Zhengnan Xie

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Education

University of Arizona Tucson, AZ
Master of Science in Information(expected May 2021) GPA: 4.0 *Aug. 2018 – May 2021*

Shanghai International Studies University Shanghai, China
Bachelor of Arts in Linguistics GPA: 3.75 *Aug. 2014 – June 2018*

Experience

Natural Language Processing Research Assistant November 2018 – current
University of Arizona *Tucson, AZ*

- **WorldTree Project:**
- Annotated a corpus of science exam questions of 7787 questions for fine-grained multi-class classification tasks
- Generated data entries (10,000 entries in total) for a semi-automatic science knowledge base corpus
- Generated structured explanations for around 2000 questions
- **Space Situational Awareness–Information Extraction task:**
- Authoring linguistic rules using Odinson language for a rule-based information extraction task
- Using python to postprocessing the extracted information
- Running BERT-NER model to compare performance between a rule-based system and a neural model
- **Question Classification tasks:**
- Generating data for fine-grained multi-class classification problems that scale to hundreds of classification labels

Web Development Intern August 2019 – November 2020
Coeur d'Alene Online Language Resource Center *Tucson, AZ*

- Using Sequalize and GraphQL to build/query/connect the database
- Using Hasura for auth backend and database backend
- Developing a full-stack web application using React, PostgreSQL, and Docker container for deployment

Projects

SemEval2018 Emoji Prediction May 2019

- Crawling twitter data for Emoji Prediction Tasks
- Built a logistic regression for training and predicting
- Visualizing the model performance in a confusion matrix using sklearn library in python

Sentiment Analysis on 15 emotions Spring 2019

- Preprocessing tweets data by cleaning up the special chars
- Utilizing word2vec word embedding for the training
- Building a neural networks with bi-directional GRUs for the training

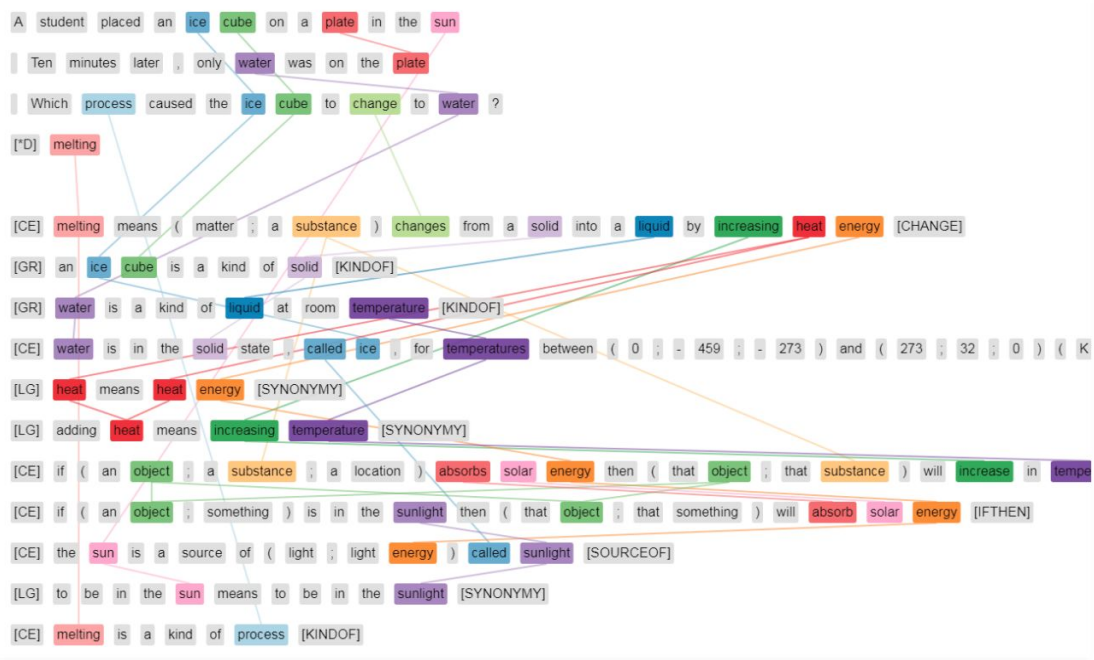
Publication

Multi-class Hierarchical Question Classification for Multiple Choice Science Exams | *LREC* August 2019
Dongfang Xu, Peter Jansen, Jaycie Martin, Zhengnan Xie, Vikas Yadav,Harish Tayyar Madabushi, Oyvind Tafjord and Peter Clark. https://arxiv.org/abs/1908.05441

