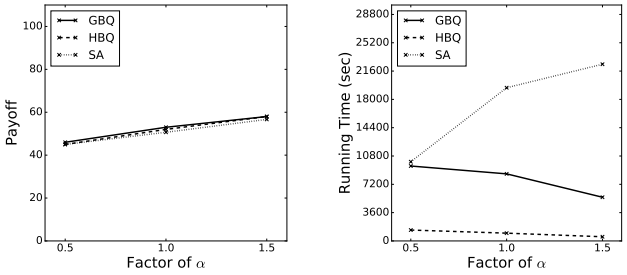
APPENDIX

Apart from the experimental results presented in Section 6.2, we also conducted a series of experiments regarding other parameters of the marketing simulator. Particularly, we set the default configuration to Configuration 0 (see Table 1) with a fixed budget 6000, vary one parameter a time and then compare the performance of GBQ, HBQ and SA in terms of utility and running time.

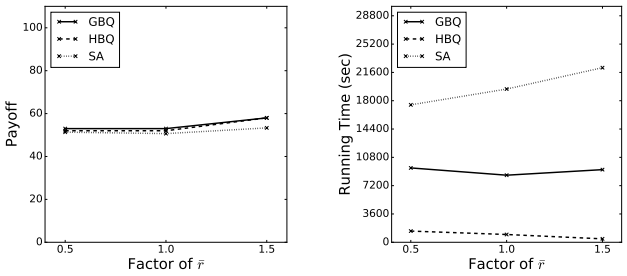
Figure 4 compares utility and running time of GBQ, HBQ and SA over different factors of α, which is a parameter defined in the keyword auction simulator. Note that when the factor of α equals to 1, it corresponds to default value of α in Configuration 0, whereas, factor of α equals to 0.5 and 1.5 are 0.5 times and 1.5 times of the default α respectively. Figure 5 compares utility and running time of all three algorithms over different factors of $\bar{r}$ for the direct mailing simulator. Similarly, factor of $\bar{r} = 1$ is the default setting. Figure 6 shows comparison among GBQ, HBQ and SA over different factors of β as defined in the broadcast marketing simulator, with factor of $\beta = 1$ the default value. Figure 7 displays comparison among GBQ, HBQ and SA over different options of R_{dml} for the direct mailing simulator. Figure 8 compares GBQ, HBQ and SA over different choices of R_{brc} for the broadcast marketing simulator.

Clearly, in all experimented cases, HBQ is the most efficient achieving competitive utilities significantly faster than GBQ, and both algorithms outperform the simulated annealing baseline.



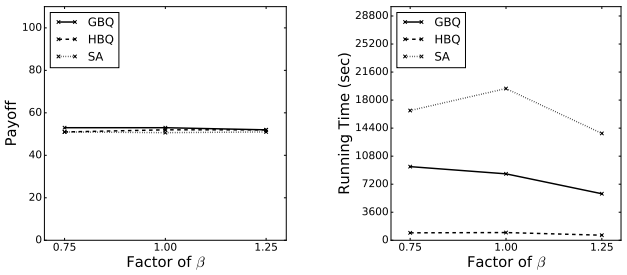
(a) (b)

Figure 4: Payoff (a) & run time (b) comparison among algorithms over different factors of α for online ads marketing.



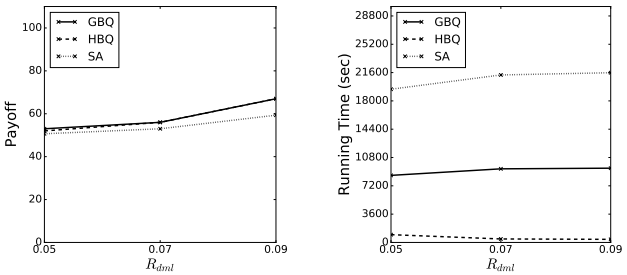
(a) (b)

Figure 5: Payoff (a) & run time (b) comparison among algorithms over different factors of $\bar{r}$ for direct mail marketing.



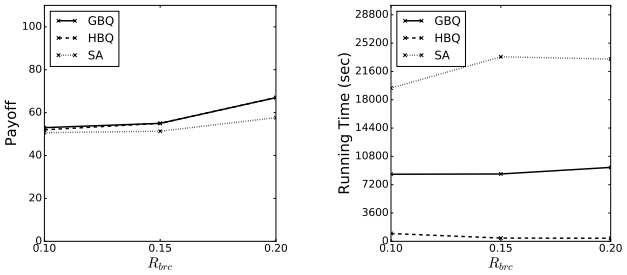
(a) (b)

Figure 6: Payoff (a) & run time (b) comparison among algorithms over different factors of β for broadcast marketing.



(a) (b)

Figure 7: Payoff (a) & run time (b) comparison among algorithms over different R_{dml} for direct mail marketing.



(a) (b)

Figure 8: Payoff (a) & run time (b) comparison among algorithms over different R_{brc} for broadcast marketing.