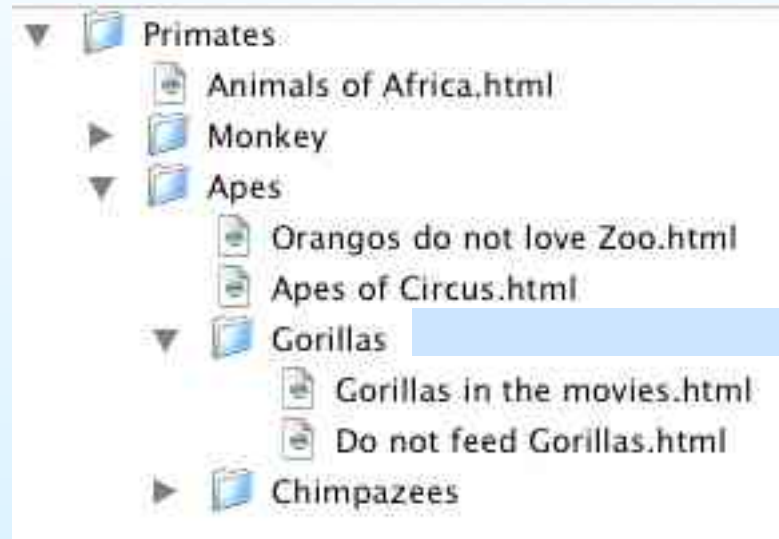


A Peer-to-Peer Advertising Games

P.Avesani, A.Agostini
ITC-irst

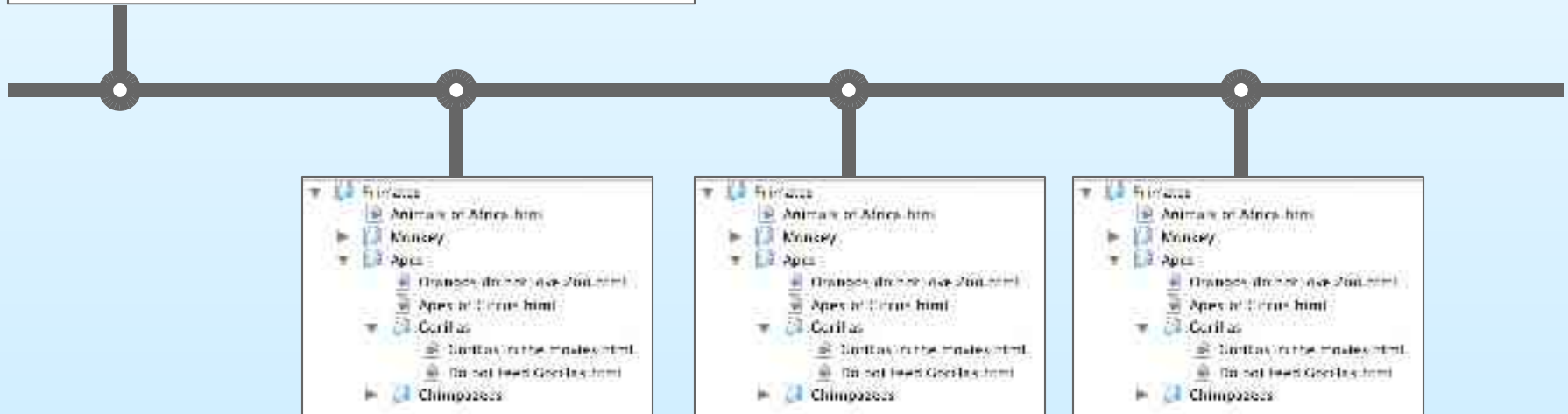


Any New Related Document ?



```
<TopicAdvertising>
  <topic> ... </topic>
</TopicAdvertising>
```

```
<TopicRecommend>
  <topic> ... </topic>
</TopicRecommend>
```



- ▶ **Motivation**
- ▶ **Problem Definition**
- ▶ **Available Solutions:**
 - ▶ **Centralized Approach**
 - ▶ **Mapping Approach**
- ▶ **Innovative Solution:**
 - ▶ **Negotiation Approach**
 - ▶ **Advertising Game**
- ▶ **Evaluation Setup**
- ▶ **Experimental Results**

