

自然语言处理领域重要论文&资源全索引

2017-10-14 机器之心

选自GitHub

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机器之心编译

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自然语言处理（NLP）是人工智能研究中极具挑战的一个分支。随着深度学习等技术的引入，NLP 领域正在以前所未有的速度向前发展。但对于初学者来说，这一领域目前有哪些研究和资源是必读的？最近，Kyubyong Park 为我们整理了一份完整列表。

GitHub 项目链接: https://github.com/Kyubyong/nlp_tasks

本人从事自然语言处理任务（NLP）的研究已经有很长时间了，有一天我想到，我需要为庞大的 NLP 领域做一个概览，我知道自己肯定不是想要一睹 NLP 任务的全貌的第一个人。

我曾竭尽所能的研究过尽可能多种类型的 NLP 任务，但由于个人知识的局限，我承认还远远没有穷尽整个领域。目前，该项目选取的参考文献都偏重最新的深度学习研究成果。我希望这些能为想要深入钻研一个 NLP 任务的人们提供一个开端。这个项目将持续更新，不过，我更希望与更多人合作。如果你有意愿的话，欢迎对这个项目作出贡献。

回指解析

- See Coreference Resolution (https://github.com/Kyubyong/nlp_tasks#coreference-resolution)

自动作文评分

- 论文: Automatic Text Scoring Using Neural Networks (<https://arxiv.org/abs/1606.04289>)
- 论文: A Neural Approach to Automated Essay Scoring (http://www.aclweb.org/old_anthology/D/D16/D16-1193.pdf)
- 竞赛: Kaggle: The Hewlett Foundation: Automated Essay Scoring (<https://www.kaggle.com/c/asap-aes>)

- 项目: EnhancedAI Scoring Engine (<https://github.com/edx/ease>)

自动语音识别

- WIKI Speech recognition (https://en.wikipedia.org/wiki/Speech_recognition)
- 论文: DeepSpeech 2: End-to-End Speech Recognition in English and Mandarin (<https://arxiv.org/abs/1512.02595>)
- 论文: WaveNet: A Generative Model for Raw Audio (<https://arxiv.org/abs/1609.03499>)
- 项目: A TensorFlow implementation of Baidu's DeepSpeech architecture (<https://github.com/mozilla/DeepSpeech>)
- 项目: Speech-to-Text-WaveNet: End-to-end sentence level English speech recognition using DeepMind's WaveNet (<https://github.com/buriburisuri/speech-to-text-wavenet>)
- 竞赛: The 5thCHiME Speech Separation and Recognition Challenge (http://spandh.dcs.shef.ac.uk/chime_challenge/)
- 资源: The 5thCHiME Speech Separation and Recognition Challenge (http://spandh.dcs.shef.ac.uk/chime_challenge/download.html)
- 资源: CSTRVCTK Corpus (<http://homepages.inf.ed.ac.uk/jyamagis/page3/page58/page58.html>)
- 资源: LibriSpeechASR corpus (<http://www.openslr.org/12/>)
- 资源: Switchboard-1 Telephone Speech Corpus (<https://catalog.ldc.upenn.edu/ldc97s62>)
- 资源: TED-LIUMCorpus (<http://www-lium.univ-lemans.fr/en/content/ted-lium-corpus>)

自动摘要

- WIKI Automatic summarization (https://en.wikipedia.org/wiki/Automatic_summarization)
- 书籍: AutomaticText Summarization (https://www.amazon.com/Automatic-Text-Summarization-Juan-Manuel-Torres-Moreno/dp/1848216688/ref=sr_1_1?s=books&ie=UTF8&qid=1507782304&sr=1-1&keywords=Automatic+Text+Summarization)
- 论文: TextSummarization Using Neural Networks (<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.823.8025&rep=rep1&type=pdf>)
- 论文: Rankingwith Recursive Neural Networks and Its Application to Multi-DocumentSummarization (<https://www.aaai.org/ocs/index.php/AAAI/AAAI15/paper/viewFile/9414/9520>)
- 资源: TextAnalytics Conferences (TAC) (<https://tac.nist.gov/data/index.html>)
- 资源: DocumentUnderstanding Conferences (DUC) (<http://www-nlp.nist.gov/projects/duc/data.html>)

