1. Summary. In this paper the authors propose a differentially privacy preserving algorithm for mining frequent itemset. This work differs from the other privacy preserving miners present in literature, indeed this algorithm mines the itemset by enforcing cardinality constraints on the transactions present in the dataset. In particular the authors study how the reduction the cardinality of the transactions lead to a lower level of noise injected in the data and introduces error in estimating the support of the items on the truncated data. The experimental results in the paper show that this algorithm is very effective, and it outperforms the state of the art in privacy preserving frequent itemsets for mining the top-$k$ itemset for large $k$ ($k > 10$).

2. Positive Points.

- The authors use formal tools to analyze the relationship between privacy and utility for the general differentially private miner algorithms using the concept of $(\delta, \eta)$-usefulness.
- The paper points out the hardness of mining frequent item with privacy constraints. Although this represents a negative result for the mining problem it reveals new challenges that we can investigate for developing new algorithmic techniques.

3. Negative Points.

- The authors proposed several heuristics to tackle the optimization problems that they introduce in the paper, so it could be interesting to see how the solutions from their algorithms are closed to the optimal ones.

4. Discussion.

- The authors use a truncation algorithm to reduce the length of the transactions in the input dataset. In my current research, I can think
to use a similar approach to reduce the dimensionality of the original dataset and then mine the frequent patterns. Unfortunately, their truncation technique can not directly be applied in mining sequential patterns since it may introduce additional occurrences in the truncated strings. This rises the challenge of developing a new transformation technique that reduces the length of the records while it does not introduce additional occurrences of patterns.