<topic>

<directory>**/Primates/Apes/Gorillas**</directory>

Encoding

<label>**Gorillas**</label>

Denotation

<bookmark>

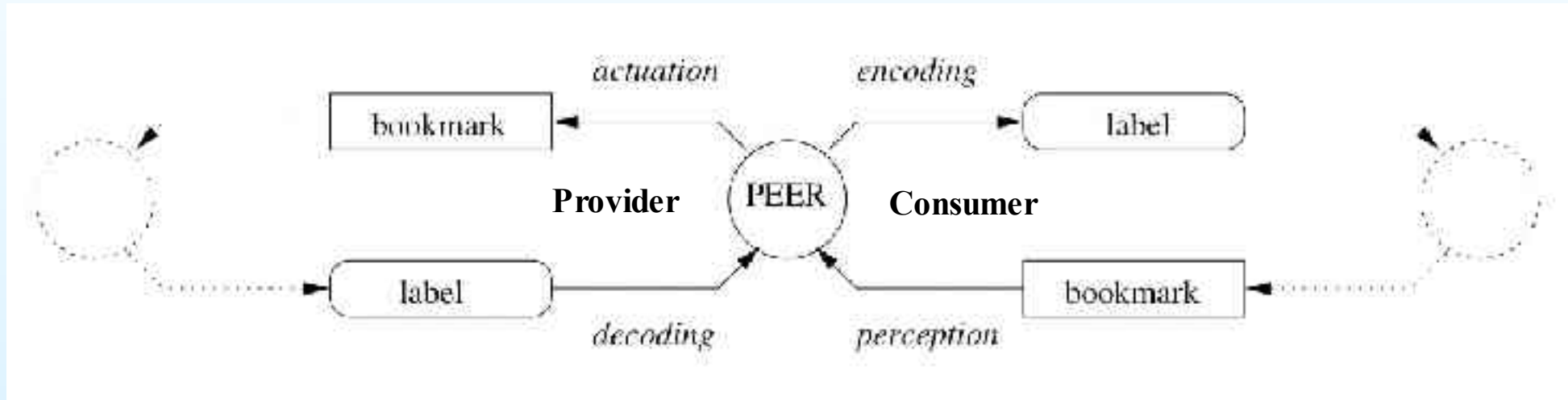
Examples

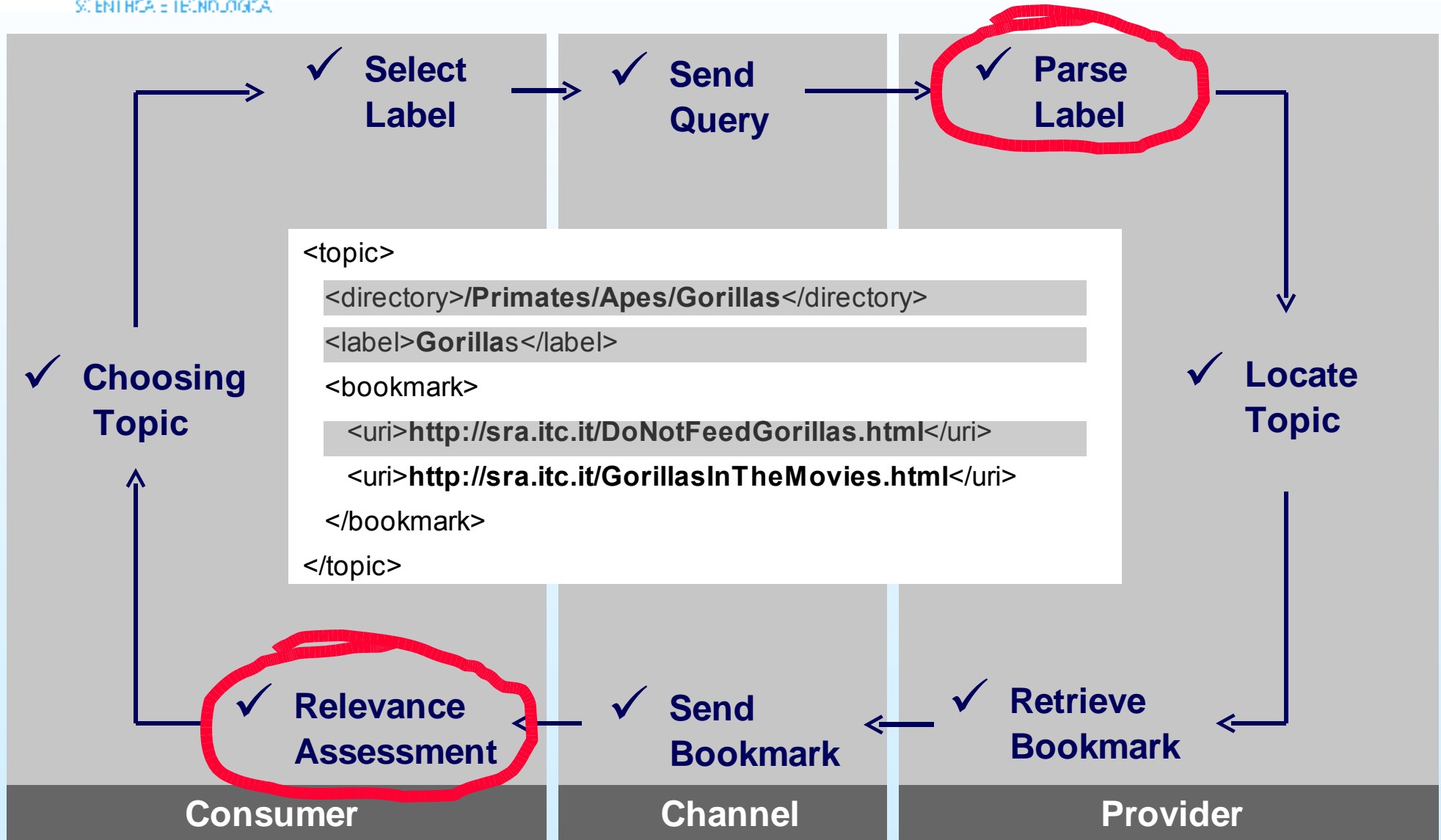
<uri>**http://sra.itc.it/DoNotFeedGorillas.html**</uri>

<uri>**http://sra.itc.it/GorillasInTheMovies.html**</uri>

</bookmark>

</topic>





► Real world examples

GOOGLE: [...] / Recreation / Food / Drink / Wine / Australia / South_Australia

LOOKSMART: [...] / Beverages / Wine / Wine_Industry / Wineries / Australia / South_Australia

GOOGLE: [...] / Home / Cooking / Fish_and_Seafood / Caviar

LOOKSMART: [...] / Recipes / By_Ingredient / Fish_&_Seafood / More_Seafood / Caviar

GOOGLE: [...] / Home / Cooking / Dairy / Eggs / Salads

LOOKSMART: [...] / Recipes / Salads / Egg_Salad

<topic>

<directory>/Primates/Apes/Gorillas</directory>

<label>Gorillas</label>

<bookmark>

<uri>http://sra.itc.it/DoNotFeedGorillas.html</uri>

<uri>http://sra.itc.it/GorillasInTheMovies.html</uri>

</bookmark>

</topic>

<topic>

<directory>/Hollywood/KingKong/Gorilla</directory>

<label>Gorillas</label>

<bookmark>

<uri>http://sra.itc.it/GorillaTeeth.html</uri>

<uri>http://sra.itc.it/GorillasInTheMovies.html</uri>

</bookmark>

</topic>

Alternatives:

- ✓ Comparing Representations
- ✓ Negotiating Denotation
- ✓ Sharing Examples

```
<topic>
<synset>S#314</synset>
<directory>/Primates/Apes/Gorillas</directory>
<label>Gorillas</label>
<bookmark>
  <uri>http://sra.itc.it/DoNotFeedGorillas.html</uri>
  <uri>http://sra.itc.it/GorillasInTheMovies.html</uri>
</bookmark>
</topic>
```

Basic Idea:

