Delong Chen (陈德龙)

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Education

BSc in Computer Science **Hohai University** **Sept. 2017 – Jun. 2021**

Nanjing, China

First-Class Outstanding Graduation Thesis in Jiangsu Province

Outstanding Graduation Thesis of Hohai University

Outstanding Graduate of Hohai University (GPA: 83/100)

Experiences

Research Assistant **Hohai University** **Jun. 2021 – Present**

Nanjing, China

Research Topics: Vision-language, Music-motion, and Hydrological Forecasting

Research Intern **MEGVII Research** **Oct. 2021 – Present**

Beijing, China

Research Topic: Efficient Large-scale Vision Language Pretraining

Summer Program **University of British Columbia** **Jul. 2018 – Aug. 2018**

Vancouver, Canada

Courses: Linguistics and Computation for NLP (Scores: 85/100, 97/100)

Research Experiences

Large-scale Vision Language Pretraining ***MEGVII Research***

- Proposed ProtoCLIP for improved representation grouping and enhanced robustness against modality gap in CLIP-style VLP. Improved linear probing and zero-shot accuracy by 5.8% and 2.0%, and matches the performance of CLIP with 4×fewer epochs (paper, code).
- Utilized Pretrained Language Models to benefit vision language models based on knowledge distillation and model adaption (on-going research).

Vision Language Learning on E-commerce Domain ***Hohai University***

- Created a multimodal E-commerce dataset MEP-3M for vision-language / fine-grained / hierarchical classification / long-tailed learning research. Awarded *LTDL-IJCAI'21* Best Dataset Paper (paper, dataset).
- Extended MEP-3M dataset to zero-shot product classification, image-text retrieval, semantic segmentation, and automatic checkout-oriented object detection pretraining [3].

Music-Motion Understanding and Generation (Graduation Thesis) ***Hohai University***

- Created the largest orchestra conducting dataset *ConductingMotion100* consisting of 100 hours of paired music and motion clips. A competition held by JSCS adopted this dataset (JSCS Anouncement, dataset).
- Proposed the first deep learning-based music-driven conducting motion generation model M^2S-GAN, which integrates generative and contrastive multimodal SSL into a unified framework (paper, Turing test video).
- Developed a demo system *VirtualConductor* based on M^2S-GAN, 3D animation and pose transfer. It was awarded as ICME Best Demo and First-Class Outstanding Graduation Thesis of Jiangsu Province (paper, Demo video)
- Employed music-motion pretraining on *ConductingMotion100* and multimodal Masked AutoEncoder to improve music beat tracking performance (on-going research).

Hydrological Forecasting ***Hohai University***

- Constructed the *HHForecasting* codebase for flood forecasting. Benchmarked 12 types of machine learning and deep learning baseline approaches, including Linear Regression, SVR, LSTM, TCN, STGCN, etc.
- Proposed wavelet decomposition for improved significant wave height prediction performance (paper).
- Validated domain adaptation for flood forecasting and proposed the first unsupervised approach for transfer learning-based flood forecasting (paper).

Other Experiences

- Authored survey papers on deep learning-based single sample face recognition [9], fatigue detection [10], and scanning image-based COVID-19 diagnosis [11,12].
- Implemented a fabric defect detection system based on Gabor Wavelets + CNN and won the third prize in the 8th "China Software Cup" Competition East China Division Finals as the team leader.
- Implemented a trainable 2-layer non-linear neural network using Assembly language as the coursework of "The Principle and Application of Microcomputer".
- Lead a national innovative project "Missing Person Searching based on Age-Invariant Face Recognition".

Awards

Academic Awards

- First-Class Outstanding Graduation Thesis in Jiangsu Province
- Outstanding Graduation Thesis of Hohai University
- Best Demo Award in *IEEE International Conference on Multimedia and Expo (ICME) 2021*
- Best Dataset Paper Award in *Long-Tailed Distribution Learning Workshop, IJCAI 2021*
- Best Presentation Award in *International Conference on Big Data and Artificial Intelligence (BDAI) 2021*

Honors and Prizes

- Outstanding Graduate of Hohai University
- Outstanding Communist Youth League Member of Jiangsu Province
- Nomination of the Person of the Year in Jiangsu Province
- Person of the Year of Hohai University in 2019
- Delegate of the All-China Student Federation
- Third Prize of the 8th China Software Cup, East China Division Finals (team Leader)

Skills

- **Coding**: Python, PyTorch
- **English**: IELTS 7.0, passed CET-4 and CET-6 exams.
- **Music background**:
  - Received diploma in violin performance from Central Conservatory of Music (top level).
  - Served as the head of Hohai University Symphony Orchestra (May. 2019 - Sept. 2020).
  - 20+ public performances of composed music.
  - Organized an online performance of 11 orchestras (video). Responsible for music composition, mixing, and video making. 20+ Media coverage: Xinhua News, People's Daily, etc.

