ĐẠI HỌC BÁCH KHOA HÀ NỘI
VIỆN CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG

Natural Language Processing group

Presenter: Le Thanh Huong
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Members

- Le Thanh Huong
- Nguyen Kiem Hieu
- Nguyen Thi Thu Trang
- Tran Viet Trung
- Cao Tuan Dung
- Nguyen Thi Kim Anh

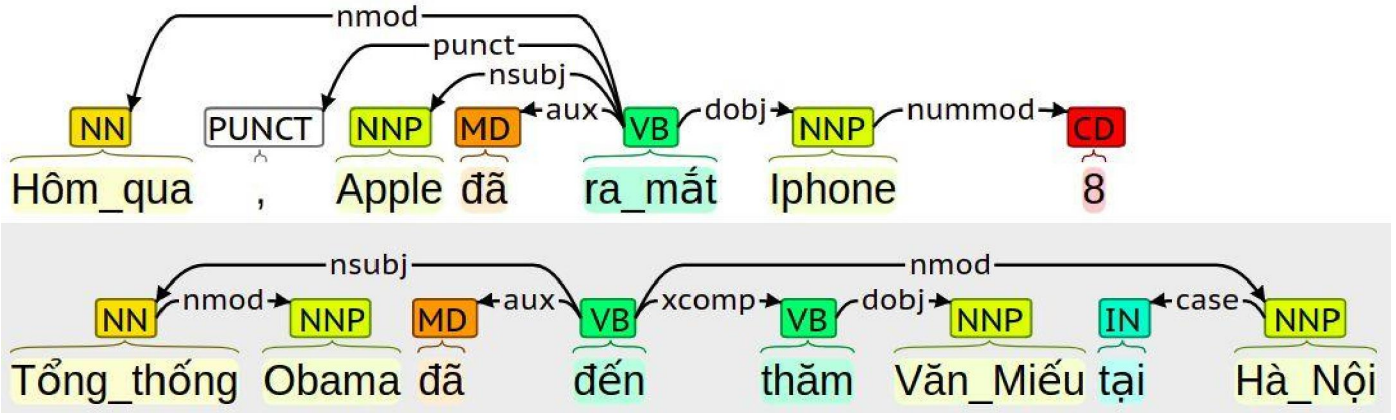
- + students

BK.AI - NLP group - Research directions

- Vietnamese natural language tools: Pyvi, vi_spacy (Trung), BK Treebank (Hieu)
- Information extraction (named entity recognition, relation extraction, event extraction) (Hieu, Huong, Trung)
- Weak supervised taxonomy construction (Trung, Dung) – Naver project
- Knowledge base construction from semi-structured documents (Trung)
- Vietnamese spelling correction (Huong)
- Plagiarism checking (Huong, Trang)
- Text summarization (Huong, Trang, Kim Anh)
- Machine translation (Trung, Huong)
- Chatbot, question answering (Trung, Huong, Trang, Hieu, Dung)
- Sentiment analysis (Hieu, Huong)

BKTreebank

A Vietnamese dependency parser



Diacritic restoration

- Input: "***Hom nay toi di hoc***"
- Output: "***Hôm nay tôi đi học***" (Today I go to school)
- Training data are freely available
- Approaches: Sequence labelling/seq-to-seq
- Challenges: Subtle ambiguation requires high-level syntactic/semantic understanding

Kiem-Hieu Nguyen, Cheol-Young Ock. *Diacritics restoration in Vietnamese: letter based vs. syllable based model*. PRICAI 2010