- ✓ Qualifying local representation with respect to centralized encoding.
- ✓ Agreement in advance on a common reference ontology.

```
<topic>
<synset>S#759</synset>
<directory>/Hollywood/KingKong/Gorilla</directory>
<label>Gorillas</label>
<bookmark>
  <uri>http://sra.itc.it/GorillaTeeth.html</uri>
  <uri>http://sra.itc.it/GorillasInTheMovies.html</uri>
</bookmark>
</topic>
```

Drawbacks:

- ✓ Effective but Not Sustainable
- ✓ Strong and Restrictive Constraint

<topic>

```
<map>
  <peer>P#147</peer>
  <topic>T#314</topic>
</map>
```

```
<directory>/Primates/Apes/Gorillas</directory>
```

```
<label>Gorillas</label>
```

```
<bookmark>
```

```
  <uri>http://sra.itc.it/DoNotFeedGorillas.html</uri>
```

```
  <uri>http://sra.itc.it/GorillasInTheMovies.html</uri>
```

```
</bookmark>
```

</topic>

<topic>

```
<map>
  <peer>P#147</peer>
  <topic>T#314</topic>
```

```
</map> <directory>/Hollywood/KingKong/Gorilla</directory>
```

```
<label>Gorillas</label>
```

```
<bookmark>
```

```
  <uri>http://sra.itc.it/GorillaTeeth.html</uri>
```

```
  <uri>http://sra.itc.it/GorillasInTheMovies.html</uri>
```

```
</bookmark>
```

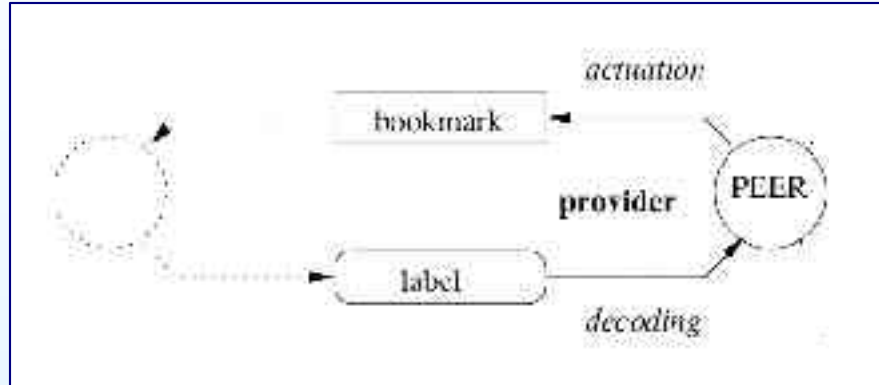
</topic>

Basic Idea:

- ✓ Pairwise mapping of local representation.
- ✓ Computation of mapping:
 - for each peer
 - for each topic

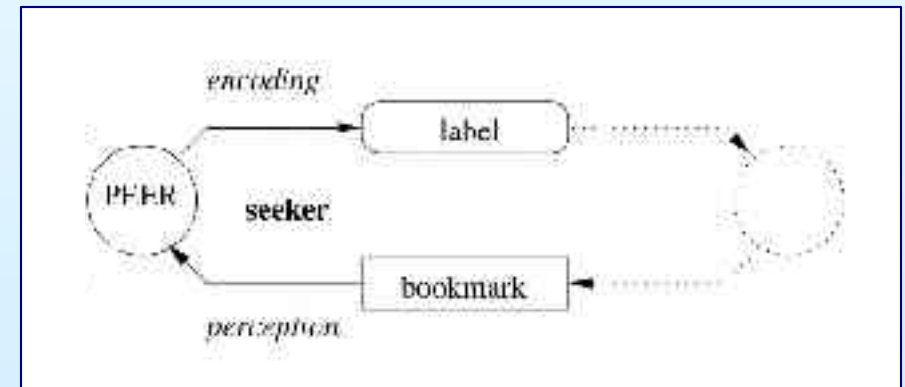
Drawbacks:

- ✓ Quadratic Complexity with respect to the number of Peers
- ✓ Breakdown of mapping computational costs



✓ What kind of denotation to choose given a topic?

