Fast Prototyping of a Malay WordNet System

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Language, Artificial Intelligence and Computer Science for Natural Language Processing Applications Workshop

Outline

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NLP for Malay Language

- WANTED: Malay lexical resource
- Sense level information
- Relation between senses
- WordNet systems for different languages
- No Malay!

Let's Build Malay WordNet!

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But...

This may (will) take years!

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So...

A quick prototype first perhaps?
Also, to explore architecture and functions of a WordNet system

Outline

前人种树，后人乘凉。

"Forebears plant the trees, descendants enjoy the shade."

"Bamboo" artwork used by permission of Keng Lye.

Existing Data at UTMK

Kamus Inggeris-Melayu Dewan (KIMD): a bilingual English-Malay dictionary

dot *n small round spot*, titik; (*appearing in large numbers on dress, leaf, etc*) bintik: ...

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KIMD senses (manually) aligned to WordNet 1.6 senses

kimd (dot, n, 1, [small round spot, (appearing in large numbers on dress, leaf, etc)], ⟨*titik, bintik*⟩).
wordnet (110025218, 'dot', n, 1, [a very small circular shape]).

Resources from English WordNet (Princeton)

Data

- lexicographer files (human editable)
- database files (generated)

Tools

- WordNet Browser (Windows, GNU/Linux)
- WordNet lookup API (C libraries)
- GRIND (lexicographer $\rightarrow$ database files)

Constructing Malay WordNet (Overview)

- Define synsets
- Generating lexicographer files
  - Copying relations from English WordNet
  - Group synsets in files by semantic fields
  - Format lexicographer files as required
- Run GRIND on lexicographer files
- Browse Malay WordNet database files in WordNet Browser!

Creating Synsets

- Use KIMD–WordNet alignment
- No Malay gloss/definition text, so re-use English gloss for now

KIMD–WordNet alignment

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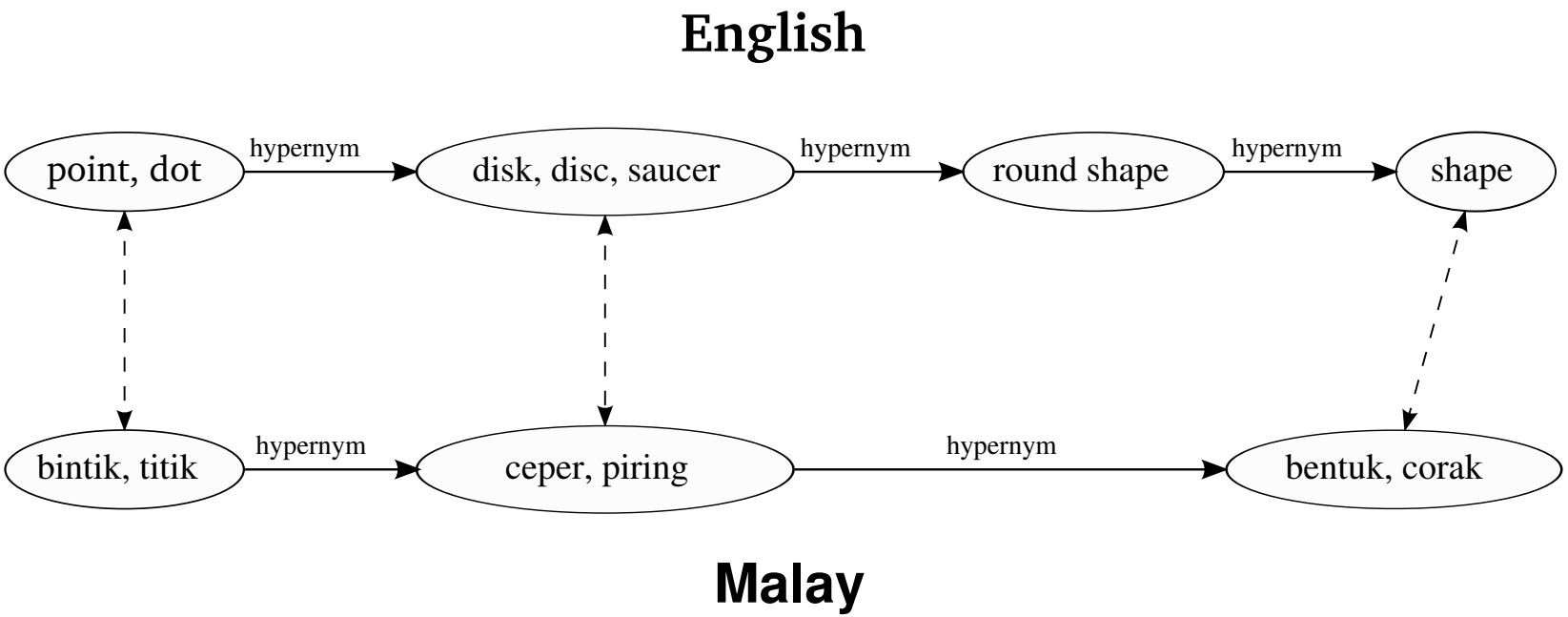
Malay WordNet synset

(**titik, bintik**; [a very small circular shape]).

