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To Whom It May Concern,

I refer Shiyu Ji to apply for his prospective graduate program. I have cooperated with Shiyu on the research project, namely *Crowdsourcing with Trembles*, in which develop incentive mechanisms for mobile phones with uncertain sensing time. Through the process of this project, I feel Shiyu has strong research capability based on my cooperation experience.

This paper is researching the problems caused by the perturbations of sensing uncertainty in crowdsensing. Since most existing crowdsensing incentive mechanisms did not consider the negative impacts of sensing uncertainty, this paper fills the void. As the first author, Shiyu proposed the basic idea, which is to leverage the notion of Trembling-Hand Perfect Equilibrium, in order to capture the essence of the uncertain perturbations. The subsequent theoretical analysis and reasoning are quite tricky. However, Shiyu did most of the theoretical part of the paper. As a result, there are a lot of rigorous and elegant results in this paper. Therefore, I believe Shiyu is quite good at modeling and reasoning. Once he abstracts the problems in the network world into the well-defined models, he can come up with convincing arguments and doable solutions in the paper. I think this capability is extraordinarily significant in academic research, especially in the society of computer science. Undoubtedly, Shiyu owns strong reasoning skills.

On the other hand, coding is another important skill in computer science research. I believe Shiyu is also qualified for the coding job, since he has done almost all of the simulations in the project. There are extensive required simulations in this paper. There are 9 groups of simulations. Each group has dozens of results to be observed. Each result is averaged over 1000 instances. Such a huge number of simulations require the personal laptop taking days to finish all of them. Therefore, the demand of parallelization is pressing. Fortunately, Shiyu is familiar with the use of supercomputing cluster offered by Oklahoma State University. By submitting the simulation jobs parallelizedly, he succeeded to significantly shorten the computing time, and now he can finish all the 9 simulation groups within one hour. Shiyu not only has a good sense in theoretical reasoning, but also can offer bright ideas when implementing the solutions.

I am glad to know that Shiyu wants to apply for the graduate program, because to study in a prestigious university will definitely benefit him a lot, especially for the advanced academic research. It will be very helpful for him to talk to the outstanding scholars working on the cutting edge of network security and privacy in the top

universities. Therefore, I strongly support him without reservation.

Sincerely,

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