Autonomous stock counting

Background

We spend considerable time every year counting stocks by the cycle count method and in some cases by full physical inventory stock counting.

In a cycle count, the business continuously counts small samples of its inventory while making sure that everything eventually gets counted over a determined period. Using sampling techniques, we can extrapolate what gets counted to generate increasingly accurate information about the entire inventory. When companies begin cycle counting, they may deliberately count the same items repeatedly to see whether different individuals get the same results. This can help identify and fix problems in counting methods, so everyone uses best practices and delivers accurate data. Cycle counting often occurs every day. For example, if a warehouse has 1,500 SKUs that need to be counted over the course of XX number of weeks, it can tally its entire inventory by counting the items associated with roughly X or Y SKUs per day.

In physical inventory counting process, we close the warehouse for a few days and count 100% of all the items present in it. This often involves larger teams and higher implementation of resources.

Some warehouses only do cycle counting while others might use a mix of cycle counting and yearly physical inventory sampling, based on local regulations.

The purpose of this problem statement is to find a way to automate the cycle counting.

The counting is currently done by humans using radio frequency devices and this consumes many hours per day in warehouses world-wide.

The challenge

We want to solve several problems.

1. Removal or significant reduction of hours in the warehouse consumed by “Cycle Counting”
2. Improvement of inventory accuracy with customized solutions to meet SPS (Schneider Production System) standards, whereas many warehouses today count below those standards.

The warehouse environment consists of containers on shelves.

The containers could be generically described as Pallets, Boxes or Pieces. The containers could be Full or Partial.

The shelves are divided into sections that we will call a bin, such sections may have a physical divider or there may simply be the notion of a divider by placing labels roughly in the center of the bin. Placed on the shelves are the containers, the containers could be at a depth and height in the bin between 1 and many.

- Warehouses are not always a perfect environment, since stocks are not always well stacked on shelves and we would need to choose minimum mandatory requirements for the warehouse structure, stacking and labelling etc. This could be strongly influenced by the vendor and solution proposed may have minimum operational standards.
- Most, if not all, warehouses have partial containers. This happens normally in an operation where a demand for stocks does not deplete the entire container.
- There may be humans in the warehouse, so we need to consider safety aspects. Also, some warehouses function 24x7 so we need to consider management plans for them.

What we are looking for?

The main goal of this challenge is to find a solution that can carry out stock counting in the warehouse. The solution will should also be able to integrate itself with the client's ERP systems.

The said solution must carry out all the following operations:

- To import a table from an external system. (This is the list and location of materials to count)
- To navigate within a warehouse and to be able to go directly to a warehouse bin location
- To be able to scan 2D 3D and RFID labels and tags to determine if it is at the correct bin and what material is in the bin
- To have the capability, preferable powered by LiDAR or similar technology, to determine the cubic measure of the material in the bin
- To have computing abilities and have a hard disk onboard to retrieve the part numbers, cubic to quantity ratio thereby extrapolating count in the bin
- To be able to "Abort" a count if there is an issue and the system experiences an error.
- After the count is completed, we need the solution to export the count table and add results to an external data base and archive the onboard data base for a time period before deleting.

What we are NOT looking for?

- Solutions that use weight based counting methodology
- Robot base solutions as the requirement is not restricted to operations on ground

Technology Specification

The solutions will be evaluated according to the following criteria.

- The solution should have a navigation system that allows them to freely operate indoors.
- Should be able to scan 2D 3D and RFID bar codes/tags.
- Should have computing abilities and be able to execute a script either until the end or to an abort exception and save data to a data base
- Should have the ability to measure cubic objects probably using LiDAR technology
- Can be based on 5G (preferably)
- Best Business Case: initial investment (CAPEX) + operational cost (OPEX))

Evaluation Criteria

The solutions will be evaluated according to the following criteria.

- Higher robustness of the solution and technical viability.
- The lower percentage of errors
- The higher degree of automation
- Best Business Case: initial investment (CAPEX) + operational cost (OPEX))

Deliverables

A PDF including the following:

Brief description of the proposed solution, including a short specification of the equipment, materials, functioning scheme…

- Images, videos, 3D models, screenshots…
- Feasibility evidence
- Estimated investment and operational costs. Include the investment in equipment, the number of workers, operating time (estimation), and/or cost for the service.

Please, send a structured description of your solution, avoid long texts, and include an index and lists. Also, you can support your solution with images and sketches or diagrams

For more details and to apply click here