TIANCHENG HU

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Summary: Master's student at ETH Zurich interested in **Natural Language Processing and Computational Social Science**

EDUCATION

ETH Zurich, Zurich, Switzerland	M.Sc.: Electrical Engineering and Information Technology	July 2022 (Expected)	GPA: 5.52/6.00
The University of Texas at Dallas, Richardson, TX, USA Hobson Wildenthal Honors College	B.S: Electrical Engineering Advisor: Prof. Carlos Busso	May 2020	GPA: 3.99/4.00 **Summa Cum Laude**

SELECTED COURSEWORK: Advanced Techniques of Machine Translation, Natural Language Processing, Computational Semantics for Natural Language Processing, Deep Learning, Image Analysis and Computer Vision, Deep Learning for Autonomous Driving, Advanced Topics in Artificial Intelligence, Probabilistic Artificial Intelligence

PUBLICATIONS

[1] M. Zhong* & **T. Hu*** & Y. Jiao*, S. Dhuliawala, B. Singh. "Drug Re-positioning via Text Augmented Knowledge Graph Embeddings", *Conference on Neural Information Processing Systems (NeurIPS) Workshop AI4Science*. 2021. To appear. (***: co-first authorship**)

[2] **T. Hu**, N. Stoehr. "Team "NoConflict" at CASE 2021 Task 1: Pretraining for Sentence-Level Protest Event Detection," *Proceedings of the 4th Workshop on Challenges and Applications of Automated Extraction of Socio-political Events from Text (CASE 2021),* online. Association for Computational Linguistics (ACL). 2021.

[3] S. Giorgi, V. Zavarella, H. Tanev, N. Stefanovitch, S. Hwang, H. Hettiarachchi, T. Ranasinghe, V. Kalyan, P. Tan, S. Tan, M. Andrews, **T. Hu**, N. Stoeher, F. Re, D. Vegh, D. Atzenhofer, B. Curtis, A. Hurriyetoglu. "Discovering Black Lives Matter Events in the United States: Shared Task 3, CASE 2021," *Proceedings of the 4th Workshop on Challenges and Applications of Automated Extraction of Sociopolitical Events from Text (CASE 2021),* online. Association for Computational Linguistics (ACL). 2021.

[4] S. Jha, M. Marzban**, T. Hu**, M. Mohamed, N. Al-Dhahir, C. Busso, "The Multimodal Driver Monitoring Database: A Naturalistic Corpus to Study Driver Attention," *IEEE Transactions on Intelligent Transportation Systems*, vol. to appear, 2021.

[5] **T. Hu**, S. Jha, C. Busso, "Temporal Head Pose Estimation Model from Point Cloud," *IEEE Transactions on Intelligent Transportation Systems*, vol. to appear, 2021.

[6] **T. Hu**, S. Jha, C. Busso, "Robust Driver Head Pose Estimation in Naturalistic Conditions from Point-Cloud Data," *IEEE Intelligent Vehicles Symposium*, October 19 - November 13, 2020 (Virtual) Las Vegas, NV, United States

WORK/RESEARCH EXPERIENCE

DeepJudge AG, Switzerland **-** *Research Intern* Oct 2021 – Present

- Explored how GPT-3 can be used to solve various kinds of **legal language understanding and processing** tasks

Drug Re-positioning via Text Augmented Knowledge Graph Embeddings – *Course Project* May 2021 – August 2021

- Proposed several methods to **incorporate textual information into knowledge graph embeddings** and conducted a case study on TransE to select the best method
- Proposed two new metrics - Percentage of Disease @ K and Unique Entities @ K that shed light on the model's performance on easy samples and the diversity of model predictions. **Quantitatively and Quantitatively analyzed** the result of adding textual information on TransE, DistMult, ProjE and RotatE.

Protest Event Extraction – *Course Project* April 2021 – May 2021

- Won English version of Subtask 2 at The 4th Workshop on Challenges and Applications of Automated Extraction of Socio-

political Events from Text (CASE) @ACL-IJCNLP 2021 by conducting **in-domain unsupervised pretraining**.
- Investigated the effect of including **more training data** from other shared subtasks, **data augmentation (checklist, paraphrase and backtranslation) and removing named entities** on the downstream task performance.
- Conducted thorough **quantitative and qualitative analysis** of the model error
- Validated our model by using it on a **spatial-temporal event extraction** pipeline on a "in-the-wild" Twitter dataset and a NYTimes dataset and compared with a gold event list.

Autonomous Systems Lab, ETH Zurich, Switzerland **–** *Semester Thesis*

Object Instance Re-localization from Partial Observations September 2020 – February 2021

- Designed a **deep learning pipeline** for partial-scan-to-partial-scan indoor **3D object instance re-localization** which significantly outperforms non-learning approaches. This pipeline consists of two networks: the instance re-identification network using triplet-loss contrastive learning and the pose estimation network using regression. Further improved performance by combining it with a postprocessing steps using **iterative closest point**.

Multimodal Signal Processing Laboratory, UT Dallas **–** *Undergraduate Research Assistant (**Fully Funded**)*

Robust Driver Head Pose Estimation with Depth Camera June 2018 – August 2020

- Developed an effective and novel end-to-end **deep learning**-based algorithm for **point cloud data** to predict **driver head pose**. This method is particularly well-suited for in-car applications where there are large ground truth head rotations, illumination changes and partial occlusions.
- Proposed a **temporal point-cloud regression framework** for driver head pose estimation, utilizing the temporal continuity of head pose across frames, significantly outperforming RGB baselines including OpenFace 2.0, ZFace and Hopenet.
- Contributed to the development of the **data collection protocol** for a deep learning friendly driver visual attention modeling dataset. Designed experimental steps that specifically induce a large range of gazes and head poses.
- Collected and analyzed the **Multimodal Driver Monitoring Dataset**, with naturalistic driving data of **59** drivers (over **10 million frames**) from multiple sensors (4 RGB cameras, 1 time-of-flight camera, vehicle CAN bus information, microphone array) to model driver visual attention. This dataset can be used for a large variety of tasks, such as driver head pose and gaze estimation, driver fatigue detection and driver emotion estimation.

Honors & Awards

Texas Analog Center of Excellence Research Scholarship ($5000) Jan 2019

UTD Undergraduate Research Scholarship ($500) Jan 2019, Feb 2020

UTD Dean's List 7 semesters

UTD Academic Excellence Scholarship – **Full tuition and fees covered for four years and $6000/year** Aug 2016

UTD Collegium V Honors Program Aug 2016

Teaching Experience

EE2310 Introduction to Digital Systems, *Peer Tutor* Spring 2018, Spring 2019

Instructor: Dr. Nathan Dodge (UTD)

Professional Membership and Service

Student Member:

Institute of Electrical and Electronics Engineers (IEEE), Association for Computational Linguistics (ACL)

Program Committee Member:

Challenges and Applications of Automated Extraction of Socio-political Events from Text (CASE) @ ACL-IJCNLP 2021