KEXIN HUANG

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EDUCATION

The Hong Kong Polytechnic University *09/2023 - 08/2027*
Brain Science and Language Technology Laboratory, Advisor: Prof. Ping Li *Ph.D student*

Imperial College London *10/2021 - 10/2022*
Msc Biomedical Engineering (Neuro-technology stream) *First class Distinction*

The University of Edinburgh *09/2016 - 06/2020*
Bsc Artificial Intelligence and Computer Science *Second Class division one (Hons)*

WORK EXPERIENCE

Teaching Assistant **The Hong Kong Polytechnic University**
Course: Introduction to AI And Data Analytics for Language Professionals *09/2024 - 12/2024*

Research Service **iRead Foundation**
Intern in iRead Foundation Online Reading Dept *01/2023 - 07/2023*

Research Assistant **The Hong Kong Polytechnic University**
Brain Science and Language Technology Laboratory *10/2022 - 07/2023*

Software Engineering Intern **Gree Intelligent Equipment Co. Ltd**
Robot Project Department *07/2019- 08/2019*

RESEARCH

Research Interest

- Brain Machine Interface
- Brain Model Alignment
- Neuro-Cognitive Mechanisms
- Individual Differences

Research Projects

- **Research on Generalizing Visual Brain Decoding to Unseen Subjects Using Uniform Learning Paradigms**
The Hong Kong Polytechnic University *01/2024 - 12/2024*
Current visual brain decoding methods fail to generalize across subjects. Leveraging a large-scale image-fMRI dataset from 177 participants, we employ a uniform learning paradigm to reveal subject-invariant patterns. Our findings demonstrate improved generalization with more training subjects, consistent across architectures and influenced by subject similarity, suggesting potential for foundation models.

- **Research on Cognitive Plausibility and Neural Relevance of Deep Language Model Representations in Capturing Neural Patterns During Naturalistic Reading of Scientific Texts**
The Hong Kong Polytechnic University *10/2022 - 10/2023*
This study investigated the impact of deep language models' cognitive plausibility by leveraging data from a large scale fMRI and eye-tracking study of naturalistic scientific text reading. Our study found the best correlation between the model of Masked Language Modeling and our fMRI based patterns, while models trained with less cognitively plausible methods produced less informative embedding and significantly worse correlations. The results suggest that cognitive plausibility contributes to a model's relevance, a crucial aspect for computational models to achieve human-like understanding of language.

- **Research on Unpaired Image-to-Image Translation for Harmonizing Skin Tones in Eczema-Affected Skin Images**
Msc Project at Imperial College London, Biological Control Systems Lab *12/2021 - 09/2022*
This project aims to transfer an already available eczema image of white skin to an eczema skin image of a darker colour tone while preserving the other content representations in the image.

  - We proposed a new Generative Adversarial Networks(GAN) structure by adding a neural network for semantic segmentation based on contrastive-unpaired-translation(CUT). The segmentation loss obtained by the added network was applied to help the generator(G) to learn the class information(e.g. skin or background) in the input images during the encoding, then keep the same pixel level class information in the generated images.

- **Research on Advancing Neural Decoding with Target-Specific Ridge Regression and State Classification**
  Imperial College London, Brain Machine Interface Course *03/2022– 06/2022*
  Designing a neural decoder by analyzing spike sequences in monkey brains to drive a hypothetical prosthetic device and precise trajectory of the monkey's hand as it reaches for the target. Our team proposed a multi-regression neural decoder with auxiliary Naive Bayesian classifiers. Proposed estimation architecture outperforms other decoders in competition, achieving a RMSE as low as 7.95 mm.

Publications

1. Kong, X., **Huang, K.**, Li, P., & Zhang, L. (2024). Toward Generalizing Visual Brain Decoding to Unseen Subjects. arXiv preprint arXiv: 2410.14445.

2. Yu, S., Gu, C., **Huang, K.**, & Li, P. (2024). Predicting the next sentence (not word) in large language models: What model-brain alignment tells us about discourse comprehension. Science Advances, 10(21), eadn7744.

Conference Proceedings

- Kong, X., **Huang, K.**, Li, P., & Zhang, L. (2024). Toward Generalizing Visual Brain Decoding to Unseen Subjects. (ICLR 2025) International Conference on Learning Representations..

- Yu, S., Gu, C., **Huang, K.**, & Li, P. (2024, April). Predicting the Next Sentence (Not Word) in Large Language Models: What model-brain alignment tells us about discourse-level comprehension. In Annual Meeting of Cognitive Neuroscience Society 2024.

- Yu, S., Gu, C., **Huang, K.**, & Li, P. (2023, March). Representations from deep language models capture neural patterns in naturalistic reading of scientific texts: cognitive plausibility and neural relevance. In Annual Meeting of Cognitive Neuroscience Society 2023.

SKILLS

Programming Languages:	Python, Matlab
Languages:	English, Chinese
Skills:	EEG experiment, 3D Modeling, Unity, fMRI Data analysis, PsychoPy

GRANTS AND AWARDS

PolyU Research Postgraduate Scholarship
Funding Body: The Hong Kong Polytechnic University. Amount: 904,320 HKD + 25,000 HKD
CBS Student Associated Money
Funding Body: The Hong Kong Polytechnic University. Amount: 35,000 HKD