指代消解

- INFO Coreference Resolution (<https://nlp.stanford.edu/projects/coref.shtml>)
- 论文: DeepReinforcement Learning for Mention-Ranking Coreference Models (<https://arxiv.org/abs/1609.08667>)
- 论文: ImprovingCoreference Resolution by Learning Entity-Level Distributed Representations (<https://arxiv.org/abs/1606.01323>)
- 竞赛: CoNLL2012 Shared Task: Modeling Multilingual Unrestricted Coreference in OntoNotes (<http://conll.cemantix.org/2012/task-description.html>)
- 竞赛: CoNLL2011 Shared Task: Modeling Unrestricted Coreference in OntoNotes (<http://conll.cemantix.org/2011/task-description.html>)

实体链接

- 见「命名实体消歧」部分

语法错误纠正

- 论文: NeuralNetwork Translation Models for Grammatical Error Correction (<https://arxiv.org/abs/1606.00189>)
- 竞赛: CoNLL-2013Shared Task: Grammatical Error Correction (<http://www.comp.nus.edu.sg/~nlp/conll13st.html>)
- 竞赛: CoNLL-2014Shared Task: Grammatical Error Correction (<http://www.comp.nus.edu.sg/~nlp/conll14st.html>)
- 资源: NUSNon-commercial research/trial corpus license (http://www.comp.nus.edu.sg/~nlp/conll14st/nucle_license.pdf)
- 资源: Lang-8Learner Corpora (<http://cl.naist.jp/nldata/lang-8/>)
- 资源: CornellMovie--Dialogs Corpus (http://www.cs.cornell.edu/~cristian/Cornell_Movie-Dialogs_Corpus.html)
- 项目: DeepText Corrector (<https://github.com/atpaino/deep-text-corrector>)
- 产品: deepgrammar (<http://deepgrammar.com/>)

字素音素转换

- 论文: Grapheme-to-PhonemeModels for (Almost) Any Language (<https://pdfs.semanticscholar.org/b9c8/fef9b6f16b92c6859f6106524fdb053e9577.pdf>)

- 论文: PolyglotNeural Language Models: A Case Study in Cross-Lingual Phonetic RepresentationLearning (<https://arxiv.org/pdf/1605.03832.pdf>)
- 论文: MultitaskSequence-to-Sequence Models for Grapheme-to-Phoneme Conversion (<https://pdfs.semanticscholar.org/26d0/09959fa2b2e18cddb5783493738a1c1ede2f.pdf>)
- 项目: Sequence-to-Sequence G2P toolkit (<https://github.com/cmuspinx/g2p-seq2seq>)
- 资源: Multilingual Pronunciation Data (https://drive.google.com/drive/folders/0B7R_gATfZJ2aWkpSWHpXUklWUmM)

语种猜测

- 见「语种辨别」部分

语种辨别

- WIKI Language identification (https://en.wikipedia.org/wiki/Language_identification)
- 论文: AUTOMATICLANGUAGE IDENTIFICATION USING DEEP NEURAL NETWORKS (https://repositorio.uam.es/bitstream/handle/10486/666848/automatic_lopez-moreno_ICASSP_2014_ps.pdf?sequence=1)
- 竞赛: 2015Language Recognition Evaluation (<https://www.nist.gov/itl/iad/mig/2015-language-recognition-evaluation>)

语言建模

- WIKI Language model (https://en.wikipedia.org/wiki/Language_model)
- 工具包: KenLMLanguage Model Toolkit (<http://kheafield.com/code/kenlm/>)
- 论文: DistributedRepresentations of Words and Phrases and their Compositionality (<http://papers.nips.cc/paper/5021-distributed-representations-of-words-and-phrases-and-their-compositionality.pdf>)
- 论文: Character-AwareNeural Language Models (<https://www.aaai.org/ocs/index.php/AAAI/AAAI16/paper/viewFile/12489/12017>)
- 资源: PennTreebank (<https://github.com/townie/PTB-dataset-from-Tomas-Mikolov-s-webpage/tree/master/data>)

