Lu Dong

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Generative AI/ Computer Vision / LLM

Personal Homepage
LinkedIn: Lu Dong

I'm pursuing my Ph.D. at SUNY Buffalo (UB), advised by Prof. Ifeoma Nwogu. My research interests are Generative AI, Language-driven Motion Generation, Situated Intelligence, 3D Human Pose Estimation, Robotic Physics Simulation, and Sign Language Translation and Generation, primarily in developing Computer Vision (CV), Large Language Models (LLM), Reinforcement Learning, Statistic Machine Learning, and Mathematical Modeling to study different human behaviors and make generative models more effective in serving human needs. I'm also experienced with Data Science, Pattern Mining, Information Retrieval, and Search Engine.

Education

State University of New York at Buffalo (UB), USA, *Ph.D. Program in Computer Science and Engineering.* 08/2021-Now
Rochester Institute of Technology (RIT), USA, *Ph.D. Program in Computing and Information Sciences.* 08/2020-05/2021
Xi'an Jiaotong University (XJTU), CHINA , *Master's Degree in Computer Science and Technology.* 08/2013-05/2016
Northeast Electric Power University (NEEPU), CHINA, *Double Bachelor's Degrees in CS and EE.* 08/2007-05/2011

Research Experience

Situated Intelligence Topic: Situated Intelligence for Children Education. **02/2024–Now**
Position: Research Assistant, Advisor: Dr.Ifeoma Nwogu *@UB*

- To enhance children's education, we have introduced a model that generates embodiment interaction feedback, based on children's engagement, attention, proximity to the interaction, and turn-taking.

AIGC Topic: Towards Open Domain Text-Driven Synthesis of Multi-Person Motions. **06/2023–03/2024**
Position: Research Intern, Advisor: Dr.Ifeoma Nwogu& Dr. Mitch Hill & Dr. Guojun Qi *@OPPO US Research*

- We introduce the first model capable of generating multi-person motion sequences from open-domain textual prompts for an arbitrary number of subjects. Additionally, we present the first large-scale datasets of text-annotated multi-person poses and motions. To evaluate our results, we have developed a novel factorized method, setting a new standard in the field.

AIGC Topic: Diffusion-based Generative Research with Large Language Model. **10/2023–02/2024**
Position: Research Assistant, Advisor: Dr.Ifeoma Nwogu *@UB*

- To enhance multimodal communication, we introduced SignDiffusion, the first model that employs diffusion models with the large language model (LLM) to generate diverse and realistic 3D sign language avatars, achieving state-of-the-art performance.

Virtual Agents: 3D Motion Reconstruction and Generation **03/2023–01/2024**
Position: Research Assistant, Advisor: Dr.Ifeoma Nwogu *@UB*

- To achieve the goals of mimicry, learning, and regeneration, we introduced SignAvatar, a pioneering framework for synthesizing 3D sign language avatars from 2D videos and regenerating them based on text or images. Additionally, we contributed a 3D dataset.

Motion Synthesis Topic: Language-guided Human Motion Synthesis with Atomic Actions **02/2022–02/2023**
Position: Research Assistant, Advisor: Dr. Ifeoma Nwogu *@UB*

- We introduced ATOM for language-guided human motion synthesis to address limitations in generalizing to new actions. Our paper demonstrates superior performance on benchmark datasets and the ability to generate open-set motion sequences.

Language Translation Topic: Reinforcement Learning Research **05/2021–02/2022**
Position: Research Assistant, Advisor: Dr.Ifeoma Nwogu *@UB+RIT*

- We introduced ReinforcedSTL, a model to address the challenges of sign language video-to-text translation. By employing Transformer and reinforcement learning techniques on both verbal and nonverbal social cues, we enhance translation performance.

