# LANGUAGE PROCESSING IN CHINESE pdf

## 1: Natural language processing - Wikipedia

*The aim of this book is to integrate the most recent research in the cognitive aspects of the Chinese language into a single academic reference for those interested in language processing and related fields.*

Introduction[ edit ] Language is central to societal life. It is a window on cognition, and may be a window on a partial explanation of cultural differences. To understand how the brain processes language, it can be useful to contrast distinct languages. In the current work, Chinese is contrasted with English English Grammar System[ edit ] To understand how Chinese language processing is different from English, it is useful to review the basic structures of English. English, as well as other Indo-European languages e. The basic structural unit is the phoneme the smallest unit of sound. Phonemes are combined to make morphemes, which are the basic units of meaning the smallest semantic unit. A morpheme may be one or more phonemes. A word may be a single morpheme e. Some morphemes, such as suffixes e. Critically, in English, one can understand the meaning of a word by identifying and understanding the component morphemes, and then combining the meanings of those morphemes. Essentially, the meaning of morphemes is invariant though there are context-dependent exceptions and morphemes add to create meaning of the word. In spoken English, the phonemes are combined to create syllables. Phonemes, morphemes and syllables are related by not equated Jay, The comprehension of a sentence is based on the meanings of the words, but the identification, and ultimately the specific meaning, of words is aided by the syntactical rules. Different categories of words fulfill different functions e. Most words belong to a single category though there are exceptions e. More typically, words are altered by suffixes or prefixes when changing categories e. For example, noun or adjectives follow articles e. Syntax also constrains subject-verb agreement and tense e. To understand spoken English, one must parse the sequence of syllables into morphemes and then into words and sentences , using both semantics and syntax. Semantics is collective meaning of all the words, while syntax is essentially grammar. The difficulty for the comprehension of spoken English is the identification of breaks between words and sentences. That is, even though it appears effortless for listeners, the breaks between words are not always obvious in the acoustic signal. In written English, the phoneme is essentially associated with a particular letter string, while words are identified by breaks and sentences are clearly marked. Hence, the breaks between words and sentences are obvious. However, morphemes or even the phonemes within a word are not necessarily obvious Jay, In English, syntax and semantics can be processed independently Liu. For example, it is easy to construct sentences that follow the syntactical rules of English e. It is also possible to construct sentences that have meaning while violating syntactical rules e. Parents can understand the speech of children even if it is ungrammatical. The absence of proper syntax or semantics will make an utterance more difficult to understand or more ambiguous, but not impossible Liu. For the comparison of English comprehension to Chinese comprehension, there are a number of other important issues. Firstly, there is a loose hierarchical nesting of meanings particularly for nouns and verbs e. Secondly, synonyms are different words with the same meanings. They can be used to change the word without changing the meaning e. Synonyms can be used to generate errors e. Homonyms are words with the same sound but different meanings. They are not detectable applicable in speech but are easily identified by both syntax and semantics in written work e. Like synonyms, homonyms can be used to generate errors, but only in written work. In that constraint, he prior context of a word may be highly constraining e. Those constraints may be semantic or syntactic or both. Finally, one must also remember that there are numerous exceptions to every rule, be that morphological or syntactical, and that colloquial speech common, everyday speech does not follow all the rules Storkel. In English, the rules should be seen as strong guidelines rather than as "rules" other alphabetic languages are more rigorous. In an orthographic language, each morpheme is only used "in isolation". Each morpheme has a stand-alone meaning Newman, Each morpheme is unbound. Even if one were to be unfamiliar with the meaning of escutcheon the bit of metal or wood that surrounds a key hole , one could surmise that escutcheons is the plural form. It can only be used in combination. It must be bound to another morpheme. Many prefixes or suffixes are bound morphemes, but note that suffixes and prefixes are not limited to bound morphemes â€" some can also function as unbound morphemes e. Bound morphemes are still morphemes â€” they have a fixed meaning that is used to modify the other morpheme of the word. However, there are numerous exceptions that can be confusing particularly during the acquisition of English. These exceptions are a consequence of the historical development of English. In addition, one must be mindful of the fact that combining morphemes into new words might or might not affect the syntax grammar. Chinese does not work this way. In Chinese, all orthographies are unbound. There are no bound morphemes in Chinese. Each orthography has its single sound. Although Chinese developed Pinyin is a pronunciation system to unify pronunciation by using letters around 50 years ago, it is impossible to recognize anything like morphemes phonemes and syllables by looking at characters, and Pinyin is generally not used for writing. Thus, one does not modify the meaning of an orthography by adding a anything like a bound morpheme. Instead, one denotes different conditions e. For example, to denote the past, one adds additional words. To be specific about the present tense, one adds additional words. To denote the plural, one adds words. Note that English uses the same tactic for some situations. For example, the future tense uses additional unbound morphemes in an auxiliary plus verb structure e. The structures of Chinese past, present and future tense are all analogous to the structure of the English future tense. This orthographic structure affects both the spoken and written versions of the language. Chinese is complicated by the fact that there are many different spoken dialects of Chinese e. However, there is only one written form for all. Those who speak different dialects use completely different pronunciations for the same written symbols. Mandarin is the official dialect the dialect based on the Northern Beijing style pronunciation of the Chinese language, and its use is enforced throughout the education system. Hence it is useful to discuss the written form before discussing the spoken form. Other characters Ideographs represent abstract concepts, often in a meaningful way e. In these, the most basic element of the construction for each character is called the Stroke See example 1. The basic strokes are combined to make basic characters e. The basic characters are elaborated upon to make more complex characters e. However, the individual strokes have no intrinsic meaning, and do not associate with particular sounds they are not the same as phonemes or letters in English. Thus, strokes cannot add up to give pronunciations and meanings to characters. This is called a logical aggregate. Some are shown in Figure 3, Logical Aggregates. However, most of the characters in the Chinese language are not logical-aggregates. One component of the character is a simpler character used for its broad semantic meaning to establish a semantic context Xue. To this, a second layer is added which may be based on an irrelevant syllable e. Some are shown in Figure 4: Generally one cannot add the components of a character to create a more complex concept even if it is a semantic-phonetic aggregate or a logical aggregate. Chinese characters have evolved throughout Chinese history. However, most people would not be able to figure out the meaning of most of the characters even if they knew that history. Note that the same is true for English. Each English word has its origins, but most English speakers do not know those origins, and knowledge of the origin does not necessarily convey an understanding of its current meaning. Generally, the interpretation of aggregate characters -- even the interpretation of pictographs or ideographs -- is not obvious. They must be memorized. Even if the meanings of the simpler pictographs and ideographs are memorized, the meaning of aggregate characters is not obvious. Turned around, one cannot decompose a Chinese character to understand its meaning. It is almost impossible to parse a character into components that can be added to create meaning. This is in stark contrast to English where one can determine to a large part the meaning of a word by simply understanding its component morphemes which are dependent on its phonemes Xue,et al, This English decomposition process has no analogue in Chinese. One simply memorizes the meanings of all symbols.