语种识别

- 见「语种辨别」部分

同一词类

- WIKI Lemmatisation (<https://en.wikipedia.org/wiki/Lemmatisation>)
- 论文: JointLemmatization and Morphological Tagging with LEMMING
(http://www.cis.lmu.de/~muellets/pdf/emnlp_2015.pdf)
- 工具包: WordNet Lemmatizer
(<http://www.nltk.org/api/nltk.stem.html#nltk.stem.wordnet.WordNetLemmatizer.lemmatize>)
- 资源: Treebank-3 (<https://catalog.ldc.upenn.edu/ldc99t42>)

观唇辨意

- WIKI Lip reading (https://en.wikipedia.org/wiki/Lip_reading)
- 论文: LipReading Sentences in the Wild (<https://arxiv.org/abs/1611.05358>)
- 论文: 3DConvolutional Neural Networks for Cross Audio-Visual Matching Recognition
(<https://arxiv.org/abs/1706.05739>)
- 项目: LipReading - Cross Audio-Visual Recognition using 3D Convolutional Neural Networks
(<https://github.com/astorfi/lip-reading-deeplearning>)
- 资源: TheGRID audiovisual sentence corpus (<http://spandh.dcs.shef.ac.uk/gridcorpus/>)

机器翻译

- 论文: NeuralMachine Translation by Jointly Learning to Align and Translate
(<https://arxiv.org/abs/1409.0473>)
- 论文: NeuralMachine Translation in Linear Time (<https://arxiv.org/abs/1610.10099>)
- 论文: AttentionIs All You Need (<https://arxiv.org/abs/1706.03762>)
- 竞赛: ACL2014 NINTH WORKSHOP ON STATISTICAL MACHINE TRANSLATION
(<http://www.statmt.org/wmt14/translation-task.html#download>)
- 竞赛: EMNLP2017 SECOND CONFERENCE ON MACHINE TRANSLATION (WMT17)
(<http://www.statmt.org/wmt17/translation-task.html>)
- 资源: OpenSubtitles2016 (<http://opus.lingfil.uu.se/OpenSubtitles2016.php>)
- 资源: WIT3:Web Inventory of Transcribed and Translated Talks (<https://wit3.fbk.eu/>)
- 资源: TheQCRI Educational Domain (QED) Corpus (<http://alt.qcri.org/resources/qedcorpus/>)

生成词法变化

- WIKI Inflection (<https://en.wikipedia.org/wiki/Inflection>)
- 论文: Morphological Inflection Generation Using Character Sequence to Sequence Learning (<https://arxiv.org/abs/1512.06110>)
- 竞赛: SIGMORPHON 2016 Shared Task: Morphological Reinflection (<http://ryancotterell.github.io/sigmorphon2016/>)
- 资源: sigmorphon2016 (<https://github.com/ryancotterell/sigmorphon2016>)

命名实体消歧

- WIKI Entity linking (https://en.wikipedia.org/wiki/Entity_linking)
- 论文: Robust and Collective Entity Disambiguation through Semantic Embeddings (http://www.stefanzwicklbauer.info/pdf/Sigir_2016.pdf)

命名实体识别

- WIKI Named-entity recognition (https://en.wikipedia.org/wiki/Named-entity_recognition)
- 论文: Neural Architectures for Named Entity Recognition (<https://arxiv.org/abs/1603.01360>)
- 项目: OSUTwitter NLP Tools (https://github.com/aritter/twitter_nlp)
- 竞赛: Named Entity Recognition in Twitter (<https://noisy-text.github.io/2016/ner-shared-task.html>)
- 竞赛: CoNLL2002 Language-Independent Named Entity Recognition (<https://www.clips.uantwerpen.be/conll2002/ner/>)
- 竞赛: Introduction to the CoNLL-2003 Shared Task: Language-Independent Named Entity Recognition (<http://aclweb.org/anthology/W03-0419>)
- 资源: CoNLL-2002 NER corpus (<https://github.com/teropa/nlp/tree/master/resources/corpora/conll2002>)
- 资源: CoNLL-2003 NER corpus (<https://github.com/synalp/NER/tree/master/corpus/CoNLL-2003>)
- 资源: NUT Named Entity Recognition in Twitter Shared task (https://github.com/aritter/twitter_nlp/tree/master/data/annotated/wnut16)

