* Context-subspace pair
* Subspace- set of attributes
* Context- graph query pattern of which the entity is a match
* Search spaces of both patterns and subspaces are exponentially large
* Given an entity, discover exceptional fact about the entity
* Exceptional fact consists of three components: an entity of interest, a context, a set of qualifying attributes
* Applications: computational journalism, recommendation systems and data cleaning
* Fact-finding
* Fact-checking
* The objective of exceptional fact discovery is to find the top k-highest scored pairs of contexts, attribute set
* Attributes of an entity are the incoming/outgoing edge labels
* Attribute values are the entity’s direct neighbours
* Context is a set of entities sharing common characteristics defined in a pattern query
* Related areas: outlier detection and outlying aspect mining
* Outlying aspect mining focuses on only one object and returns the subspaces of attributes in which the object is relatively outlying, regardless of its true degree of outlyingness.
* This paper is closer to outlying aspect mining
* Maverick is beam search-based framework
* Outer loop is the traversal of search space of patterns and inner loop for subspace
* Due to memory and time constraints use beam search space instead of bfs, dfs or other heuristic search space
* Beam search is not complete
* Exceptionality score and heuristics
* Maverick exploit the upper bound properties of exceptionality scoring function to guide the traversal of set enumeration tree
* Explore the SE tree using heuristics methods like best first search and prune branch that do not contain highly scored subspaces based on upper bound of exceptionality score
* **Outlyingness:** Entity receives high score if it has rare attributes
* **Heuristic functions:** gives each pattern a score, based on which beam is formed with patterns of highest score for next iteration
* Improvements:
  + System finds exceptional facts with respect to one entity, but we can let system pick the entities
  + Designing algorithm which can share computation algorithms
  + System considers a static knowledge graph, adding incremental algorithms
  + A large scale user study

For the exceptional facts, we can propose following things.

* **Search Algorithms**: The paper implements beam search which is efficient for large search space in comparison to BFS, DFS for computing exceptional fact based on a heuristic function. We can propose new heuristic function. There are some limitations to beam search like it is not complete i.e. it does not guarantee to find a solution.
* **Entity discovery**: Current implementation focuses on finding facts with respect to one entity. We can let the system pick entities on its own.