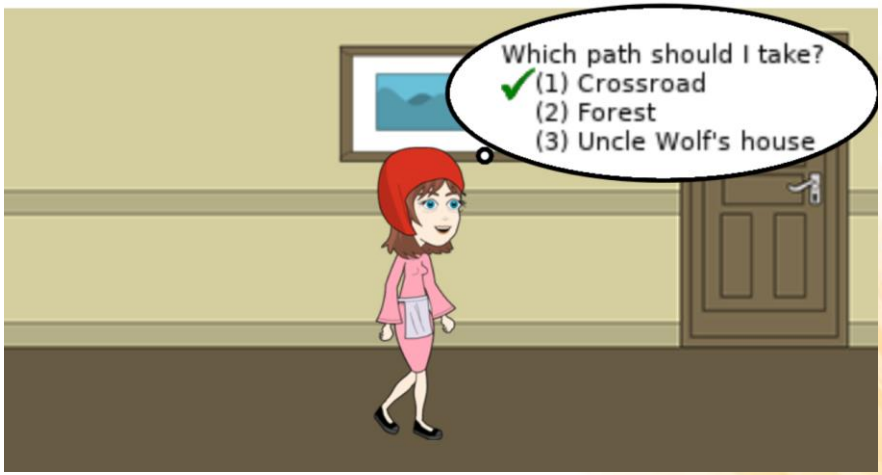
```
<Interactions>
  <Interaction type = "balloon" event = "ID" text = "TEXT"
   thoughtx = "TX", thoughty = "TY", balloonx = "BX",
   balloony = "BY" mx = "MX", my = "MY", defaultoption = "ID"
   defaultid = "ID">
    <Option text = "TEXT" nextevent = "ID" currentevent = "ID"/>
    ...
  </Interaction>
  ...

  <Interaction type = "object" event = "ID">
    <NotInteracted resource = "RES" x = "X" y = "Y" scale = "S"
     nextevent = "ID" currentevent = "ID"/>
    <Interacted resource = "RES" x = "X" y = "Y" scale = "S"
     nextevent = "ID" currentevent = "ID"/>
  </Interaction>
  ...
</Interactions>
```

# Comics Viewer: Thought Balloons

- Thought balloon example:

```
<Interaction type = "balloon" event = "N6" text = "Which path should
 I take?" thoughtx = "260", thoughty = "35", balloonx = "300",
 balloony = "47" mx = "220", my = "75", defaultoption = "N22"
 defaultid = "2">
   <Option text = "Crossroad" nextevent = "N7" currentevent = "1"/>
   <Option text = "Forest" nextevent = "N22" currentevent = "2"/>
   <Option text = "Uncle Wolf's house" nextevent = "N32"
    currentevent = "3"/>
</Interaction>
```

# Comics Viewer: Interactive Objects

- Interactive object example:

```
<Interaction type = "object" id = "OB1" event = "N3">
  <NotInteracted resource = "antidotenormal" x = "40" y = "140"
   scale = "0.5" nextevent = "N4" currentevent = "1"/>
  <Interacted resource = "antidoteinteracted" x = "40" y = "140"
   scale = "0.5" nextevent = "N5" currentevent = "1"/>
</Interaction>
```


# Comics Viewer: Variables

- Examples of variables:

```
<Variables>
  <Variable name = "villain" value = "Bzou"/>
  <Variable name = "hasantidote" value = "true"/>
  <Variable name = "test" value = "1"/>
</Variables>
```

- Changing variables in thought balloons:

```
<Interaction type = "balloon" event = "N6" ... >
  <Option text = "Crossroad" ... setvar = "villain = Wolf"/>
  <Option text = "Forest" ... setvar = "villain = Bzou"/>
  <Option text = "Uncle's house" ... setvar = "villain = Uncle Wolf"/>
</Interaction>
```

# Comics Viewer: Variables

- Examples of variables:

```
<Variables>
  <Variable name = "villain" value = "Bzou"/>
  <Variable name = "hasantidote" value = "true"/>
  <Variable name = "test" value = "1"/>
</Variables>
```

- Changing variables in interactive objects:

```
<Interaction type = "object" id = "OB1" event = "N3">
  <NotInteracted ... setvar = "hasantidote = true"/>
  <Interacted ... setvar = "hasantidote = false"/>
</Interaction>
```

# Comics Viewer: Variables

- Examples of variables:

```
<Variables>
  <Variable name = "villain" value = "Bzou"/>
  <Variable name = "hasantidote" value = "true"/>
  <Variable name = "test" value = "1"/>
</Variables>
```

- Using variables to create conditions:

```
<Edges>
  ...

  <Edge ... condition = "hasantidote == true"/>
  <Edge ... condition = "hasantidote == false"/>

  ...
</Edges>
```

# Comics Viewer: Variables

- Examples of variables:

```
<Variables>
  <Variable name = "villain" value = "Bzou"/>
  <Variable name = "hasantidote" value = "true"/>
  <Variable name = "test" value = "1"/>
</Variables>
```

- Using variables to change characters:

```
<Events>
  ...
  <Event id = "N7" event = "meet(Little girl, #villain#, the
   crossroad)"/>
  <Event id = "N22" event = "meet(Little girl, #villain#, the
   woods)"/>
  <Event id = "N32" event = "meet(Little girl, #villain#, villain's
   house)"/>
  ...
</Events>
```

# Project Assignment 4

4) Add interaction to the interactive narrative of your project (the same narrative created in the last Project Assignments) using the Comics Viewer system.