

ClaimsWhat is claimed is:

1. A system, comprising:
 - one or more memory devices storing instructions;
 - one or more processors configured to execute the instructions to perform operations comprising:
 - receiving information associated with an out of stock item from a system storing information associated with items in a fulfillment center, the information collected over an extended period;
 - determining a cause of the out of stock condition by running a decision tree against the received information, the decision tree includes a plurality of conditions;
 - predicting an out of stock condition of the item based on the determined cause; and
 - contacting a supplier of the out of stock item to request more items based on the prediction.
2. The system of claim 1, wherein determining a cause of the out of stock condition by running a decision tree comprises:
 - measuring a purity for each condition;
 - choosing a condition with the highest purity that splits a decision tree into branches;
 - storing the chosen condition in a data structure;
 - repeating measuring a purity for each of remaining condition and choosing a condition with the highest purity to form a sub-divided branch based on the chosen condition until all conditions split the decision tree into branches; and
 - determining a cause of out of stock condition by finding a condition forming the longest path from a root of the decision tree.

3. The system of claim 2, wherein the operations further comprise limiting a number of conditions for measuring a purity.
4. The system of claim 2, wherein the purity provides a certainty about whether an item is out of stock or not after a condition splits a decision tree.
5. The system of claim 2, wherein the purity is symmetric.
6. The system of claim 1, wherein the extended period covers 7 days.
7. The system of claim 1, wherein the information associated with an out of stock item include at least one cause for the out of stock condition on a day.
8. The system of claim 1, wherein the plurality of conditions includes a low forecast for purchasing the out of stock item, an unexecuted purchase order, an unreceived purchase order by a supplier, a failure from a supplier to deliver an ordered amount of the out of stock item, a defect with the out of stock item, and a canceled purchase order.
9. The system of claim 1, wherein the operations further comprise contacting a supplier to check on status of purchase orders associated with the out of stock item.
10. A method for determining a cause of out of stock condition, comprising:
 - receiving information associated with an out of stock item from a system storing information associated with items in a fulfillment center, the information collected over an extended period;
 - determining a cause of the out of stock condition by running a decision tree against the received information, the decision tree includes a plurality of conditions;
 - predicting an out of stock condition of the item based on the determined cause; and
 - contacting a supplier of the out of stock item to request more items based on the prediction.

11. The method of claim 10, wherein determining a cause of the out of stock condition by running a decision tree comprises:
 - measuring a purity for each condition;
 - choosing a condition with the highest purity that splits a decision tree into branches;
 - repeating measuring a purity for each of remaining condition and choosing a condition with the highest purity to form a sub-divided branch based on the chosen condition until all conditions split the decision tree into branches; and
 - determining a cause of out of stock condition by finding a condition forming the longest path from a root of the decision tree.
12. The method of claim 11, wherein the operations further comprise limiting a number of conditions for measuring a purity.
13. The method of claim 11, wherein the purity provides a certainty about whether an item is out of stock or not after a condition splits a decision tree.
14. The method of claim 11, wherein the purity is symmetric.
15. The method of claim 10, wherein the extended period covers 7 days.
16. The method of claim 10, wherein the information associated with an out of stock item include at least one cause for the out of stock condition on a day.
17. The method of claim 10, wherein the plurality of conditions includes a low forecast for purchasing the out of stock item, an unexecuted purchase order, an unreceived purchase order by a supplier, a failure from a supplier to deliver an ordered amount of the out of stock item, a defect with the out of stock item, and a canceled purchase order.

18. The method of claim 10, wherein the operations further comprise contacting a supplier to check on status of purchase orders associated with the out of stock item.
19. A system, comprising:
one or more memory devices storing instructions;
one or more processors configured to execute the instructions to perform operations comprising:
receiving information associated with an out of stock item from a system storing information associated with items in a fulfillment center, the information collected over an extended period, and a limited number of conditions;
determining a cause of the out of stock condition by running a decision tree against the received information, the decision tree including the limited number of conditions;
predicting an out of stock condition of the item based on the determined cause; and
contacting a supplier of the out of stock item to request more items based on the prediction.
20. The system of claim 19, wherein determining a cause of the out of stock condition by running a decision tree comprises:
measuring a purity for each condition, the purity providing a certainty about whether an item is out of stock or not after a condition splits a decision tree;
choosing a condition with the highest purity that splits a decision tree into branches;
storing the chosen condition in a data structure;
repeating measuring a purity for each of remaining condition and choosing a condition with the highest purity to form a sub-divided branch based on the chosen condition until all conditions split the decision tree into branches; and

determining a cause of out of stock condition by finding a condition forming the longest path from a root of the decision tree.