Part-of-speech tagging
Named-Entity Recognition

- biLSTM + Conditional Random Fields
- Utilize char-level representation

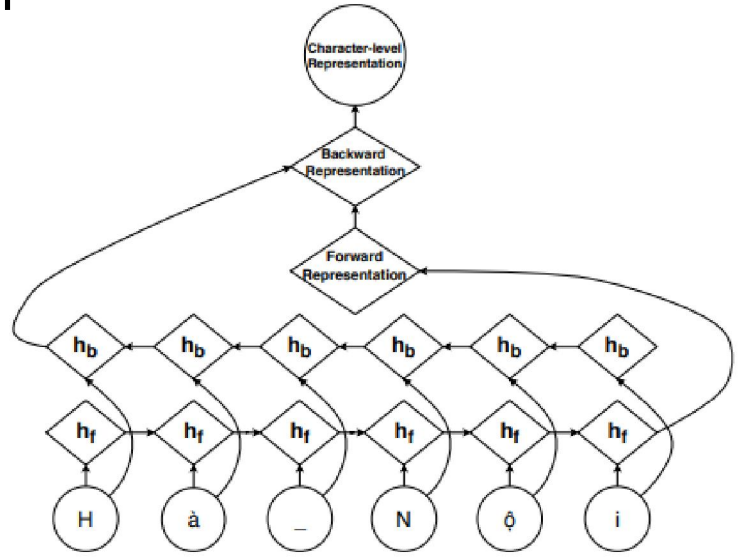
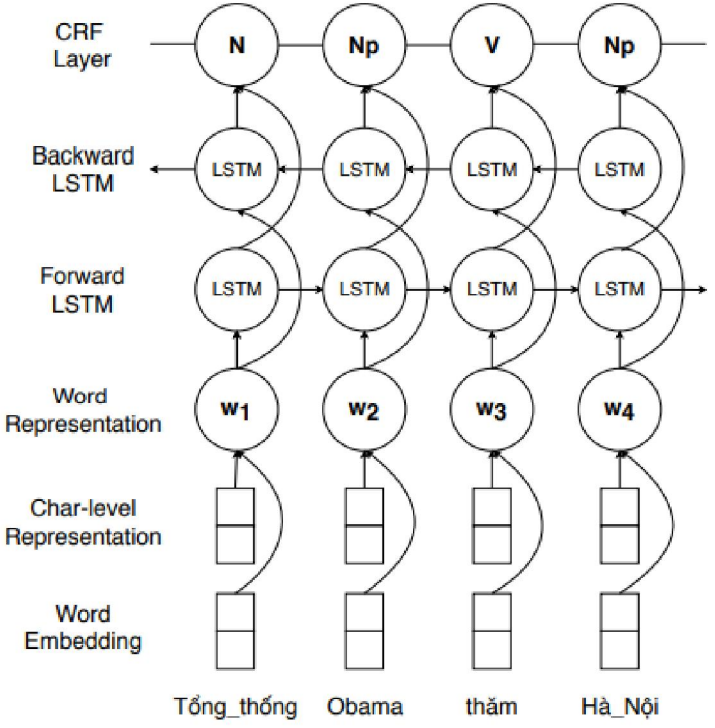


Figure 2. The character embeddings of the word "Hà_Nội" are given to a bidirectional LSTMs for extracting character-level word features. Character-level representation of one word is the concatenation of its forward and backward representations

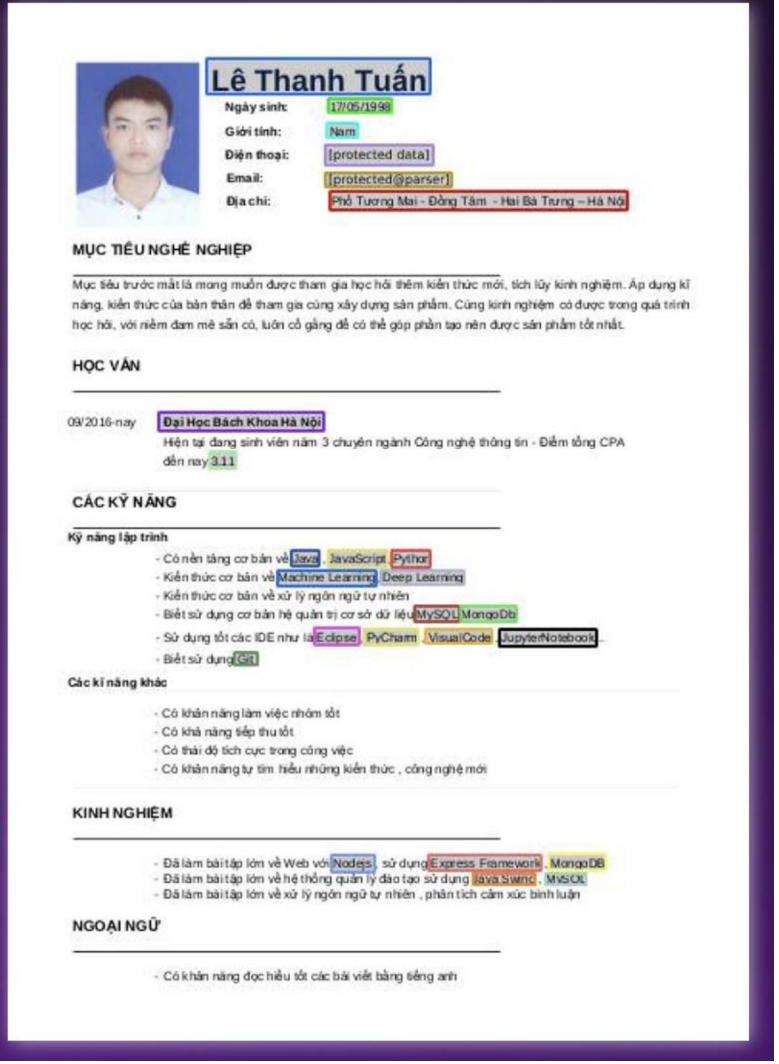


Anh-Duong Nguyen, Kiem-Hieu Nguyen, Van-Vi Ngo. *Neural sequence labelling for Vietnamese POS Tagging and NER*. RIVF 2019

Knowledge base construction from semi-structured documents

Easily capture applicant data with our Resume AI

Making your HR software smarter, save time on manual data entry. Our Resume AI engine uses advanced Artificial Intelligence and Machine Learning techniques to automatically extract every CV into a complete and searchable candidate record.