- ✓ Let try to assess how a given denotation choice works from the consumer point of view.
- ✓ What-if simulation



```

<topic>
  <directory>/Primates/Apes/Gorillas</directory>
  <lexicon>
    <label>Gorillas</label>
    <used>515</used>
    <success> 480</success>
  </lexicon>
  <lexicon>
    <label>Wild Gorillas</label>
    <used>51</used>
    <success> 10</success>
  </lexicon>
  <bookmark>
    <uri>http://sra.itc.it/DoNotFeedGorillas.html</uri>
    <uri>http://sra.itc.it/GorillasInTheMovies.html</uri>
  </bookmark>
</topic>

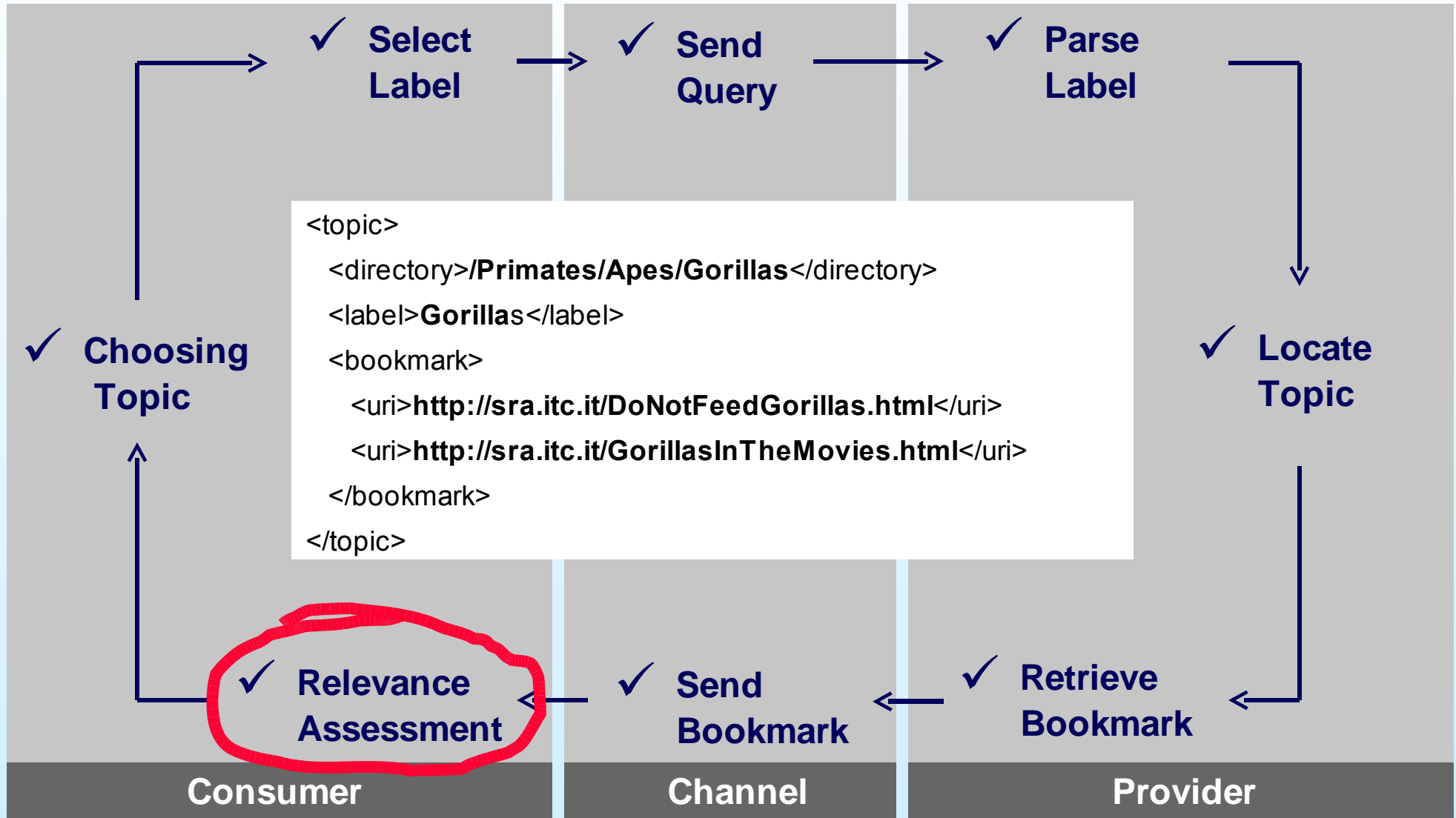
```

```

<topic>
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  <lexicon>
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    <used>613</used>
    <success> 530</success>
  </lexicon>
  <lexicon>
    <label>Gorillas</label>
    <used>51</used>
    <success> 10</success>
  </lexicon>
  <bookmark>
    <uri>http://sra.itc.it/GorillaTeeth.html</uri>
    <uri>http://sra.itc.it/GorillasInTheMovies.html</uri>
  </bookmark>
</topic>