WorldTree V2: A Corpus of Science-Domain Structured Explanations and Inference Patterns supporting Multi-Hop Inference | *LREC* 2020
Zhengnan Xie, Sebastian Thiem, Jaycie Martin, Elizabeth Wainwright,Steven Marmorstein, Peter Jansen.
https://www.aclweb.org/anthology/2020.lrec-1.671/

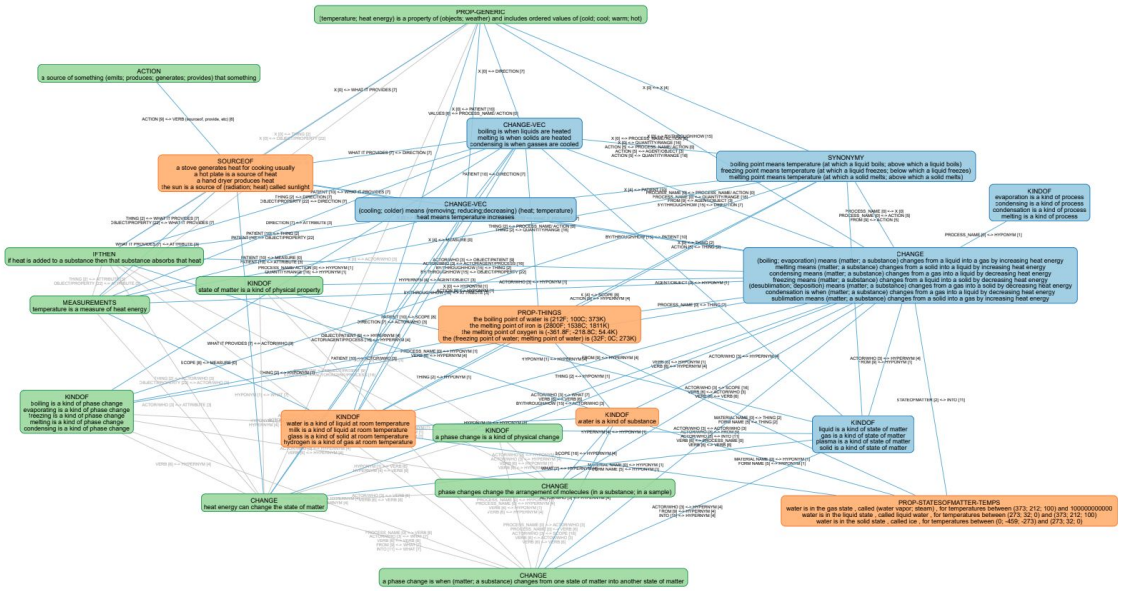
Technical Skills

Programming: Python, HTML/CSS, SQL, Java
Frameworks: React, Node.js, Odinson
Developer Tools: Git, Docker, VS Code, Linux, High Performance Computing, Hasura
Libraries: pandas, NumPy, Matplotlib, Sklearn, Keras
Languages: Chinese, English



