ENTEGRA SYSTEMS

WIMs™

A Natural Language Understanding System

- ☑ A new world of language, text, message searching
- ☑ Minimize false positives
- ☑ Structured and un-structured data
- ☑ Easy to use
- ☑ Easily integrated with existing tools
- ☑ Affordable
- ☑ Scalable
- ☑ Usable in any language/dialect

See through the ambiguity, understand the intention, and uncover threats behind millions of messages across languages.

WIMs™, a powerful NLU technology, concretely removes ambiguity from a text, visualizes meaning, and uncovers the human intent.

National security agencies have the ability to collect messages by the millions and millions. Today, understanding what is really being said is the challenge. WIMs is a new breakthrough technology in the world of language, text, and message searching. It allows users to analyze raw text, decipher intent, and map the meaning. Ultimately, it allows you to scour millions of texts, visualize the meaning behind the language, and understand them as a human would.

Natural Language Understanding (NLU) is a category or extension of Natural Language Processing (NLP) that is focused on extracting the underlying meaning of a text. The WIMs NLU Analyzer is a collection of algorithms, lexical resources, and processors that are designed to take raw input text, **understand the meanings** or intentions behind it, and produce artifacts that enable easy querying and further analysis by users and downstream systems.

WIMs (Weakly Inferred Meanings) are **unambiguous, machine-tractable representations** of the meaning and intention behind a piece of natural language text. That is, a WIM encapsulates exactly what the author or speaker meant by **mapping the text to an object** that can be queried and inspected in a predictable way.

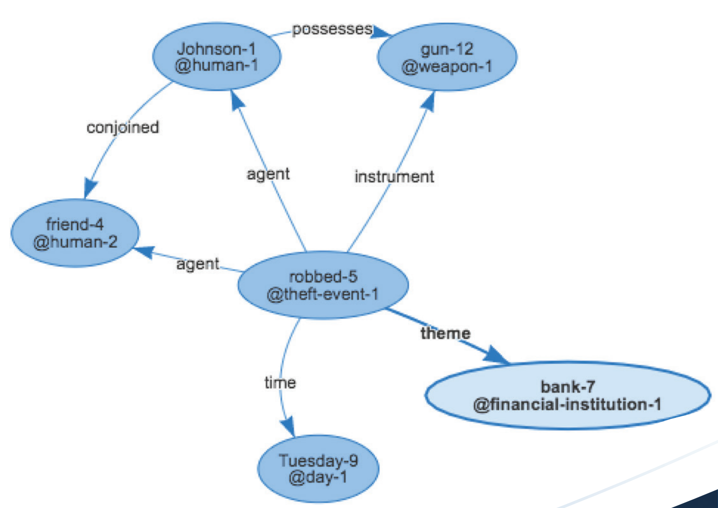
WIMs are represented as **directed graphs**, where each node represents an entity or event in the text, and where each directed edge represents a **semantic relationship** between two nodes. Consider the following example:

Johnson and his friend robbed the bank on Tuesday with his gun. (1)

In this text, the two **agents** (**agents** are entities that are "doing something") are Johnson and his friend. They are taking part in an event–robbed–which has a **theme** (what something is being done to): the bank. Further, Tuesday is indicated as the **time**, and gun is indicated as the **instrument** (an entity that assists in an event). Finally, the gun isn't just a gun, but rather it is his gun, indicating a **possessive** relationship.

The WIM for this text is visualized in **WIM Example (1)**. Each entity and event is represented as a node that is mapped to the original text as well as an unambiguous ontological concept, and are interconnected by relationships stated directly or inferred from the text. *(Continued on next page)*

WIM Example (1)



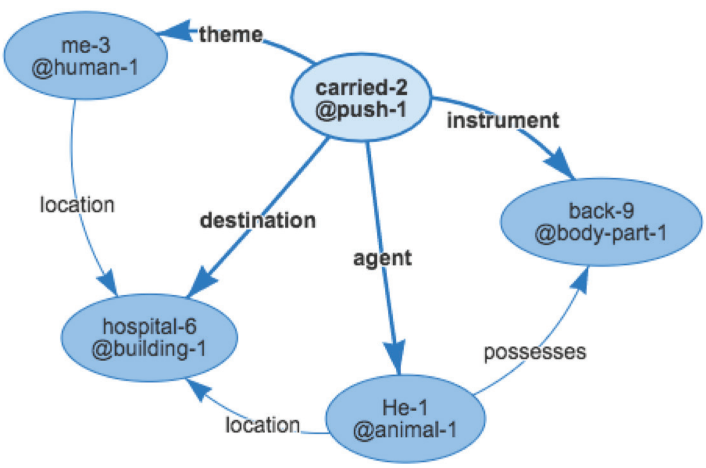
The WIMs NLU Analyzer is designed to concretely disambiguate the meaning of text. Consider for example the following two sentences:

He carried me to the hospital on his back. (2)

She carried the child to term. (3)

Each of these sentences is anchored by the verb carry, however each has a completely different meaning. The WIMs system correctly identifies which of the (over 40) possible meanings of the word carry is correct for each sentence by using contextual clues (see **WIM Example (2)**). These selected senses correspond to one or more ontological concepts; for instance, both Johnson and his friend were mapped to @human, the ontological concept for human beings as shown in **WIM Example (1)**. The selected senses also contribute to the semantic relationships found in the sentence. Ultimately, by properly ascertaining which definition of each word is correct in the sentence, the system can graph the text's meaning.

WIM Example (2)



Once mapping is complete, the format allows for a variety of advanced usages. For example, WIMs enables advanced search, or "search by intention." The search phrase "someone committed a crime with a weapon" would match the Johnson example, even though no textual match occurs.

Further, the ontology (and by extension, a generated WIM) is language agnostic; while the ontological concepts are named with English-language counterparts, @human is the concept of a human being, regardless of language. The WIMs format, therefore, allows for "search by intention" across languages—searching in one language and finding hits in another—again with nonspecific or fuzzy search terms.

The WIMs system is designed to be domain flexible, with a scalable 125,000+ word sense general-purpose lexicon and custom ontology. WIMs can easily integrate custom domain-specific terminology to allow for more accurate analyses.

WIMs has been constructed with scalability and integration in mind; plugging WIMs into existing data streams and outputting the results to existing visualization tools, 2nd-tier analytics, and further processing is both supported and encouraged.

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