Publications

Vision and Language

[1] **Delong Chen**, Zhao Wu, Fan Liu, et al.
Prototypical Contrastive Language Image Pretraining
ArXiv, submitted to a top-tier conference.

[2] **Delong Chen**, Fan Liu, et al.
MEP-3M: A Large-scale Multi-modal E-Commerce Products Dataset
IJCAI 2021 Workshop on Long-Tailed Distribution Learning. **(Best Dataset Paper)**

[3] Fan Liu, **Delong Chen**, et al.
MEP-3M: A Large-scale Multi-modal E-Commerce Products Dataset
Pattern Recognition submission.

Music and Motion

[4] Fan Liu, **Delong Chen** (corresponding author), et al.
Self-Supervised Music Motion Synchronization Learning for Music-Driven Conducting Motion Generation
Journal of Computer Science and Technology, JCST, (**SCI**, **IF**: 1.871, CCF-B) 2022.

[5] **Delong Chen**, Fan Liu, et al.
VirtualConductor: Music-driven Conducting Video Generation System
2021 IEEE International Conference on Multimedia & Expo, ICME'21. **(Best Demo)**

[6] **Delong Chen**.
Music-driven Conducting Motion Generation based on Motion Decomposition and Self-supervised Cross-modal Perceptual Loss (基于动态频域分解与跨模态感知的乐队指挥动作生成)
Outstanding Graduation Thesis of Hohai University, ***First-Class Outstanding Graduation Thesis in Jiangsu Province***.

Hydrological Forecasting

[7] **Delong Chen**, Fan Liu, et al.
Significant Wave Height Prediction based on Wavelet Graph Neural Network
2021 4th International Conference on Big Data and Artificial Intelligence, BDAI'21. **(Best Presentation)**

[8] **Delong Chen,** Ruizhi Zhou, Yanling Pan, Fan Liu.
A Simple Baseline for Adversarial Domain Adaptation-based Unsupervised Flood Forecasting
Technical Report, *ArXiv*, 2022.

Survey Papers

[9] Fan Liu, **Delong Chen** (joint first author), et al.
Deep Learning based Single Sample Face Recognition: A Survey
Artificial Intelligence Review, AIRE, 2022. (**SCI**, **IF**: 9.588)

[10] Fan Liu, **Delong Chen**, et al.
A Review of Driver Fatigue Detection and Its Advances on the Use of RGB-D Camera and Deep Learning
Engineering Applications of Artificial Intelligence, EAAI submission, minor revision. (**SCI**, **IF**: 7.802)

[11] Fan Liu, **Delong Chen** (corresponding author), et al.
Let AI Perform Better Next Time — A Systematic Review of Medical Imaging-based Automated Diagnosis of COVID-19: 2020-2022
Applied Sciences, 2022. (**SCI**, **IF**: 2.838)

[12] **Delong Chen**, Shunhui Ji, Fan Liu, et al.
A Review of Automated Diagnosis of COVID-19 Based on Scanning Images
2020 6th International Conference on Robotics and Artificial Intelligence, ICRAI'20.

Other Topics

[13] Fan Liu, Junfeng Wang, **Delong Chen**, et al.
Asymmetric Exponential Loss Function for Crack Segmentation
Multimedia Systems, 2022. (**SCI**, **IF**: 2.603)

[14] Zhibin Chen, Fan Liu, **Delong Chen**, et al.
Weakly Correlated Adversarial Learning for Cognitive Diagnosis System
2021 IEEE International Conference on Multimedia & Expo, ICME'21, Demo Track.

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背景

计算机科学与技术专业学士学位 **河海大学（211/双一流）** **2017.09 - 2021.06**
江苏省优秀毕业论文一等奖，河海大学优秀毕业论文 南京
河海大学优秀本科毕业生（GPA: 83/100）

科研助理 **河海大学** **2021.06 - 至今**
研究方向：音乐与动作多模态学习、水文预报 南京

算法实习生 **旷视研究院** **2021.10 – 至今**
研究方向：视觉-语言预训练 北京

暑期项目 **不列颠与哥伦比亚大学（US News: 37）** **2018.07 – 2018.08**
自然语言处理：语言学方向与计算学方向（Scores: 85/100，97/100） 加拿大，温哥华

科研经历

➢ 视觉与语言

- 提出 ProtoCLIP 以提升 CLIP 预训练过程中表征聚簇（representation grouping）效率以及对模态鸿沟（modality gap）的鲁棒性，在线性评估与零样本分类任务上分别提升 5.8%与 2.0%的准确率，以减少 4 倍训练量在下游性能达到与 CLIP 相当的性能（paper, code).
- 构建了面向多模态学习、细粒度分类、层次分类、长尾分布学习任务的大规模电商商品数据集 MEP-3M，获评 LTDL@IJCAI'21 Best Dataset Paper (paper, dataset).
- 将 MEP-3M 拓展至零样本商品识别、商品检索、语义分割，以及面向自动零售场景的目标检测器预训练[3].
- 在研项目：将预训练自然语言模型中的知识蒸馏至视觉模型.