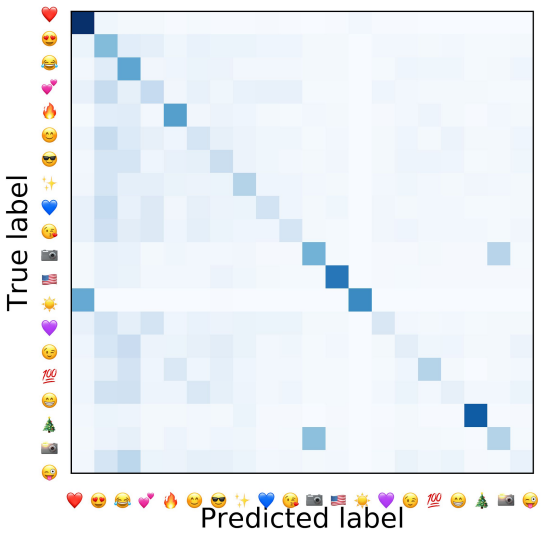
WorldTree V2.1

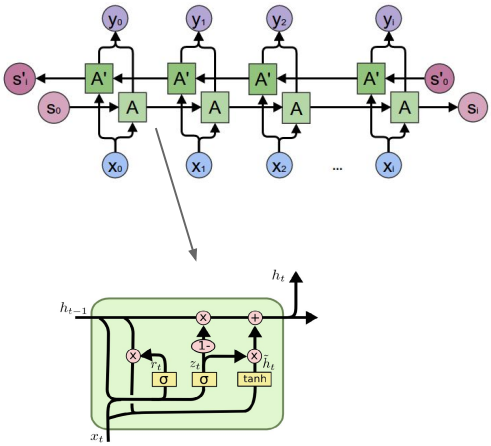
We expanded the corpus to 5000 thousand questions with multiple structured science facts and we generated 344 patterns on top of the corpus, aiming to provide a high-quality training data for question answering community.



WorldTree V2.1

experienced in using multiple data generating interfaces.





Emoji Prediction

Visualization of a confusion map that shows how well my model predicted the emoji for each tweet.

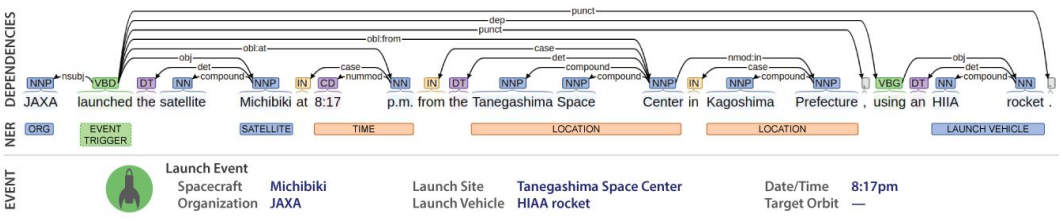
Sentiment analysis

I built a bidirectional GRU using word2vec to classify 15 classes(anger, anticipation, disgust, fear, etc.) for tweets data.

Space Event Information Extraction

We used rule-based method to extract structured event information from news articles crawled from the web.

We compared the rule-based method with the statistical method (BERT model).



Astronomy / Celestial Events
- Planetary/Stellar Features
- Natural Cycles and Patterns
- Planetary/Stellar Distances
- Orbits

Earth Science
- Human Impacts on the Earth
- Weather
- Geology
- Outer Structure (Atmosphere/Hy
- Inner Structure (Crust/Mantle/C

Energy
- Properties of Light
- Converting Energy
- Electricity
- Sound Energy
- Potential/Kinetic Energy

Matter
- Chemistry
- Measurement
- Changes of State
- Properties of Materials
- Physical vs Chemical Ch
- Mixtures

Safety
- Safety Procedures
- Safety Equipment

Scientific Method
- Components of Inference
- Graphing Data
- Scientific Models

Other
- History of Science

Forces
- Gravity
- Friction
- Speed/Velocity
- Mechanical Energy
- Newton's Laws

Life Science
- Life Functions
  - Features and their Functions
    - Cellular Biology
    - Animal Features and Functions
    - Plant Features and Functions
      - Photosynthesis
      - Reproduction/Pollination
        - Seed Dispersal
      - Leaves
      - Roots
  - Environmental Effects on Development
  - Responses to Environment Changes
  - Basic Life Functions
- Interdependence/Food Chains
- Reproduction
- Adaptations and the Environment
- Continuity of Life/Life Cycle

Science Questions Classification

experienced in high-accuracy data generation pipelines for fine-grained multi-class classification problems that scale to hundreds of classification labels

Coeur d'Alene Language Resource Web Page Development

I joined the group to redevelop the website using Node.js, React, GraphQL, and mySQL(community edition) to allow increased functionality and more responsive interaction.

We use Docker to deploy our model on the server.