Publication

[1] **Lu Dong**, Lipisha Nitin Chaudhary, Fei Xu, Xiao Wang, Mason Lary, Ifeoma Nwogu. "SignAvatar: Sign Language 3D Motion Reconstruction and Generation." (The 18th IEEE International Conference on Automatic Face and Gesture Recognition. **FG 2024**)
[2] **Lu Dong**, Xiao Wang, Mason Lary, Ifeoma Nwogu. "SignGen: Semantically-Guided American Sign Language Generation." (ACL2024 under review)
[3] Mengyi Shan, **Lu Dong**, Yutao Han, Yuan Yao, Tao Liu, Ifeoma Nwogu, Guo-Jun Qi, Mitchell Hill. "Towards Open Domain Text-Driven Synthesis of Multi-Person Motions". (ECCV2024 under review)
[4] Fei Xu, Lipisha Nitin Chaudhary, **Lu Dong**, Srirangaraj Setlur, Venu Govindaraju, Ifeoma Nwogu. "A Study of Video-based Human Representation for American Sign Language Alphabet Generation." (ICME2024 under review)
[5] Zhai, Yuanhao, Mingzhen Huang, Tianyu Luan, **Lu Dong**, Ifeoma Nwogu, Siwei Lyu, David Doermann, and Junsong Yuan. "Language-guided Human Motion Synthesis with Atomic Actions." In Proceedings of the 31st ACM International Conference on Multimedia, pp. 5262-5271. 2023. **ACM MM 2023.**
[6] Juan Li, **Lu DONG**, Jianhang Ding, Xinyu Yang; Exploring the General Melodic Characteristics of XinTianYou Folk Songs [C], 12th Sound and Music Computing Conference, Maynooth, Ireland. 2015:393-399.

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Internship & Work Experience

Research Internship - Human Motion Generation **06/2023–08/2023**
InnoPeak Technology (OPPO US Research) *@Seattle, WA, US*

- During this internship, my research centered on developing a text-driven approach for synthesizing multi-person motions in open domains. We successfully build the first generative model capable of generating motion for an arbitrary number of subjects.

Research Internship - Human Pose Estimation **05/2022–08/2022**
InnoPeak Technology (OPPO US Research) *@Palo Alto, CA, US*

- During my internship, my research was focused on enhancing human pose estimation performance in scenarios involving blur. This work was successfully integrated into a gym app product.

Senior Data Analyst **09/2016–04/2020**
Shaanxi Haina Electronic Technology Co.,LTD, *@XI'AN, CHINA*

- As the lead researcher and developer for Recommendation Systems, my responsibility was to ensure the smooth operation of the system. Our work has successfully provided long-term support for over 100 small companies.

Project Experience

Information Retrieval Project -Covid19 & Vaccine Analysis Search Engine [Page Link] **09/2021-12/2021 @UB**

- Regarding COVID and Vaccines, I collected a dataset of 50,000 tweets from diverse languages, various countries, authorities, and the general public using Tweepy. The front-end utilizes a Google-like user interface with HTML, CSS, Bootstrap, JavaScript, and Ajax techniques. The back-end using the Flask server, deployed on AWS EC2 cloud, employs statistical models and semantic-based language analysis to track trends among authorities related to COVID-19, public attitudes toward vaccines, and their impacts.

Natural Language Processing Project- Medical Tutoring ChatBot **09/2021-12/2021 @UB**

- This project supports a non-profit organization's mission to enhance medical knowledge in underdeveloped regions of India. We tackled challenges like database creation from PDFs, user-friendly chatbot implementation, delivering high-quality results, and ensuring user engagement and retention. The chatbot serves as an educational tool to boost medical literacy and, ultimately, save lives. Details can be found at the ChatBot Project

Reinforcement Learning Project –Multi-Agent Collaborative Reinforcement Learning **09/2021-12/2021 @UB**

- The RL Learning system was developed based on the OpenAI Gym Environment, incorporating various RL algorithms, including Q-Learning, SARSA, DQN, DDQN, Actor-Critic, and notably PPO. In addition, it excels in addressing multi-agent cooperation tasks with dynamic reward mechanisms. Our experimental results clearly showcase a twofold increase in convergence efficiency.

Skills and Others

Honors	Excellent Postgraduate Student, Excellent Student Leadership, Excellent Undergraduate Student,
Awards	Outstanding Leadership Award, National Graduate Academic Scholarship, National Encouragement Scholarship, Academic Scholarships.
Activities	Captain of Undergraduate Women Basketball Team, Silver Metal of University Women's Hurdle, Silver Prize in College Debate Competition. Judge for 2022 UB Hacking Competition.