释义检测

- 论文: Dynamic Pooling and Unfolding Recursive Autoencoders for Paraphrase Detection (<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.650.7199&rep=rep1&type=pdf>)
- 项目: Paralex: Paraphrase-Driven Learning for Open Question Answering (<http://knowitall.cs.washington.edu/paralex/>)

- 资源：Microsoft Research Paraphrase Corpus (<https://www.microsoft.com/en-us/download/details.aspx?id=52398>)
- 资源：Microsoft Research Video Description Corpus (<https://www.microsoft.com/en-us/download/details.aspx?id=52422&from=http%3A%2F%2Fresearch.microsoft.com%2Fen-us%2Fdownloads%2F38cf15fd-b8df-477e-a4e4-a4680caa75af%2F>)
- 资源：PascalDataset (<http://nlp.cs.illinois.edu/HockenmaierGroup/pascal-sentences/index.html>)
- 资源：Flicker Dataset (<http://nlp.cs.illinois.edu/HockenmaierGroup/8k-pictures.html>)
- 资源：TheSICK data set (<http://clic.cimec.unitn.it/composes/sick.html>)
- 资源：PPDB:The Paraphrase Database (<http://www.cis.upenn.edu/~ccb/ppdb/>)
- 资源：WikiAnswers Paraphrase Corpus (<http://knowitall.cs.washington.edu/paralex/wikianswers-paraphrases-1.0.tar.gz>)

语法分析

- WIKI Parsing (<https://en.wikipedia.org/wiki/Parsing>)
- 工具包：TheStanford Parser: A statistical parser (<https://nlp.stanford.edu/software/lex-parser.shtml>)
- 工具包：spaCyparser (<https://spacy.io/docs/usage/dependency-parse>)
- 论文：A fastand accurate dependency parser using neural networks
(<http://www.aclweb.org/anthology/D14-1082>)
- 竞赛：CoNLL2017 Shared Task: Multilingual Parsing from Raw Text to Universal Dependencies
(<http://universaldependencies.org/conll17/>)
- 竞赛：CoNLL2016 Shared Task: Multilingual Shallow Discourse Parsing
(<http://www.cs.brandeis.edu/~clp/conll16st/>)
- 竞赛：CoNLL2015 Shared Task: Shallow Discourse Parsing
(<http://www.cs.brandeis.edu/~clp/conll15st/>)
- 竞赛：SemEval-2016 Task 8: The meaning representations may be abstract, but this taskis concrete!
(<http://alt.qcri.org/semeval2016/task8/>)

词性标记

- WIKI Part-of-speech tagging (https://en.wikipedia.org/wiki/Part-of-speech_tagging)
- 论文：MultilingualPart-of-Speech Tagging with Bidirectional Long Short-Term Memory Models andAuxiliary Loss (<https://arxiv.org/pdf/1604.05529.pdf>)
- 论文：UnsupervisedPart-Of-Speech Tagging with Anchor Hidden Markov Models
(<https://transacl.org/ojs/index.php/tacl/article/viewFile/837/192>)
- 资源：Treebank-3 (<https://catalog.ldc.upenn.edu/Ldc99t42>)

- 工具包: nltk.tag package (<http://www.nltk.org/api/nltk.tag.html>)

拼音-中文转换

- 论文: NeuralNetwork Language Model for Chinese Pinyin Input Method Engine (<http://aclweb.org/anthology/Y15-1052>)
- 项目: NeuralChinese Transliterator (https://github.com/Kyubyong/neural_chinese_transliterator)