Lê Thanh Tuấn

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Giới tính: Nam
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Email: [protected@parser]
Địa chỉ: Phố Tương Mai - Đồng Tâm - Hai Bà Trưng - Hà Nội

MỤC TIÊU NGHỀ NGHIỆP

Mục tiêu trước mắt là mong muốn được tham gia học hỏi thêm kiến thức mới, tích lũy kinh nghiệm. Áp dụng kĩ năng, kiến thức của bản thân để tham gia cùng xây dựng sản phẩm. Cùng kinh nghiệm có được trong quá trình học hỏi, với niềm đam mê sẵn có, luôn cố gắng để có thể góp phần tạo nên được sản phẩm tốt nhất.

HỌC VẤN

09/2016-nay **Đại Học Bách Khoa Hà Nội**
Hiện tại đang sinh viên năm 3 chuyên ngành Công nghệ thông tin - Điểm tổng CPA đến nay 3.11

CÁC KỸ NĂNG

Kỹ năng lập trình

- Có nền tảng cơ bản về Java, JavaScript, Python
- Kiến thức cơ bản về Machine Learning, Deep Learning
- Kiến thức cơ bản về xử lý ngôn ngữ tự nhiên
- Biết sử dụng cơ bản hệ quản trị cơ sở dữ liệu MySQL, MongoDb
- Sử dụng tốt các IDE như là Eclipse, PyCharm, VisualCode, JupyterNotebook
- Biết sử dụng Git

Các kĩ năng khác

- Có khả năng làm việc nhóm tốt
- Có khả năng tiếp thu tốt
- Có thái độ tích cực trong công việc
- Có khả năng tự tìm hiểu những kiến thức , công nghệ mới

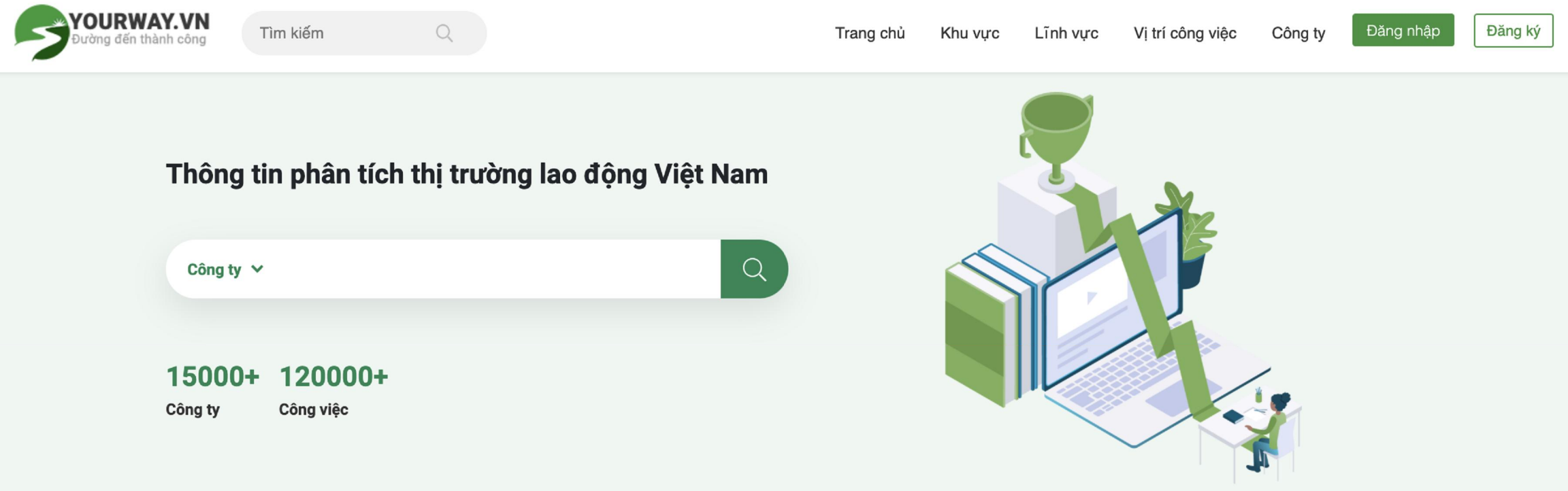
KINH NGHIỆM

- Đã làm bài tập lớn về Web với Nodejs, sử dụng Express Framework, MongoDB
- Đã làm bài tập lớn về hệ thống quản lý đào tạo sử dụng Java Swing, MySQL
- Đã làm bài tập lớn về xử lý ngôn ngữ tự nhiên , phân tích cảm xúc bình luận