```

Basic Idea: ✓ **Trial&Error Strategy (game)**
 ✓ **Direct vs Indirect Feedback**

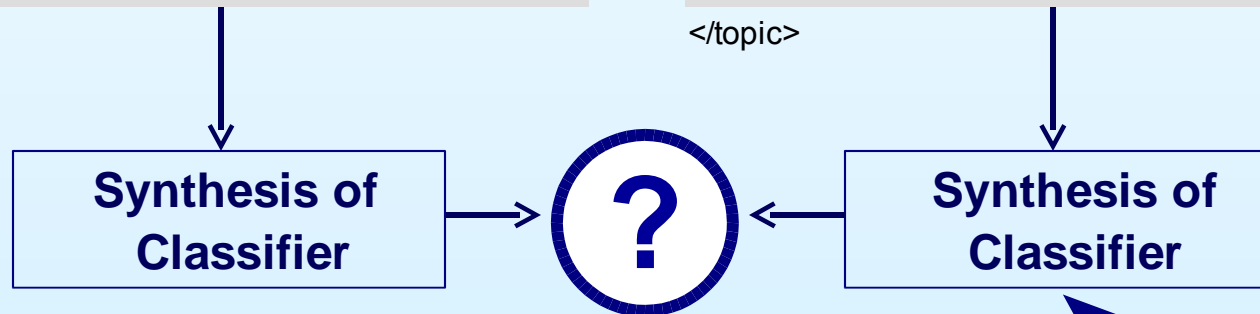


Consumer

```
<topic>
  <directory>/Primates/Apes/Gorillas</directory>
  ...
  <bookmark>
    <uri>http://sra.itc.it/DoNotFeedGorillas.html</uri>
    <uri>http://sra.itc.it/GorillasInTheMovies.html</uri>
  </bookmark>
</topic>
```

Provider

```
<topic>
  <directory>/Hollywood/KingKong/Gorilla</directory>
  ...
  <bookmark>
    <uri>http://sra.itc.it/GorillaTeeth.html</uri>
    <uri>http://sra.itc.it/GorillasInTheMovies.html</uri>
  </bookmark>
</topic>
```



**Nearest-Neighbor Codebook
Standard Prototype-Based
Minimum Error Classifier**

▶ Google Web Directories

[www.google.com/dirhp]

```
<topic>
  <directory>/top/home/cooking/soups_and_stews/fish_and_seafood</directory>
  <label>fish_and_seafood</label>
  <bookmark> ... </bookmark>
  <bookmark> ... </bookmark>
  ...
  <bookmark> ... </bookmark>
</topic>
```

```
<bookmark>
  <uri>http://www.bettycrocker.com</directory>
  <excerpt>
    Crunchy Snacks from Betty Crocker: collection of sweet and
    savoury snack recipes which pack a crunch, from healthy vegetables.
  </excerpt>
  <lemmata>
    snack, collection, recipe, healthy, savoury, vegetable, sweet, crunch
  </lemmata>
</bookmark>
```