## 2: Cloud Natural Language | Cloud Natural Language API | Google Cloud

*select article Graphemic, Phonological, and Semantic Activation Processes during the Recognition of Chinese Characters.*

History[ edit ] The history of natural language processing generally started in the s, although work can be found from earlier periods. In , Alan Turing published an article titled " Intelligence " which proposed what is now called the Turing test as a criterion of intelligence. The Georgetown experiment in involved fully automatic translation of more than sixty Russian sentences into English. The authors claimed that within three or five years, machine translation would be a solved problem. Little further research in machine translation was conducted until the late s, when the first statistical machine translation systems were developed. Some notably successful natural language processing systems developed in the s were SHRDLU , a natural language system working in restricted " blocks worlds " with restricted vocabularies, and ELIZA , a simulation of a Rogerian psychotherapist , written by Joseph Weizenbaum between and  Using almost no information about human thought or emotion, ELIZA sometimes provided a startlingly human-like interaction. When the "patient" exceeded the very small knowledge base, ELIZA might provide a generic response, for example, responding to "My head hurts" with "Why do you say your head hurts? During the s, many programmers began to write "conceptual ontologies ", which structured real-world information into computer-understandable data. Up to the s, most natural language processing systems were based on complex sets of hand-written rules. Starting in the late s, however, there was a revolution in natural language processing with the introduction of machine learning algorithms for language processing. However, part-of-speech tagging introduced the use of hidden Markov models to natural language processing, and increasingly, research has focused on statistical models , which make soft, probabilistic decisions based on attaching real-valued weights to the features making up the input data. The cache language models upon which many speech recognition systems now rely are examples of such statistical models. Such models are generally more robust when given unfamiliar input, especially input that contains errors as is very common for real-world data , and produce more reliable results when integrated into a larger system comprising multiple subtasks. Many of the notable early successes occurred in the field of machine translation , due especially to work at IBM Research, where successively more complicated statistical models were developed. These systems were able to take advantage of existing multilingual textual corpora that had been produced by the Parliament of Canada and the European Union as a result of laws calling for the translation of all governmental proceedings into all official languages of the corresponding systems of government. However, most other systems depended on corpora specifically developed for the tasks implemented by these systems, which was and often continues to be a major limitation in the success of these systems. As a result, a great deal of research has gone into methods of more effectively learning from limited amounts of data. Recent research has increasingly focused on unsupervised and semi-supervised learning algorithms. Such algorithms are able to learn from data that has not been hand-annotated with the desired answers, or using a combination of annotated and non-annotated data. Generally, this task is much more difficult than supervised learning , and typically produces less accurate results for a given amount of input data. However, there is an enormous amount of non-annotated data available including, among other things, the entire content of the World Wide Web , which can often make up for the inferior results if the algorithm used has a low enough time complexity to be practical. In the s, representation learning and deep neural network -style machine learning methods became widespread in natural language processing, due in part to a flurry of results showing that such techniques [4] [5] can achieve state-of-the-art results in many natural language tasks, for example in language modeling, [6] parsing, [7] [8] and many others. Popular techniques include the use of word embeddings to capture semantic properties of words, and an increase in end-to-end learning of a higher-level task e. In some areas, this shift has entailed substantial changes in how NLP systems are designed, such that deep neural network-based approaches may be viewed as a new paradigm distinct from statistical natural language processing. For instance, the term neural machine translation NMT emphasizes the fact that deep learning-based approaches to machine translation directly learn sequence-to-sequence transformations, obviating the need for intermediate steps such as word alignment and language modeling that were used in statistical machine translation SMT. However, this is rarely robust to natural language variation. Since the so-called "statistical revolution" [11] [12] in the late s and mid s, much natural language processing