Relations between Synsets

- Refer to relations between English WordNet synsets
- Copy selected relations over to Malay WordNet where possible



Semantic Fields

- Synsets are placed in separate lexicographer files according to semantic fields
- Refer to aligned English WordNet synsets

noun.shape

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(**titik, bintik**; [a very small circular shape]).

Lexicographer File Snippet

. . .

{ titik_pertemuan, noun.Tops:bentuk,@ (a connecting point at which several lines come together) }
{ tempat_sambung, noun.Tops:bentuk,@ (the shape or manner in which things come together and a connection is made) }
{ bintik, titik, ceper,@ (a very small circular shape) }
{ pori, ruang,@ (any tiny hole admitting passage of a liquid (fluid or gas)) }
{ pohon, rajah,@ (a figure that branches from a single root) }
{ susuh, taji, juluran,@ (any sharply pointed projection) }

. . .

Outline

Malay WordNet Prototype

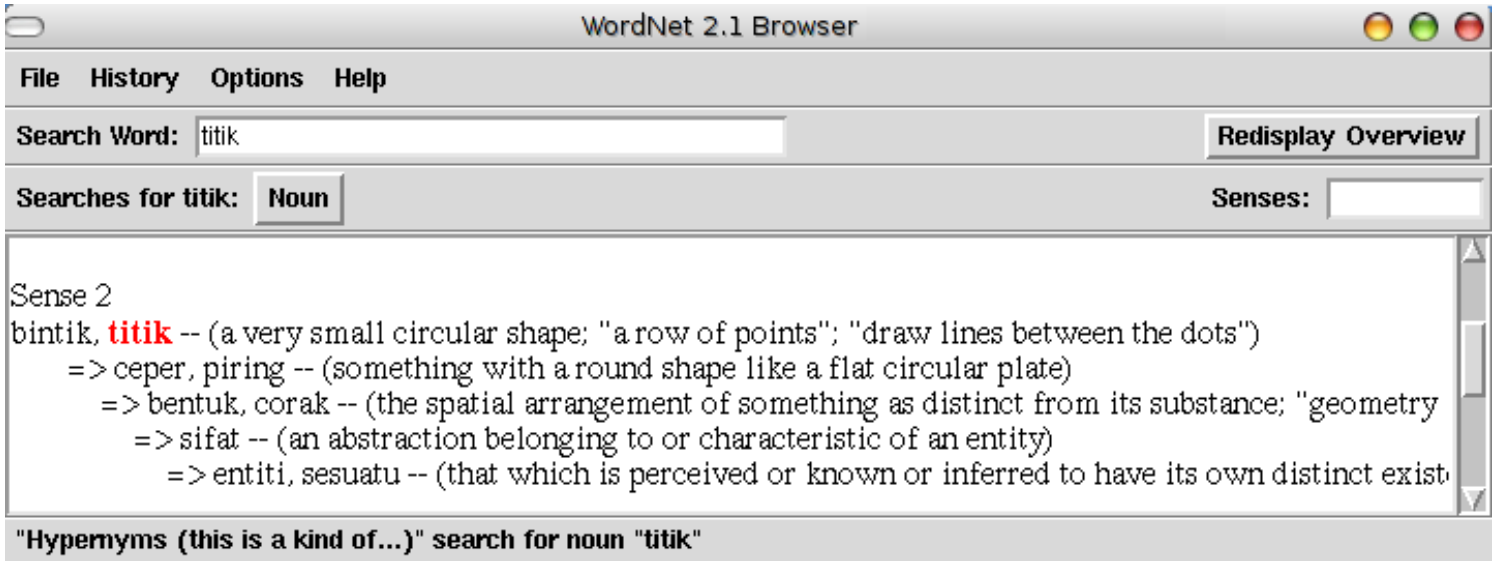
Nouns

- 12429 synsets
- hypernymy/hyponymy
- holonymy/meronymy
  - part-of
  - member-of
  - substance-of

