Readme for Reproducibility submission of paper "HypeR: Hypothetical Reasoning With What-If and How-To Queries Using a Probabilistic Causal Approach"

Sainyam Galhotra, Amir Gilad, Sudeepa Roy, and Babak Salimi

Instructions to run the code:

Reproduce all:

bash reproduce.sh

Figure 6

- Script : bash fig6.sh
- Time taken: 12 hrs
- Conclusion:

In this experiment, we evaluate the **effect of sample size** on quality and running time of Hyper-sampled

a. Fig 6a:
   i. Orange (Hyper) and green (Hyper-sampled) curves converge with higher sample size
   ii. Standard deviation reduces with increasing sample size
b. Fig 6b:
   i. Running time of Hyper is a constant
   ii. Hyper-sampled running time increases linearly with increasing sample size
c. **Note:** Exact values of running time may not match as it is dependent on the computer specifications.

Figure 8

- Script: bash fig8.sh
- Time taken:
- Conclusion:
  - Fig 8a
    - Credit history and Status have the maximum gap in minimum and maximum value
    - Investment has the least gap in maximum and minimum value
  - Fig 8b
    - Marital and Occupation have the maximum gap in minimum and maximum value
    - Class has the least gap in maximum and minimum value

Figure 9

- Script: bash fig9.sh
- Time taken:
- Conclusions:
    - Fig 9a:
        - Solution quality improves with increasing number of buckets
        - Opt-discrete and hyper-sampled have similar solution quality
    - Fig 9b
        - Hyper-sampled running time is almost constant
        - Opt-discrete running time increases exponentially with number of buckets

Figure 10

- Script: bash fig10.sh
- Time taken:
- Conclusions
    - Fig 10a
        - Ground truth, Hyper-sampled and Hyper-NB have similar values
        - Indep has the maximum noise
    - Fig 10b
        - Ground truth, Hyper-sampled and Hyper-NB have similar values
        - Indep has the maximum noise

Figure 11

- Script: bash fig11.sh
- Time taken:
- Conclusions
    - Fig 11a
        - Hyper running time increases linearly with dataset size
        - Hyper-sampled plateaus after 0.1
        - Indep increases linearly with dataset size
    - Fig 11b
        - All techniques increase linearly with dataset size
        - OptHowTo has the maximum slope (growth) followed by Hyper followed by Hyper-sampled

Figure 12

- Script: bash fig12.sh
- Time taken:
- Conclusions
    - Fig 12a
        - Indep running time is a constant
        - Hyper-sampled time increases linearly

- Fig 12b
  - Hyper-sampled running time is mostly constant
  - Opt-Howto increases exponentially