▶ Advertising Games

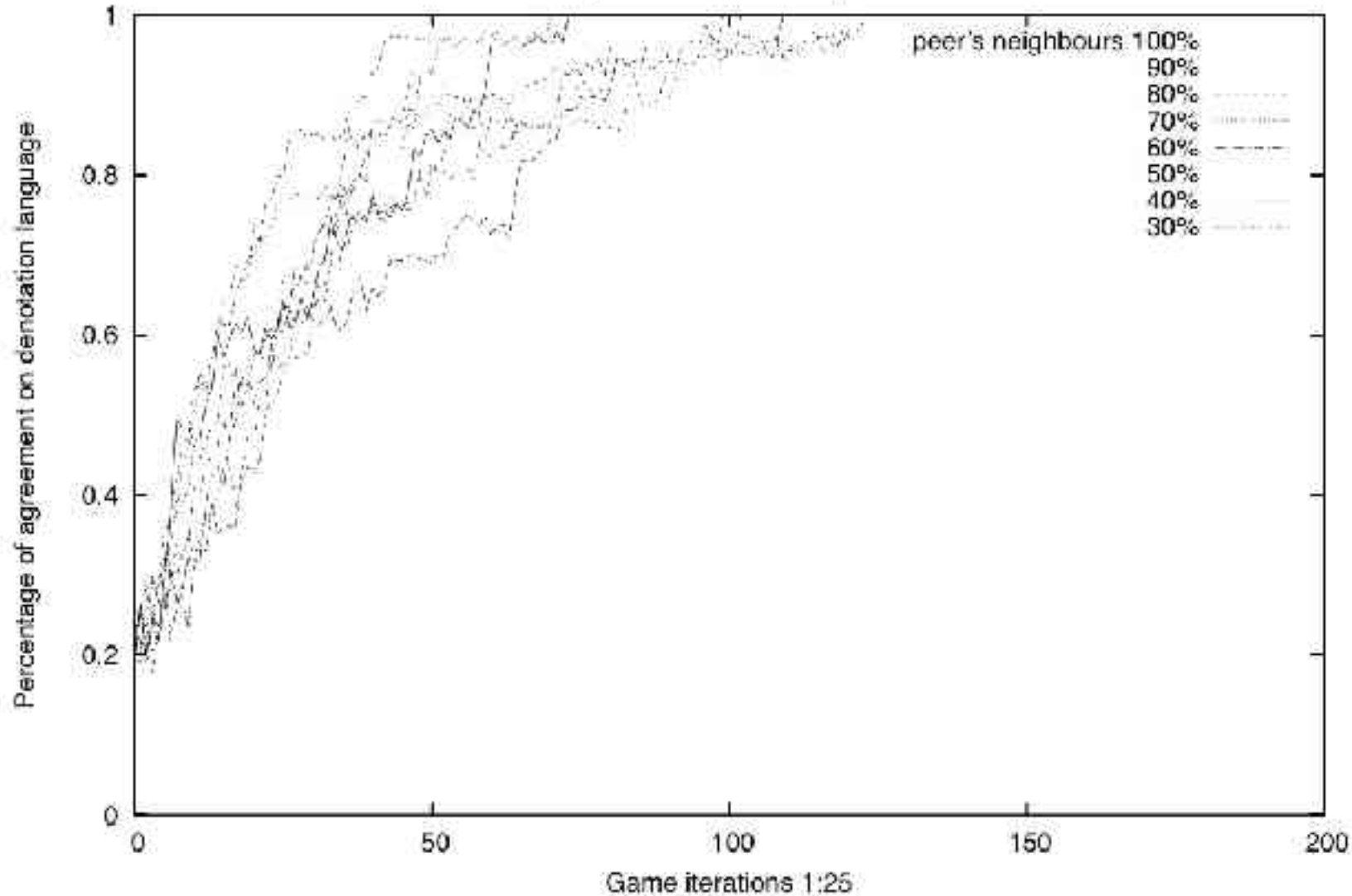
- 20 users
- 20 topics
- 20 labels
- ~1000 iterations
- unbiased lexicon
- sample of bookmarks

