Dear Professor Chen,

My name is Xiaoqin Feng, a Senior Speech Algorithm Engineer at Mobvoi AI Lab. I am applying to USC for a Ph.D., and I am very interested in your research areas. I would like to explore the possibility of doing my research with you, with financial support.

In my first internship (TAL AI Lab), I did research on deep knowledge tracing(DKT) to monitor student knowledge states or skill acquisition levels. In this project, I considered the intrinsic relations of question information and applied graph representations as supervision to DKT. This method demonstrates the importance of question relation information and proposes an idea to extract sequence memory based on graph embedding(MovieLens, e.g. ). This work led to a co-author conference submission to *AIED 2019*. I believe the Ph.D. program enables future works of information extraction and knowledge acquisition and representation, and I am eager to bring up more research ideas in this field.

In my last few years of work(Mobvoi AI Lab), I primarily focus on text information extraction to guide the naturalness and expressiveness of text-to-speech(TTS). I have mentored five interns, where I developed my teamwork ability and enhanced my problem-solving ability. I divide my work into two sides. Semantic NLP, on the one hand, converts non-standard text into representations with accurate pronunciation, prosody, etc. I proposed a model architecture called Unified Frontend, which aims to transform complex joint models into end-to-end(E2E) models based on semantic analysis. For multi-level prosody prediction, I imposed prompt learning to obtain discriminative representation. Emotional NLP, on the other hand, focuses on the emotional aspect of language understanding. I established criteria for emotional data(non-well-defined tasks). For stress prediction, I propose a coarse-to-fine stress model with auxiliary granularity supervision. Both of these works led to conference submissions to *PRML 2022*(co-author), *ICASSP 2023*(first-author, reviewing) and seven patents. The challenges of fine-grained tasks relying on more knowledge, semantic ambiguity, lack of context, and robustness drive my motivation to further my study in the Ph.D. program.

I have looked through your lab website, and I think your team's work in knowledge acquisition and semi- or unsupervised learning of information closely aligns with my research interests. Specifically, the recent works in *NAACL 2022,* such as the approach that formulates entity typing as a natural language inference (NLI) problem to obtain general effects; mitigates relation extraction (RE) biases with counterfactual analysis; and structure-aware equivariance learning method that improves the non-structure data extraction and representation appeals to me. My research interests lie in natural

language processing(NLP), especially natural language understanding(NLU), information extraction(IE), information representation(IR), and their application to real life, I hope to make machines understand nature and fill the gap in introducing knowledge to NLP.(mini-supervised, cross-language, multi-model, e.g.)

If you are interested in the proposed study and want to know more about me, I am ready to communicate further with you via email or video call. You are also welcome to refer to my CV attached to this email. Moreover, my personal website is *https://xqfeng-josie.github.io/*.

I realize how busy you must be, so I appreciate any time you can reply to me. Thank you very much.

Sincerely,

Xiaoqin Feng