Verbs

- 5805 synsets
- hypernymy/troponymy
- cause
- entailment

Screenshots



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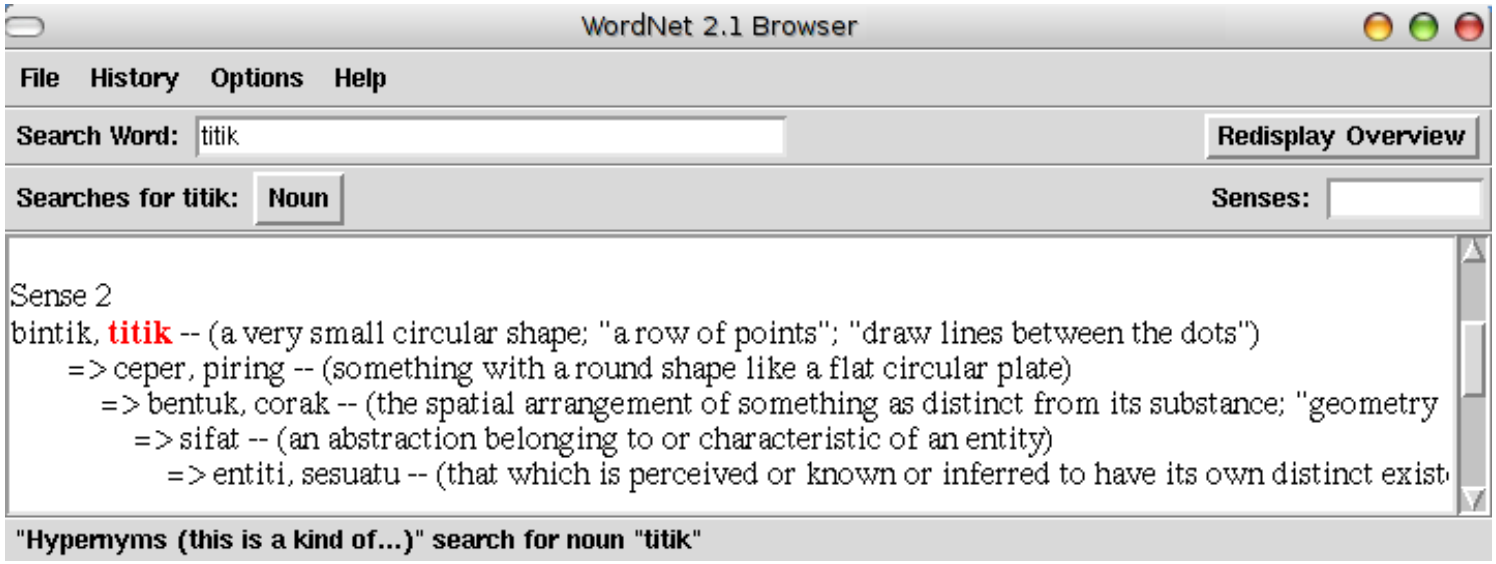

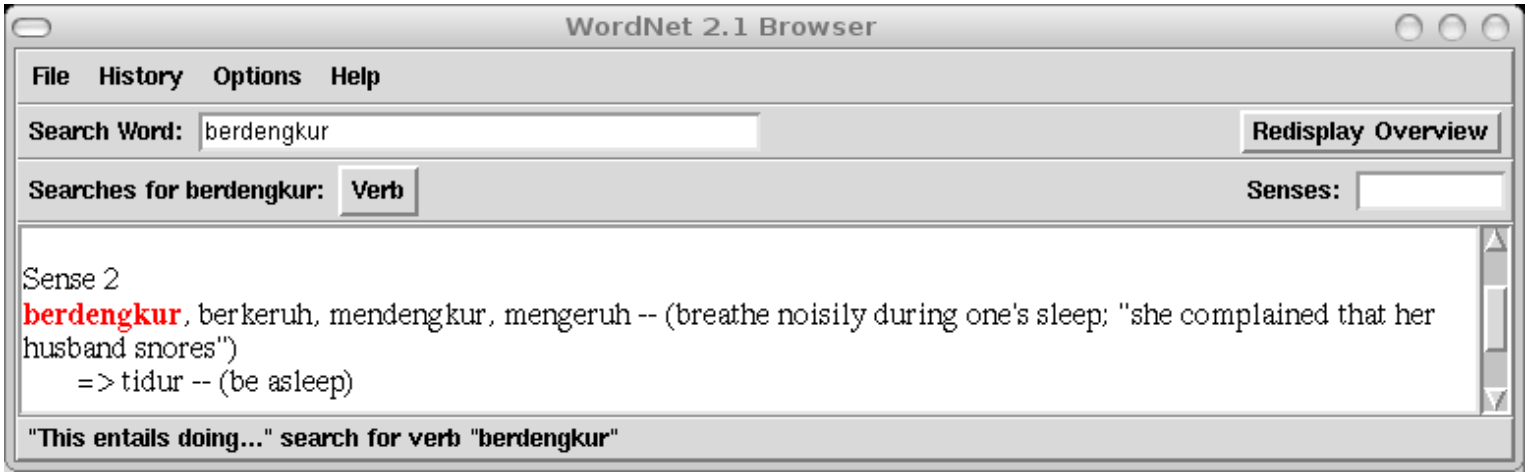

Outline

Problems and Issues
(It's a hacky prototype after all!)

- Unsuitable Malay entries
  - KIMD is uni-directional, English-Malay dictionary
  - e.g. "absentee" "*orang, anggota, dan lain-lain yang tidak hadir*"
- No Malay gloss (yet)
- No Malay verb frames (yet)
- Derivation of Malay synsets
  - merging/splitting synsets
  - words specific to Malay language/culture e.g. "*baju kurung*"
- Not all relations for English synsets make sense in Malay

Future Work

- Use Malay monolingual lexicon
- Verb frames for Malay
- Proper "learning" of relations e.g. machine learning techniques
- Full localisation for Malay users (GUI, terms and glossary etc)
- Alignment to EuroWordNet

Summary

- Creating a WordNet system is **HARD WORK**.
- Lexicographic expertise is sorely needed
- We achieved some understanding about the software tools and process to help lexicographers compile the necessary data

Thank You for Your Attention!