▶ Experimental Goals

- Hidden Peers
- Hidden Encoding

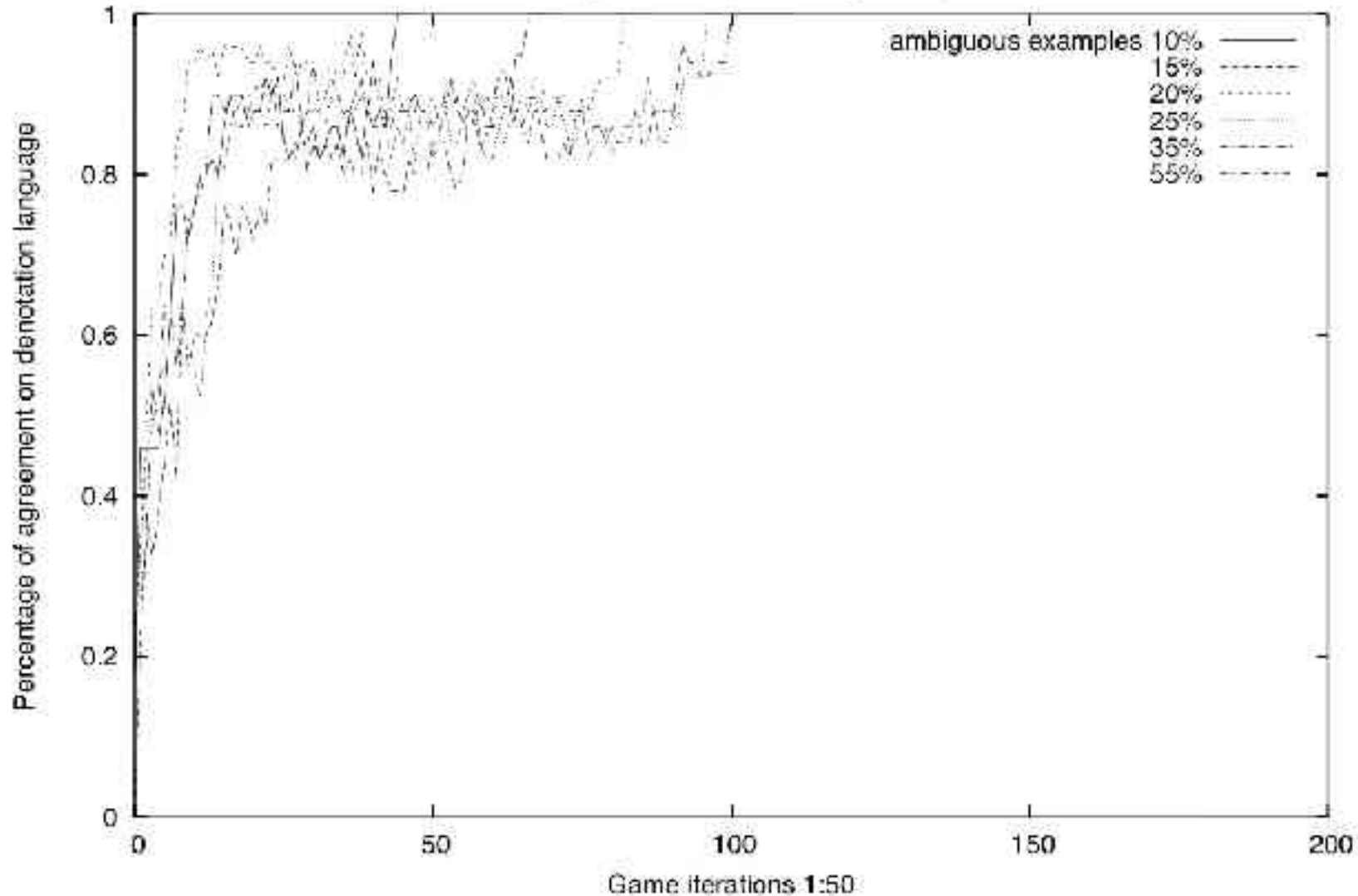
Experiment 1: Hidden Peers

Advertising Game between Neighbour Peers



Experiment 2: Hidden Concepts

Advertising Game with Misleading Perception



- ▶ **Looking at advertising problem as a problem of emergence of a common denotational language.**
- ▶ **Proposal of advertising game as a model to enable a negotiation-based approach.**
- ▶ **Computational and empirical evidence of the working model on examples with real world data.**