问答系统

- WIKI Question answering (https://en.wikipedia.org/wiki/Question_answering)
- 论文: Ask MeAnything: Dynamic Memory Networks for Natural Language Processing (http://www.thespermwhale.com/jaseweston/ram/papers/paper_21.pdf)
- 论文: DynamicMemory Networks for Visual and Textual Question Answering (<http://proceedings.mlr.press/v48/xiong16.pdf>)
- 竞赛: TRECQuestion Answering Task (<http://trec.nist.gov/data/qamain.html>)
- 竞赛: NTCIR-8: Advanced Cross-lingual Information Access (ACLIA) (<http://aclia.lti.cs.cmu.edu/ntcir8/Home>)
- 竞赛: CLEFQuestion Answering Track (<http://nlp.uned.es/clef-qa/>)
- 竞赛: SemEval-2017 Task 3: Community Question Answering (<http://alt.qcri.org/semeval2017/task3/>)
- 资源: MSMARCO: Microsoft MACHine Reading COMprehension Dataset (<http://www.msmarco.org/>)
- 资源: Maluuba NewsQA (<https://github.com/Maluuba/newsqa>)
- 资源: SQuAD:100,000+ Questions for Machine Comprehension of Text (<https://rajpurkar.github.io/SQuAD-explorer/>)
- 资源: GraphQuestions: A Characteristic-rich Question Answering Dataset (<https://github.com/ysu1989/GraphQuestions>)
- 资源: StoryCloze Test and ROCStories Corpora (<http://cs.rochester.edu/nlp/rocstories/>)
- 资源: Microsoft Research WikiQA Corpus (<https://www.microsoft.com/en-us/download/details.aspx?id=52419&from=http%3A%2F%2Fresearch.microsoft.com%2Fen-us%2Fdownloads%2F4495da01-db8c-4041-a7f6-7984a4f6a905%2Fdefault.aspx>)
- 资源: DeepMind Q&A Dataset (<http://cs.nyu.edu/~kcho/DMQA/>)
- 资源: QASent (<http://cs.stanford.edu/people/mengqiu/data/qg-emnlp07-data.tgz>)

关系提取

- WIKI Relationship extraction (https://en.wikipedia.org/wiki/Relationship_extraction)

- 论文: A deeplearning approach for relationship extraction from interaction context insocial manufacturing paradigm (<http://www.sciencedirect.com/science/article/pii/S0950705116001210>)

语义角色标注

- WIKI Semantic role labeling (https://en.wikipedia.org/wiki/Semantic_role_labeling)
- 书籍: Semantic Role Labeling (https://www.amazon.com/Semantic-Labeling-Synthesis-Lectures-Technologies/dp/1598298313/ref=sr_1_1?s=books&ie=UTF8&qid=1507776173&sr=1-1&keywords=Semantic+Role+Labeling)
- 论文: End-to-endLearning of Semantic Role Labeling Using Recurrent Neural Networks (<http://www.aclweb.org/anthology/P/P15/P15-1109.pdf>)
- 论文: NeuralSemantic Role Labeling with Dependency Path Embeddi ngs (<https://arxiv.org/abs/1605.07515>)
- 竞赛: CoNLL-2005 Shared Task: Semantic Role Labeling (<http://www.cs.upc.edu/~srlconll/st05/st05.html>)
- 竞赛: CoNLL-2004 Shared Task: Semantic Role Labeling (<http://www.cs.upc.edu/~srlconll/st04/st04.html>)
- 工具包: Illinois Semantic Role Labeler (SRL) (http://cogcomp.org/page/software_view/SRL)
- 资源: CoNLL-2005 Shared Task: Semantic Role Labeling (<http://www.cs.upc.edu/~srlconll/soft.html>)

语句边界消歧

- WIKI Sentence boundary disambiguation (https://en.wikipedia.org/wiki/Sentence_boundary_disambiguation)
- 论文: AQuantitative and Qualitative Evaluation of Sentence Boundary Detection for theClinical Domain (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5001746/>)
- 工具包: NLTKTokenizers (http://www.nltk.org/_modules/nltk/tokenize.html)
- 资源: TheBritish National Corpus (<http://www.natcorp.ox.ac.uk/>)
- 资源: Switchboard-1 Telephone Speech Corpus (<https://catalog.ldc.upenn.edu/ldc97s62>)

情绪分析

- WIKI Sentiment analysis (https://en.wikipedia.org/wiki/Sentiment_analysis)
- INFO Awesome Sentiment Analysis (<https://github.com/xiamx/awesome-sentiment-analysis>)
- 竞赛: Kaggle: UMICH SI650 - Sentiment Classification (<https://www.kaggle.com/c/si650winter11#description>)