➢ 音乐与动作

- 构建了包含 100 小时音频动作数据的 *ConductingMotion100* 数据集，为同类数据集中规模最大，被江苏省计算机学会主办的"远见杯"挑战赛所采用.
- 将生成式与判别式自监督学习融合为统一的框架，的提出首个基于深度学习的音乐驱动的指挥动作生成算法M^2S-GAN (paper, Turing test video).
- 基于M^2S-GAN, 三维建模与姿态迁移技术, 开发 *VirtualConductor* 演示系统, 获评 ICME'21 Best Demo、河海大学优秀本科毕业论文、江苏省优秀本科毕业论文一等奖(paper, Demo video).
- 在研项目：基于掩码自编码器（MAE）在 *ConductingMotion100* 数据集预进行节拍检测器预训练.

➢ 水文预报

- 构建洪水预报 codebase *HHForecasting*，实现了包括 Linear Regression, SVR, LSTM, TCN, STGCN 等 12 种机器学习/深度学习基线模型.
- 将毕设动态频域分解算法迁移至水文预报，提出基于小波频域分解的海浪有效波高预报方法（paper).
- 验证基于对抗领域自适应的洪水预报方法，构建首个无监督洪水预报基线模型（paper).

➢ 其它项目

- 完成关于深度单样本人脸识别[9]，疲劳驾驶检测[10]，基于扫描图像的新冠肺炎自动诊断[11,12]的

综述论文。

- 实现基于 Gabor 小波与 CNN 的瑕疵定位与识别系统，获第八届“中国软件杯”华东赛区决赛三等奖（团队负责人），获 1 项软件著作权授权（第一作者）.
- 基于汇编语言实现包含两个非线性层的可训练神经网络，作为“微型计算机原理与实践”课程作业。
- 主持国家级大学生创新创业训练计划项目“基于跨年龄人脸识别的失踪人口匹配系统”.

荣誉与奖项

➢ 学术奖项

- 江苏省优秀毕业论文一等奖.
- 河海大学 2021 届本科优秀毕业设计.
- Best Dataset Paper Award in Long-Tailed Distribution Learning Workshop, IJCAI 2021.
- Best Demo Award in IEEE International Conference on Multimedia and Expo (ICME) 2021.
- Best Presentation Award in International Conference on Big Data and Artificial Intelligence (BDAI) 2021.

➢ 个人荣誉与竞赛奖项

- 河海大学 2021 届本科“优秀毕业生”荣誉称号.
- “江苏省优秀共青团员”称号.
- “2019 江苏省大学生年度人物”提名奖.
- 2020 年河海大学“海韵风华大学生年度人物”称号.
- 推选为中华全国学生联合会第二十七次代表大会（全国学联二十七大）代表.
- 第八届“中国软件杯”华东赛区决赛三等奖（团队负责人）.

专业技能

- **英语**：雅思 7.0，通过 CET-4、CET-6.
- **编程**：熟悉 Python、Pytorch.
- **音乐背景**：
  获中央音乐学院小提琴演奏文凭级证书.
  于 2019.05-2020.09 担任河海大学管弦乐团团长.
  有作曲（Sibelius）、编曲（Cubase）经验，作曲作品公开演出 20+次.
  策划组织 11 所高校乐团云合奏，完成作曲、混音、视频制作. 媒体报道：新华社、人民日报等.

论文成果

视觉与语言

[1] **Delong Chen**, Zhao Wu, Fan Liu, et al.
Prototypical Contrastive Language Image Pretraining
ArXiv, submitted to a top-tier conference.

[2] **Delong Chen**, Fan Liu, et al.
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音乐与动作

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Journal of Computer Science and Technology, JCST, (**SCI**, **IF**: 1.871, CCF-B) 2022.

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河海大学优秀本科毕业论文，**江苏省优秀本科毕业论文一等奖**

水文预报

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Technical Report, *ArXiv*, 2022.

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[10] Fan Liu, **Delong Chen**, et al.
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Applied Sciences, 2022. (**SCI**, **IF**: 2.838)

[12] **Delong Chen**, Shunhui Ji, Fan Liu, et al.
A Review of Automated Diagnosis of COVID-19 Based on Scanning Images
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其它

[13] Fan Liu, Junfeng Wang, **Delong Chen**, et al.
Asymmetric Exponential Loss Function for Crack Segmentation
Multimedia Systems, 2022. (**SCI**, **IF**: 2.603)

[14] Zhibin Chen, Fan Liu, **Delong Chen**, et al.
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