

## APPENDIX A

### SIMULATION EXPERIMENTS

Here, we consider downtown Queens as an example to clarify the experimental settings. Relevant information about the setting of the Queens area is as follows.

*Setting 1* (Geographic information): We select a grid-like regular block area of roughly 1430m \* 835m from Google Map and divide it into four types of neighborhoods with different colors shown in Fig.3 (in the submitted paper): red for residential areas, yellow for commercial areas, blue for the school district, and green for the entertainment area. Each type shares the same user distribution, Poisson Point Process in Eq.(8) (in the submitted paper), but with different coefficients  $\lambda$ . Furthermore, population density also varies among blocks. We collect the urban population data from [1], through which it is clear to see the difference in density among block regions. We also consider the settings of data characteristics in [2], which describes the pattern of urban population distribution. Thus we can approximate the population by residential space area.

*Setting 2* (The distribution of users): The distribution of users varies in two dimensions, the temporal dimension and the spatial dimension. Complying with the probability distribution of active users in [3], we assume there exists the identical rule and adopt the normal distribution  $\mathcal{N}(\mu = 10, \tau = 3.6)$ . Meanwhile, we apply the period during 12 a.m., which is the noon peak, and most users are also very active online.

*Setting 3* (User walking speed): According to [4] describing, the walking speed distribution of pedestrians follows a normal distribution  $\mathcal{N}(\mu = 1.34, s^2 = 0.26)$  or remains at a constant speed of 1 m/s, as determined by McNett and Voelker. We determine the average speed of the user to be 1 m/s. In this context, the travel cost time will fulfill the maximum walking time restriction.

*Setting 4* (Base station layout): Following the model proposed in Section III, we dispose the base stations beside the roads uniformly in the area. In this arrangement, the entire block area is certainly covered by 5G signals.

In summary, preciously speaking, the experimental simulation context settings are: we adopt the noontime slot between 12:30 a.m. and 13:30 a.m. The selected study areas will be divided into different sub-regions depending on the region's function and population property. Meanwhile, the population also varies with time.

## REFERENCES

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