Tianrui Hu

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Education

Northeastern University, Boston, Massachusetts 2020 – Present
Ph.D. student in Computer Science

Virginia Tech, Blacksburg, Virginia 2018 – 2020
M.S. in Computer Science

Beijing University of Posts and Telecommunications (BUPT), Beijing, China 2014 – 2018
B.Eng. in Telecommunication Engineering

Academic Experience

BehavIoT at Northeastern University Oct.2020 – Present
Advisor: Dr. David Choffnes
Modeling and Controlling Internet of Things Behavior Using Network-Inferred State Machines

Bot Detection with Limited Data at Virginia Tech Aug.2018 – May.2020
Advisor: Dr. Gang Wang and Dr. Bimal Viswanath

- Build a stream-based real-time bot detection system to complement with rule-based method to catch advanced bots.
- Develop a data synthesis method to enable effective model training with limited labeled data.
- Validate our system using real-world datasets from 3 different online services.
- Sustain our system over a long period of time with low-cost retraining.
- Explore adversarial machine learning and transfer learning on bot detection.

Noise Robust Speech Feature Extraction at BUPT Sept.2017 – May.2018
Advisor: Dr. Zhanyu Ma *Undergraduate Thesis*

- Build a multi-task adversarial network based noise-robust feature extractor.
- Extract bottleneck features from the extractor to enhance the robustness of a speaker verification system.

Affective Computing via Social Media at Tsinghua University Jan.2017 – July.2017
Advisor: Dr. Jia Jia

- Construct a benchmark social media dataset for online depression detection and analysis.
- Extract six groups of discriminant depression oriented features to describe users from different aspects.
- Detect depression via social media using multi-modal dictionary learning model.
- Extract and process acoustic and textual information from a large-scale internet voice dialogue dataset.
- Infer emotion using both acoustic and textual features of voice data by an semi-supervised bimodal deep autoencoder.

Publications

- Steve T.K. Jan, Qingying Hao, **Tianrui Hu**, Jiameng Pu, Sonal Oswal, Gang Wang, and Bimal Viswanath. "Throwing Darts in the Dark? Detecting Bots with Limited Data using Neural Data Augmentation" To appear in the IEEE Symposium on Security & Privacy (**IEEE S&P**), May 2020.
- Yu Hong, **Tianrui Hu**, Zhanyu Ma, Zheng-Hua Tan, and Jun Guo. "Multi-Task Adversarial Network Bottleneck Features for Noise-Robust Speaker Verification." In 2018 6th IEEE International Conference on Network Infrastructure and Digital Content (**IC-NIDC**), 2018.

- Shen Guangyao, Jia Jia, Liqiang Nie, Fuli Feng, Cunjun Zhang, **Tianrui Hu**, Tat-Seng Chua, and Wenwu Zhu. "Depression Detection via Harvesting Social Media: A Multimodal Dictionary Learning Solution." In International Joint Conference on Artificial Intelligence (**IJCAI**), 2017.

Teaching

- **Teaching Assistant at Vignia Tech**
  - CS 1044-Intro to Programming in C++
  - CS 1054-Intro to Programming in Java
  - CS 3114-Data Structures and Algorithms

Other Projects

Information Retrieval System at Virginia Tech Aug.2019 – Dec.2019

Advisor: Dr. Edward A. Fox

- Implement an Elasticsearch based information retrieval system for indexing, searching, and ranking.
- Validate and improve our system on the Virginia Tech Electronic Thesis and Dissertations, and Tobacco Settlement datasets.
- Build a user-friendly website for searching and present recommendations based on user behaviors.

Adversarial Samples with Spatial Constraints at Virginia Tech Jan.2019 – May.2019

Advisor: Dr. Bimal Viswanath

- Propose an approach to generate adversarial samples with spacial constrains
- Implement image masking. Generate perturbations only within mask area and evaluate the attack on a face recognition model.

Indoor Objection Detection System by LabVIEW at BUPT Jan.2017 – Jul.2017

Advisor: Dr. Yitong Liu

- Build an indoor object and human intrusion detection system based on USRP and LabVIEW.
- Detect the moving speed and direction of the indoor objection.

Human Action Recognition at University of Chinese Academy of Science Sept.2016 – Jan.2017

Advisor: Dr. Ce Li

- Build an improved collaborative representation classifier based on l_2-regularization for human action recognition.
- Evaluate our method using depth motion map features on MSRGesture3D dataset.

Honors and Awards

3rd Class Prize, the National VIContest	Jul. 2017
1st Class Prize, the 17th Student Creative Award of BUPT	Jun. 2017
3rd Class Scholarship, excellent student of BUPT	2014 - 2017
Outstanding Student Leader, BUPT	2014 - 2015
1st Class Prize, the 13th Awarding Program for Future Scientists	Dec. 2013

Social Activity

Section Director of Science and Technology, Student Union of SICE, BUPT	2015 - 2016
Science and Technology Director, Student Grade Committee of SICE, BUPT	2014 - 2015
Volunteer Member, Sunshine Volunteers Association of BUPT	2015 - 2016
Member, Student Union of SICE, BUPT	2014 - 2015
Member, Student Television of BUPT	2014 - 2015