- 竞赛: SemEval-2017 Task 4: Sentiment Analysis in Twitter (<http://alt.qcri.org/semeval2017/task4/>)
- 竞赛: SemEval-2017 Task 5: Fine-Grained Sentiment Analysis on Financial Microblogs and News (<http://alt.qcri.org/semeval2017/task5/>)
- 项目: SenticNet (<http://sentic.net/about/>)
- 资源: Multi-Domain Sentiment Dataset (version 2.0) (<http://www.cs.jhu.edu/~mdredze/datasets/sentiment/>)
- 资源: Stanford Sentiment Treebank (<https://nlp.stanford.edu/sentiment/code.html>)
- 资源: Twitter Sentiment Corpus (<http://www.sanalytics.com/lab/twitter-sentiment/>)
- 资源: Twitter Sentiment Analysis Training Corpus (<http://thinknook.com/twitter-sentiment-analysis-training-corpus-dataset-2012-09-22/>)
- 资源: AFINN: List of English words rated for valence (http://www2.imm.dtu.dk/pubdb/views/publication_details.php?id=6010)

源分离

- WIKI Source separation (https://en.wikipedia.org/wiki/Source_separation)
- 论文: From Blind to Guided Audio Source Separation (<https://hal-univ-rennes1.archives-ouvertes.fr/hal-00922378/document>)
- 论文: Joint Optimization of Masks and Deep Recurrent Neural Networks for Monaural Source Separation (<https://arxiv.org/abs/1502.04149>)
- 竞赛: Signal Separation Evaluation Campaign (SiSEC) (<https://sisec.inria.fr/>)
- 竞赛: CHiME Speech Separation and Recognition Challenge (http://spandh.dcs.shef.ac.uk/chime_challenge/)

说话人认证

- 见「说话人识别」部分

语音身份分离

- WIKI Speaker diarisation (https://en.wikipedia.org/wiki/Speaker_diarisation)
- 论文: DNN-based speaker clustering for speaker diarisation (http://eprints.whiterose.ac.uk/109281/1/milner_is16.pdf)
- 论文: Unsupervised Methods for Speaker Diarization: An Integrated and Iterative Approach (http://groups.csail.mit.edu/sls/publications/2013/Shum_IEEE_Oct-2013.pdf)

- 论文: Audio-Visual Speaker Diarization Based on Spatiotemporal Bayesian Fusion
(<https://arxiv.org/pdf/1603.09725.pdf>)
- 竞赛: RichTranscription Evaluation (<https://www.nist.gov/itl/iad/mig/rich-transcription-evaluation>)

说话人识别

- WIKI Speaker recognition (https://en.wikipedia.org/wiki/Speaker_recognition)
- 论文: A NOVEL SCHEME FOR SPEAKER RECOGNITION USING A PHONETICALLY-AWARE DEEP NEURAL NETWORK
(<https://pdfs.semanticscholar.org/204a/ff8e21791c0a4113a3f75d0e6424a003c321.pdf>)
- 论文: DEEP NEURAL NETWORKS FOR SMALL FOOTPRINT TEXT-DEPENDENT SPEAKER VERIFICATION
(<https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/41939.pdf>)
- 竞赛: NIST Speaker Recognition Evaluation (SRE) (<https://www.nist.gov/itl/iad/mig/speaker-recognition>)
- INFO Are there any suggestions for free databases for speaker recognition?
(https://www.researchgate.net/post/Are_there_any_suggestions_for_free_databases_for_speaker_recognition)

唇读

- 见「观唇辨意」部分

语音识别

- 见「自动语音识别」部分

语音分割

- WIKI Speech_segmentation (https://en.wikipedia.org/wiki/Speech_segmentation)
- 论文: Word Segmentation by 8-Month-Olds: When Speech Cues Count More Than Statistics
(http://www.utm.toronto.edu/infant-child-centre/sites/files/infant-child-centre/public/shared/elizabeth-johnson/Johnson_Juszyk.pdf)
- 论文: Unsupervised Word Segmentation and Lexicon Discovery Using Acoustic Word Embeddings
(<https://arxiv.org/abs/1603.02845>)

- 论文: UnsupervisedLexicon Discovery from Acoustic Inpu
(http://www.aclweb.org/old_anthology/Q/Q15/Q15-1028.pdf)
- 论文: Weaklysupervised spoken term discovery using cross-lingual side information
(<http://www.research.ed.ac.uk/portal/files/29957958/1609.06530v1.pdf>)
- 资源: CALLHOME Spanish Speech (<https://catalog ldc.upenn.edu/ldc96s35>)