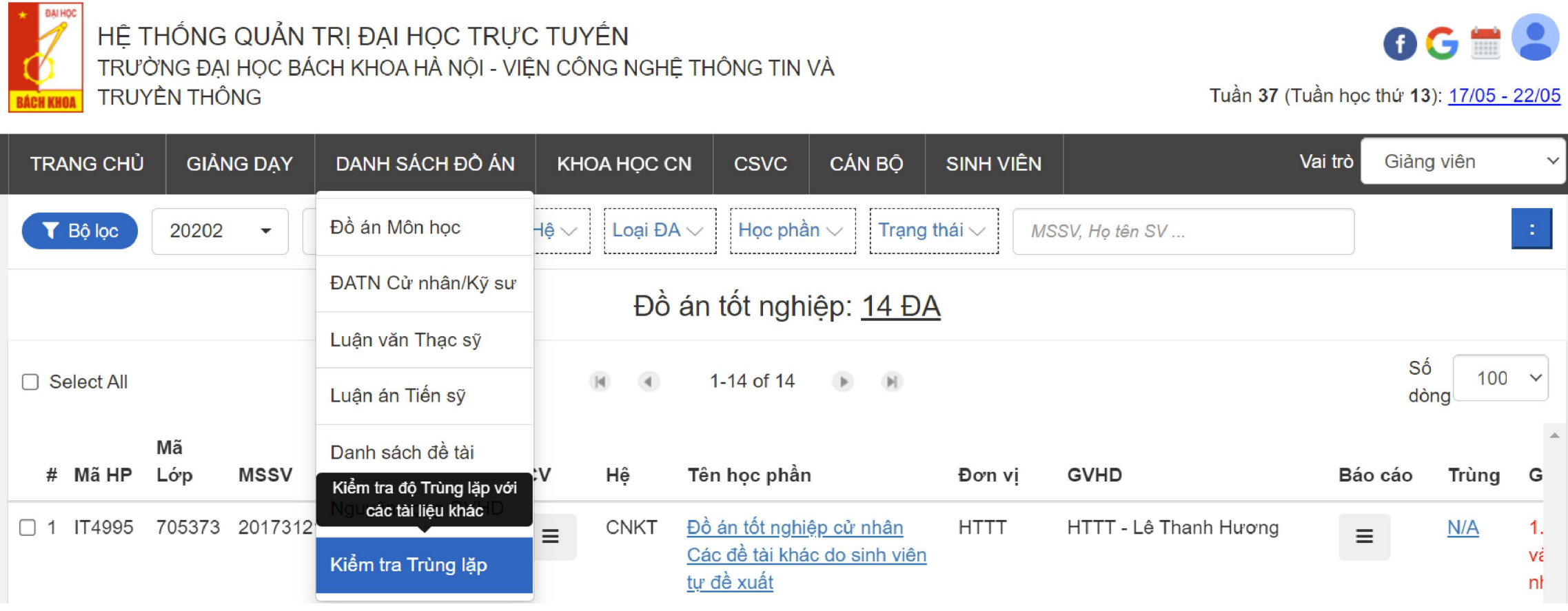
NGOẠI NGỮ

- Có khả năng đọc hiểu tốt các bài viết bằng tiếng anh

Knowledge base construction from semi-structured documents



Plagiarism checking

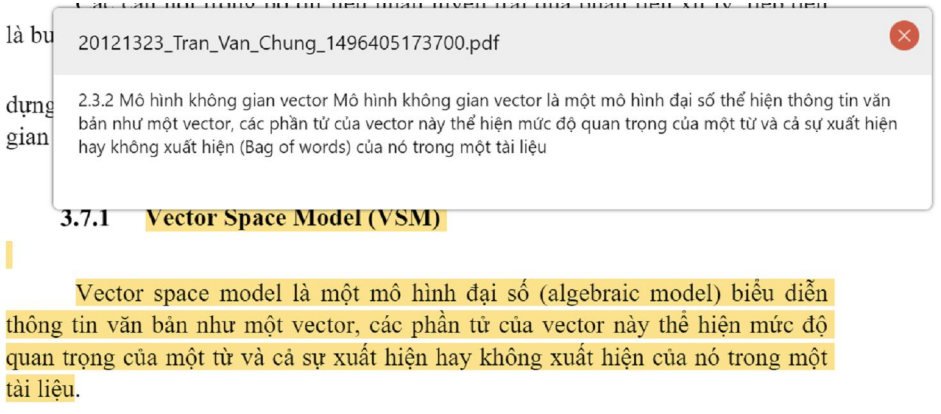


Plagiarism checking

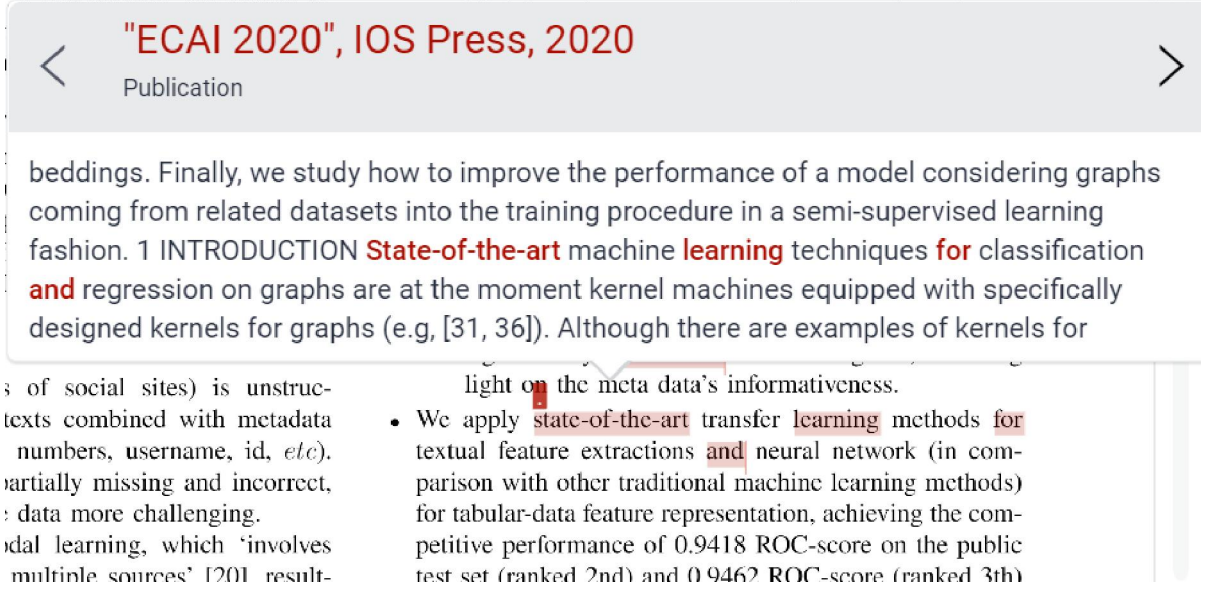
- The system can check plagiarism for theses in Vietnamese
- Database: Theses from different universities; journal papers in Vietnamese
- Checking:
  - Compare with documents in the system, do not check with online documents
  - Checking sentential similarity based on an improvement of leveinstein distance measure, concerning word reordering, distance between words, …
  - Exclude short sentences (<7 words), acknowledgment, TOC
- Future directions:
  - Challenge: Documents from Internet
  - Implementing a function for checking documents in English
  - Developing a flexible interface: people can accept/reject the highlights of similar text, exclude sources, add comments
  - Developing a function for spell checking

Nguyen Van Son, Le Thanh Huong, Nguyen Chi Thanh. A two-phase plagiarism detection system based on multi-layer LSTM Networks. IAES International Journal of Artificial Intelligence, 2021