research has relied heavily on machine learning. The machine-learning paradigm calls instead for using statistical inference to automatically learn such rules through the analysis of large corpora of typical real-world examples a corpus plural, "corpora" is a set of documents, possibly with human or computer annotations. Many different classes of machine-learning algorithms have been applied to natural-language-processing tasks. These algorithms take as input a large set of "features" that are generated from the input data. Some of the earliest-used algorithms, such as decision trees , produced systems of hard if-then rules similar to the systems of hand-written rules that were then common. Increasingly, however, research has focused on statistical models , which make soft, probabilistic decisions based on attaching real-valued weights to each input feature. Such models have the advantage that they can express the relative certainty of many different possible answers rather than only one, producing more reliable results when such a model is included as a component of a larger system. Systems based on machine-learning algorithms have many advantages over hand-produced rules: The learning procedures used during machine learning automatically focus on the most common cases, whereas when writing rules by hand it is often not at all obvious where the effort should be directed. Automatic learning procedures can make use of statistical-inference algorithms to produce models that are robust to unfamiliar input e. Generally, handling such input gracefully with hand-written rulesâ€”or, more generally, creating systems of hand-written rules that make soft decisionsâ€"is extremely difficult, error-prone and time-consuming. Systems based on automatically learning the rules can be made more accurate simply by supplying more input data. However, systems based on hand-written rules can only be made more accurate by increasing the complexity of the rules, which is a much more difficult task. In particular, there is a limit to the complexity of systems based on hand-crafted rules, beyond which the systems become more and more unmanageable. However, creating more data to input to machine-learning systems simply requires a corresponding increase in the number of man-hours worked, generally without significant increases in the complexity of the annotation process. Major evaluations and tasks[ edit ] The following is a list of some of the most commonly researched tasks in natural language processing. Note that some of these tasks have direct real-world applications, while others more commonly serve as subtasks that are used to aid in solving larger tasks. Though natural language processing tasks are closely intertwined, they are frequently subdivided into categories for convenience. A coarse division is given below.

## 3: Natural Language Processing Group - Microsoft Research

*May, It is a nice course for those interested in working on natural language processing in Chinese, as it can help further career, as Chinese is the second largest used language.*

## 4: Language processing in Chinese (è±†ç“£)

*This book introduces Chinese language-processing issues and techniques to readers who already have a basic background in natural language processing (NLP). Since the major difference between Chinese and Western languages is at the word level, the book primarily focuses on Chinese morphological analysis and introduces the concept, structure, and.*

## 5: The Stanford Natural Language Processing Group

*Research article Full text access Graphemic, Phonological, and Semantic Activation Processes during the Recognition of Chinese Characters.*

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## 6: NJStar Chinese Word Processor - Free download and software reviews - CNET www.enganchecubano.

*Buy or Rent Natural Language Processing and Chinese Computing: 7th CCF International Conference, NLPCC , Hohhot, China, August 26?30, , Proceedings, Part II as an eTextbook and get instant access.*

## 7: Language processing in Chinese (Book, ) [www.enganchecubano.com]

*å›¾ä¹¦Language processing in Chinese ä»‹ç»•ã€•ä¹¦è¯„ã€•è®ºå•›å•ŠæŽ¨è••. The aim of this book is to integrate the most recent research in the cognitive aspects of the Chinese language into a single academic reference for those interested in language processing and related fields.*

## 8: Psycholinguistics/A comparison of language processing in Chinese and English - Wikiversity

*Chinese Natural Language Processing and Speech Processing Overview. We work on a wide variety of research in Chinese Natural Language Processing and speech processing, including word segmentation, part-of-speech tagging, syntactic and semantic parsing, machine translation, disfluency detection, prosody, and other areas.*

## 9: Language processing in Chinese (eBook, ) [www.enganchecubano.com]

*Brandeis University's Chinese Language Processing program is anchored by linguistic corpora annotated with morphological, syntactic, semantic and discourse structures. The Chinese Treebank, started at University of Pennsylvania, is a segmented, part-of-speech tagged, and fully bracketed corpus.*

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