Personal Statement

I am Bingbing Feng, a PhD applicant from China. I am an Algorithm Researcher in the Speech Research Group at eMeet. I obtained my B.Sc. degree and M.Sc. degree both in computer science from the College of Information Engineering, Xiangtan University, China in 2015 and 2018, respectively. I am mostly working on speech recognition and speech augmentation problems, and have broad interests in nonlinear dynamics, complex network and natural language processing as well. I am a winner of 2022 IEEE Transactions on Circuits and Systems Guillemin-Cauer Best Paper.

Through undergraduate and graduate study, I have been exposed to such disciplines as Discrete Mathematics, Mathematical Analysis (90 out of 100), Linear Algebra (100 out of 100), Probability and Mathematical Statistics (100 out of 100), Complex Function and Integral Transform (99 out of 100), and so on. I have sound fundamentals of mathematical knowledge, and you can see on the transcript that I did very well in math-related subjects. In the process of the study, I preferred research and teaching modes such as group discussion, PPT representation and the like.

During my master's study, I participated in the research on dynamical degradation mechanism of digital chaotic systems via mapping networks, which was presided over by my master's supervisor, Chengqing Li. Under the careful guidance of my supervisor and the influence of the good academic atmosphere of the laboratory, my academic ability has been significantly improved, grasping the methods of literature retrieval and data processing, as well as the skills of scientific paper writing, and my related research achievements are published in IEEE Transactions on Circuits and Systems-I, IEEE Transactions on Computers, and IEEE Access. The paper "Dynamic Analysis of Digital Chaotic Maps via State-Mapping Networks" published in IEEE Transactions on Circuits and Systems-I won the 2022 IEEE Transactions on Circuits and Systems Guillemin-Cauer Best Paper, and another paper "The graph structure of the generalized discrete Arnold's Cat map" published in IEEE Transactions on Computers was selected as ESI Highly Cited Paper. In my master's thesis "Network Analysis of Dynamics of Chaotic Systems in Digital Domain", the second and third chapters are based on the technical content of the above award-winning paper, and the fourth chapter is based on the technical content of the above ESI highly cited paper.

During my time as an Algorithm Researcher at eMeet, I am mostly working on end-to-end ASR (Automatic Speech Recognition), improving AED (Attention-based Encoder-Decoder) model with chunk-wise self-attention and speech enhancement for robust streaming ASR, developing important production-oriented features ranging from ITN (Inverse Text Normalization), Punctuation Restoration, Contextual Biasing and Endpoint Detection. In the process of pushing forward the implementation of the project, my theoretical research and engineering application ability has been further improved, acquiring proficient programming skills, such as MATLAB, PyTorch, C and Linux, which lays a solid academic foundation and cultivates strong practical capability for

future research. Along with deepening my theoretical research and engineering application, I have found that speech and audio signal processing is a very challenging research field and developed an unquenchable interest in speech and audio signal processing.

At present, speech recognition technology based on deep learning has achieved quite good performance in the near-field environment, even surpassing the human level. However, in the real environment, the speech signal is inevitably interfered by noise and reverberation, especially in the far-field conditions, since the energy of the sound wave decays exponentially with the propagation distance during the propagation process, the speech signal is more seriously disturbed by noise and reverberation, which greatly affects the performance of speech interaction applications such as speech recognition. In my studies toward a doctoral degree, I hope to conduct more in-depth theoretical research on speech and audio signal processing, such as speech enhancement and light-weighted far-field robust speech recognition motivated by problem, as well as speech synthesis. I enjoy studying speech and audio signal processing for its own sake and would like to continue my studies on the level demanded by the PhD program. I have carefully learned achievements of your research group on speech and audio signal processing, full of creativity and utility. I really want to study for my doctoral degree in your research group, and believe that through my own efforts, I can complete the research tasks during the doctoral period well. Despite of academic studies, I am also fond of reading and cycling, devoting a majority of spare time to them.

With strong desire for knowledge, curiosity and passion for scientific research, I firm my determination to study a PhD program. The experience of working in the field of artificial intelligence makes me realize what I really pursue. After earning my PhD, I would like to continue to engage in theoretical research in related fields and cross-fields in scientific research institutions or universities, doing my best to push forward the engineering application of theoretical research achievements. With all sincerity, I hope you can take my application into serious consideration, and I shall appreciate you if you grant me an opportunity for further studies.