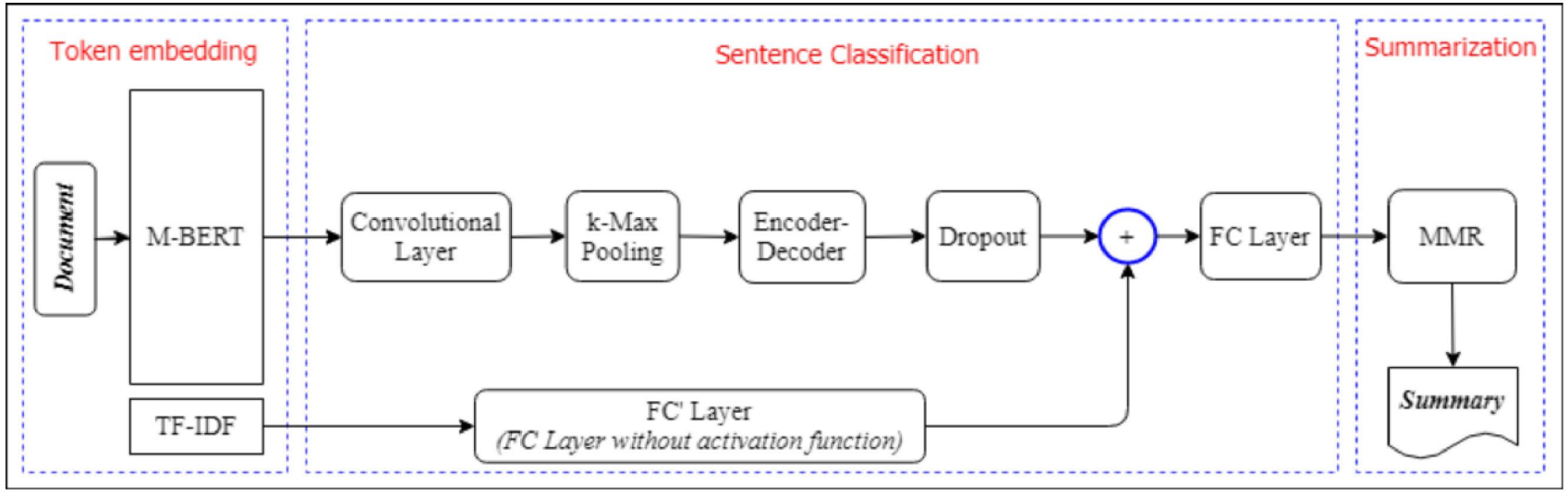
Coopy *(sentence-based)*



TurnItIn *(word-based)*



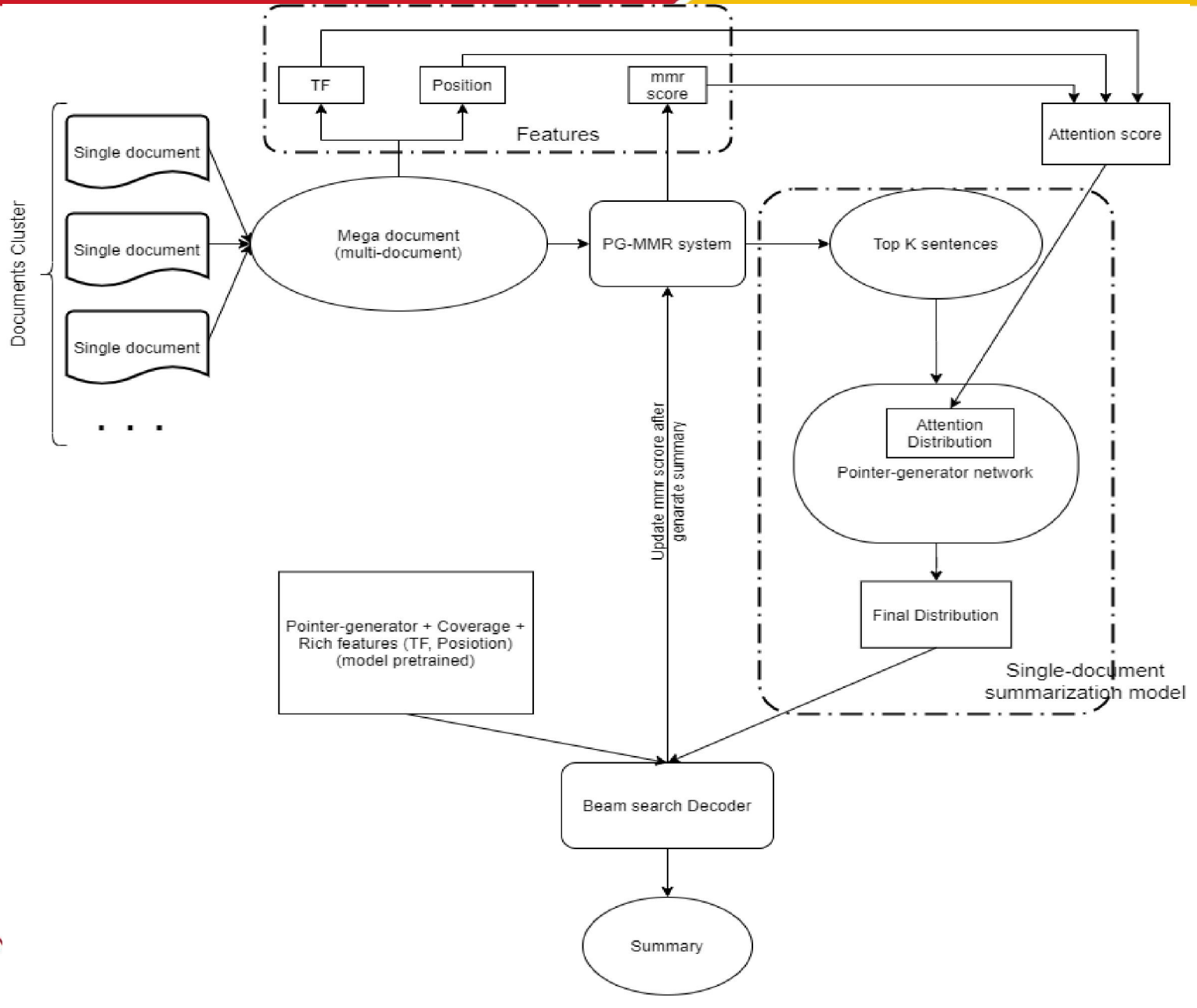
Single, extractive summarization



1. Minh-Tuan Luu, Thanh-Huong Le, Minh-Tan Hoang (2021). An effective deep learning approach for extractive text summarization. Indian Journal of Computer Science and Engineering. Vol. 12, No. 2, 2021, e-ISSN:0976-5166, p-ISSN:2231-3850, pp.434-444.

2. Minh-Tuan Luu, Thanh-Huong Le, Minh-Tan Hoang . A hybrid model using the pretrained bert and deep neural networks with rich feature for extractive text summarization. Journal of Computer Science and Cybernetics, 2021 (accepted)