语音合成

- WIKI Speech synthesis (https://en.wikipedia.org/wiki/Speech_synthesis)
- 论文: WaveNet:A Generative Model for Raw Audio (<https://arxiv.org/abs/1609.03499>)
- 论文: Tacotron:Towards End-to-End Speech Synthesis (<https://arxiv.org/abs/1703.10135>)
- 论文: DeepVoice 2: Multi-Speaker Neural Text-to-Speech (<https://arxiv.org/abs/1705.08947>)
- 资源: TheWorld English Bible (<https://github.com/Kyubyong/tacotron>)
- 资源: LJSpeech Dataset (<https://github.com/keithito/tacotron>)
- 资源: LessacData (http://www.cstr.ed.ac.uk/projects/blizzard/2011/lessac_blizzard2011/)
- 竞赛: Blizzard Challenge 2017 (https://synsig.org/index.php/Blizzard_Challenge_2017)
- PRODUCT Lyrebird (<https://lyrebird.ai/>)
- 项目: TheFestvox project (<http://www.festvox.org/index.html>)
- 工具包: Merlin: The Neural Network (NN) based Speech Synthesis System
(<https://github.com/CSTR-Edinburgh/merlin>)

语音增强

- WIKI Speech enhancement (https://en.wikipedia.org/wiki/Speech_enhancement)
- 书籍: Speechenhancement: theory and practice (https://www.amazon.com/Speech-Enhancement-Theory-Practice-Second/dp/1466504218/ref=sr_1_1?ie=UTF8&qid=1507874199&sr=8-1&keywords=Speech+enhancement%3A+theory+and+practice)
- 论文 AnExperimental Study on Speech Enhancement BasedonDeepNeuralNetwork
(http://staff.ustc.edu.cn/~jundu/Speech%20signal%20processing/publications/SPL2014_Xu.pdf)
- 论文: ARegression Approach to Speech Enhancement BasedonDeepNeuralNetworks
(https://www.researchgate.net/profile/Yong_Xu63/publication/272436458_A_Regression_Approach_to_Speech_Enhancement_Based_on_Deep_Neural_Networks/links/57fddda08aeaf819a5bdd97.pdf)
- 论文: SpeechEnhancement Based on Deep Denoising Autoencoder
(https://www.researchgate.net/profile/Yu_Tsao/publication/283600839_Speech_enhancement_based_on_deep_denoising_Auto-Encoder/links/577b486108ae213761c9c7f8/Speech-enhancement-based-on-deep-denoising-Auto-Encoder.pdf)

语音文本转换

- 见「自动语音识别」部分

口语的术语检测

- 见「语音分割」部分

词干提取

- WIKI Stemming (<https://en.wikipedia.org/wiki/Stemming>)
- 论文: A BACKPROPAGATION NEURAL NETWORK TO IMPROVE ARABIC STEMMING (<http://www.jatit.org/volumes/Vol82No3/7Vol82No3.pdf>)
- 工具包: NLTKStemmers (<http://www.nltk.org/howto/stem.html>)

术语提取

- WIKI Terminology extraction (https://en.wikipedia.org/wiki/Terminology_extraction)
- 论文: NeuralAttention Models for Sequence Classification: Analysis and Application to KeyTerm Extraction and Dialogue Act Detection (<https://arxiv.org/pdf/1604.00077.pdf>)

文本简化

- WIKI Text simplification (https://en.wikipedia.org/wiki/Text_simplification)
- 论文: Aligning Sentences from Standard Wikipedia to Simple Wikipedia (<https://ssli.ee.washington.edu/~hannaneh/papers/simplification.pdf>)
- 论文: Problems in Current Text Simplification Research: New Data Can Help (<https://pdfs.semanticscholar.org/2b8d/a013966c0c5e020ebc842d49d8ed166c8783.pdf>)
- 资源: Newsela Data (<https://newsela.com/data/>)

