Towards the Self-Annotating Web
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Motivation

- Semantic Web requires deeper understanding behind the words
- Meta-data hard to come by without a lot of manual labor
- Desirable to generate the meta-data (annotations) in an unsupervised way
Methods

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   (b) Instance: “U.S.A.”
   (c) Concept: “country”
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   (d) Hypothesis phrase: “U.S.A is a country”
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5. Evaluate set using Google’s hits for each item (Markert et al.)
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6. Use the number of hits to determine the best concept that describes the instance
Patterns

- Hearst
  - <concept>s such as <instance>
  - such <concept>s as <instance>
  - <concept>s, (especially|including) <instance>
  - <instance> (and|or) other <concept>s

- Definite
  - the <instance> <concept>
  - the <concept> <instance>

- Apposition
  - <instance>, a <concept>

- Copula
  - <instance> is a <concept>
Methods
Evaluation

- 30 Texts from www.lonelyplanet.com evaluated by two subjects

- Compare top-n results generated by system with the standards.

- Baseline:
  \[ \text{count}_b(i, c) = \sum_{p \in P} \text{count}(i, c, p) \]

- Weighted:
  \[ \text{count}_w(i, c) = \sum_{p \in P} w_p \text{count}(i, c, p) \]

- Use standard precision/recall methods. \((R_{b,\theta} = \text{baseline set retrieved with hit cutoff threshold } \theta, \text{Standard}_y = \text{standard set produced by subject } y, I = \text{the instance set})\)
\[ Pr_{cy} = \frac{\text{correct answers}}{\text{total answers}} = \frac{|R_{b,\theta} \cap Standard_y|}{|R_{b,\theta}|} \]

\[ Re_{cy} = \frac{\text{correct answers}}{\text{answers in reference standard}} = \frac{|R_{b,\theta} \cap Standard_y|}{|I|} \]

\[ F_{1,y} = \frac{2 \times Pr_{cy} \times Re_{cy}}{Pr_{cy} + Re_{cy}} \]
Results (Before and After Pattern Weighting)

Figure 2: Precision, F-Measure and Accuracy/Recall for $R_{b,\theta}$

Figure 3: Precision, F-Measure and Accuracy/Recall for $R_{b,\theta}$
zoomed into interval [0..1000]
Contribution / What can be Improved?

- Show the effectiveness of using simple patterns and hits from the search engine in an annotation task (accuracy around 24.9% v.s. 69.09% for human)

- Need to justify the cutoff threshold $\theta$. Should show how the number of hits from Google reflect on the performance of the system

- Accuracy measure misleading for high threshold $\theta$

- In Figure 4, misleading precision for the top 5 results measure
  - Achieve a 30% $F_1$ improvement with the weighting? Not really.

- Efficiency (277 nouns, 59 concepts, and 10 patterns = 163,430 hits to Google!)
Discussion Questions

• Is this really practical in the context of semantic web?

• Does this scale?

• Who would use this system?

• Is there a better way to leverage the web as a knowledge base for annotation?