Multiple, abstractive summarization

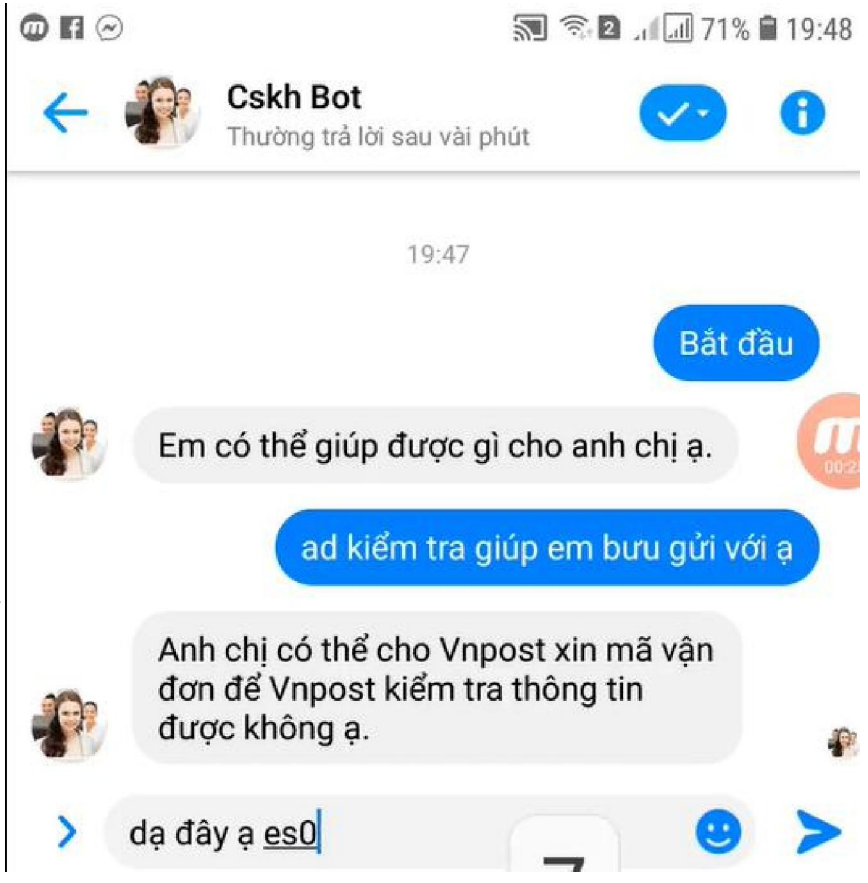


Multilingual Machine Translation

- Cooperate with VNU University of Engineering and Technology
- Basing on neural machine translation – Open NMT
- Creating sentence alignment datasets (Vietnamese – Khmer):
  - Text alignment
    - Translate Khmer documents into Vietnamese using Google translation API
    - Extracting a bag of words for each document
    - Compute cosine similarity based on 2 bags of words
  - Sentence alignment
    - Translate Khmer sentences into Vietnamese using Google translation API
    - Compute sentential similarity: using Bert for sentence embedding