文本语音转换

- 见「语音合成」部分

文本蕴涵

- WIKI Textual entailment (https://en.wikipedia.org/wiki/Textual_entailment)
- 项目: Textual Entailment with TensorFlow (<https://github.com/Steven-Hewitt/Entailment-with-Tensorflow>)
- 论文: Textual Entailment with Structured Attentions and Composition (<https://arxiv.org/pdf/1701.01126.pdf>)
- 竞赛: SemEval-2014 Task 1: Evaluation of compositional distributional semantic modelson full sentences through semantic relatedness and textual entailment (<http://alt.qcri.org/semeval2014/task1/>)
- 竞赛: SemEval-2013 Task 7: The Joint Student Response Analysis and 8th RecognizingTextual Entailment Challenge (<https://www.cs.york.ac.uk/semeval-2013/task7.html>)

声音转换

- 论文: PHONETIC POSTERIORGRAMS FOR MANY-TO-ONE VOICE CONVERSION WITHOUT PARALLEL DATATRaining (http://www1.se.cuhk.edu.hk/~hccl/publications/pub/2016_paper_297.pdf)
- 项目: Animplementation of voice conversion system utilizing phonetic posteriorgrams (https://github.com/sesenosannko/ppg_vc)
- 竞赛: VoiceConversion Challenge 2016 (<http://www.vc-challenge.org/vcc2016/index.html>)
- 竞赛: VoiceConversion Challenge 2018 (<http://www.vc-challenge.org/>)
- 资源: CMU_ARCTIC speech synthesis databases (http://festvox.org/cmu_arctic/)
- 资源: TIMITAcoustic-Phonetic Continuous Speech Corpus (<https://catalog.ldc.upenn.edu/ldc93s1>)

声音识别

- 见「说话人识别」部分

词嵌入

- WIKI Word embedding (https://en.wikipedia.org/wiki/Word_embedding)
- 工具包: Gensim: word2vec (<https://radimrehurek.com/gensim/models/word2vec.html>)
- 工具包: fastText (<https://github.com/facebookresearch/fastText>)
- 工具包: GloVe:Global Vectors for Word Representation (<https://nlp.stanford.edu/projects/glove/>)
- INFO Where to get a pretrained model (<https://github.com/3Top/word2vec-api>)
- 项目: Pre-trained word vectors of 30+ languages (<https://github.com/Kyubyong/wordvectors>)
- 项目: Polyglot: Distributed word representations for multilingual NLP (<https://sites.google.com/site/rmyeid/projects/polyglot>)

词预测

- INFO What is Word Prediction? (http://www2.edc.org/ncip/library/wp/what_is.htm)
- 论文: The prediction of character based on recurrent neural network language model (<http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7960065>)
- 论文: An Embedded Deep Learning based Word Prediction (<https://arxiv.org/abs/1707.01662>)
- 论文: Evaluating Word Prediction: Framing Keystroke Savings (<http://aclweb.org/anthology/P08-2066>)
- 资源: An Embedded Deep Learning based Word Prediction (<https://github.com/Meinwerk/WordPrediction/master.zip>)
- 项目: Word Prediction using Convolutional Neural Networks—can you do better than iPhone™ Keyboard? (https://github.com/Kyubyong/word_prediction)

词分割

- WIKI Word segmentation (https://en.wikipedia.org/wiki/Text_segmentation#Segmentation_problems)
- 论文: Neural Word Segmentation Learning for Chinese (<https://arxiv.org/abs/1606.04300>)
- 项目: Convolutional neural network for Chinese word segmentation (<https://github.com/chqiwang/convseg>)
- 工具包: Stanford Word Segmenter (<https://nlp.stanford.edu/software/segmenter.html>)
- 工具包: NLTK Tokenizers (http://www.nltk.org/_modules/nltk/tokenize.html)

词义消歧

- 资源: Word-sense disambiguation (https://en.wikipedia.org/wiki/Word-sense_disambiguation)
- 论文: Train-O-Matic: Large-Scale Supervised Word Sense Disambiguation in Multiple Languages without Manual Training Data (<http://www.aclweb.org/anthology/D17-1008>)
- 资源: Train-O-Matic Data (<http://trainomatic.org/data/train-o-matic-data.zip>)
- 资源: BabelNet (<http://babelnet.org/>)

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