Chatbot – QA system

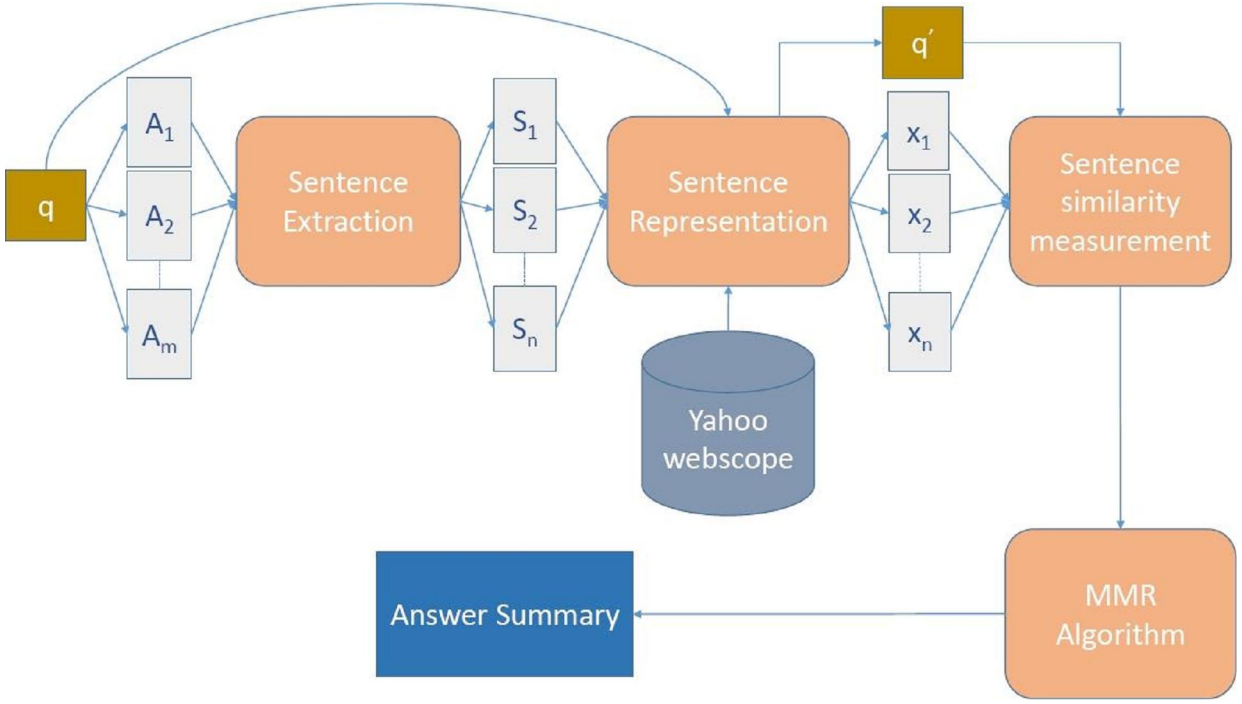
- With an available QA set:
  - Measure question similarity based on question types, cosine similarity, BERT
- Without any QA dataset
  - Question classification: SVM, CNN
  - Named entity recognition: NeuroNER, FlexCRF
  - Searching for results
  - Generating answers based on predefined templates or summarizing answers
- Future work:
  - Use pretrain model like BERT, Electra, fine tune with QA datasets, in order to generate answers from the input questions



Huong T. Le, Dung T. Cao, Trung H. Bui, Long T. Luong and Huy Q. Nguyen (2021). Improve Quora Question Pair Dataset for Question Similarity Task. RIVF 2021.

CQA: Answer summarization

- Sentence representation from auto-encoder
- Maximal Marginal Relevance framework



Thi-Thanh Ha, Thanh-Chinh Nguyen, Kiem-Hieu Nguyen, Van-Chung Vu, Kim-Anh Nguyen. *Unsupervised Sentence Embeddings for Answer Summarization in Non-factoid CQA*. CICLING 2018

CQA: Vietnamese question retrieval

- A dataset for question retrieval in Vietnamese in the mobile domain
- A BERT model for the domain

	Pairs of questions
Train	5,996
Dev	847
Test	1,068
Average length (syllable)	27
Vocabulary (syllable)	5,821

Table 1: Statistics of Thegioididong dataset.

Corpus size	1.1M
Vocabulary size (syllable)	151,735
Average length (syllable)	31

Table 2: Statistics of unlabeled corpus crawled from The gioi Di dong.

Models	MAP
LSTM	52.60
CNN	53.10
ABCNN	51.52
LSTM attention	55.50
BERT-multilingual	61.06
BERT4Vn	63.75
PhoBERT	65.50
BERT4ecommerce	**70.50**
ElasticSearch	52,00
SVM	49.75

Thi-Thanh Ha, Van-Nha Nguyen, Kiem-Hieu Nguyen, Kim Anh Nguyen, Tien-Thanh Nguyen. *Utilizing Bert for Question Retrieval on Vietnamese E-commerce Sites*. PACLIC 2020

Thank you for your attention!

Q & A