SYSTEM FOR DETERMINING TRANSPORT ROUTES AND/OR POSITIONS OF GOODS AND TRIGGERING AUTOMATED OPERATIONS

FIELD OF INVENTION

The present invention relates to a system for determining the transport routes and/or the position of goods and a method for determining the transport routes and/or the position of goods, wherein based on the determined transport route and/or position of the goods an automated operation is triggered.

BACKGROUND

At present, independent systems are often used in logistics and production planning. Moreover, the corresponding payment and ordering systems are usually also independent of these systems. Particularly, in the case of cross-company processes, no reliable system exists that can manage logistics, planning, payment and ordering tasks within one system. A further critical point, especially in the case of cross-company exchange, is the question of how such data can be protected against manipulation.

In view of this, it is found that a need exists to provide a system, which can provide the opportunity to manage planning, logistics, ordering and finance incl. payment tasks within one system. In particular, there is a need to provide a more or less automated system that allows an automated cross-company exchange of goods, payments and other finance, insurance, factoring related transactions, and that meets the high security requirements.

SUMMARY

In an aspect, there is provided a system (100) for determining the transport routes and/or the position of goods, comprising:

at least one load carrier unit (10) for transporting and/or storing goods, wherein the at least one load carrier unit comprises data storage means configured to store at least identification data comprising at least information with respect to the type of goods and the amount of the goods transported by and/or stored on the load carrier unit;

at least one data collection point (20), wherein the at least one load carrier unit and the at least one data collection point comprise communication means configured to provide a data exchange between the at least one load carrier unit and the at least one data collection point and exchanging at least the identification data;

at least one route and/or position evaluation means (30) configured to determine the route and/or the position of the at least one load carrier unit based on the data exchange between the at least one data collection point and the at least one load carrier unit;

at least one triggering means (30) configured to trigger a predetermined operation on at least one computer unit (40) depending on the determined route and/or position of the at least one load carrier unit.

In another aspect, there is provided a method for determining the transport routes and/or the position of goods, comprising the steps:

providing a system (100) for determining the transport routes and/or the position of goods as defined above;

determining (S10) at least one route and/or position of at least one load carrier unit (10) by position evaluation means (30) based on a data exchange between at least one data collection point (20) and at least one load carrier unit (10);

triggering (S20) by at least one triggering means (30) a predetermined operation on at least one computer unit (40) depending on the determined route and/or position of the at least one load carrier unit (10).

In another aspect, there is provided a use of at least one load carrier unit (10) for transporting and/or storing goods, wherein the at least one load carrier unit (10) comprises data storage means configured to store at least identification data comprising at least information with respect to the type of goods and the amount of the goods transported by and/or stored on the load carrier unit (10) in a system (100) as defined above.

In another aspect, there is provided a use of at least one data collection point (20) configured to provide a data exchange between at least one load carrier unit (10) in a system as defined above.

In another aspect, there is provided a use of analysis data as input data for an analysis algorithm for estimating and/or predicting the stock quantities and/or transport times and/or required replenishment and/or for a simulation and/or optimization of a system (100) in a system (100) as defined above.

In another aspect, there is provided a computer program element which when executed by a processor is configured to carry out the method as defined above.

In the view of the above, it is an object of the present disclosure to provide a system, which can provide the opportunity to manage planning, logistics, ordering and finance incl. payment tasks within one system. Moreover, it is in particular the object of the present disclosure to provide a more or less automated system that allows a cross-company exchange of goods and payments and other finance related transactions that also meets the high security requirements.

These and other objects, which become apparent upon reading the following description are solved by the subject-matter of the independent claims. The dependent claims refer to preferred examples of the disclosure.

According to a first example, a system for determining the transport routes and/or the position of goods is provided, comprising: at least one load carrier unit for transporting and/or storing goods, wherein the at least one load carrier unit comprises data storage means configured to store at least identification data comprising at least information with respect to the type of goods and the amount of the goods transported by and/or stored on the load carrier unit; at least one data collection point, wherein the at least one load carrier unit and the at least one data collection point comprise communication means configured to provide a data exchange between the at least one load carrier unit and the at least one data collection point and exchanging at least the identification data; at least one route and/or position evaluation means configured to determine the route and/or the position of the at least one load carrier unit based on the data exchange between the at least one dpata collection point and the at least one load

It is in particular preferred that these data are generated/added using Distributed Ledger Technology (DLT) or shared ledger technology. A distributed ledger is a consensus of replicated, shared, and synchronized digital data geographically spread across multiple sites, countries, or institutions. There is no central administrator or centralized data storage. In this respect, it is preferred that the manufacturers, the suppliers, customers, and all other participants provide/form a peer-to-peer network using a common consensus algorithm. The distributed ledger is spread across the nodes/devices on the peer-to-peer network, where each replicates and saves an identical copy of the ledger and updates itself independently. When a ledger update happens, each node constructs the new transaction, and then the nodes vote by consensus algorithm on which copy is correct. Once a consensus has been determined, all the other nodes update themselves with the new, correct copy of the ledger.
As a result, it is in particular preferred to combine the Internet of Things (IoT) technology for triggering respective operations based on the position and/or route of the goods and distributed ledger technology for providing a most secure communication channel. Thereby, also cross-company transactions can be performed in a very secure and reliable manner and all those involved can check whether the data are authentic or whether the ledger has been manipulated. Therefore, it is now also possible to automate the payment and other finance related transactions corresponding to purchases and sales. By using the Distributed Ledger Technology (DLT), it is possible to eliminate the possibility that the ledger is unrecognized manipulated and all transactions can be reliably traced, if necessary, even retrospectively. In this respect, amongst others Direct Debit procedures, like SEPA or e-Money-based Cash-on-Ledger solutions, can be used between business partners to trigger automatic payments and automatic clearings.
In a further implementation, the system further comprises data collection means configured to collect analysis data with respect to the identification data of the at least one load carrier unit, the determined route and/or positions of the at least one load carrier unit and/or the triggered predetermined operations.
According to a second example, a method for detecting the transport routes and/or the position of goods, its consumption, replacement and replenishment, comprising the steps: providing a system for detecting the transport routes and/or the position of goods as described above; determining at least one route and/or position of at least one load carrier unit by position evaluation means based on a data exchange between at least one data collection point and at least one load carrier unit; triggering by at least one triggering means a predetermined operation on at least one computer unit depending on the determined route and/or position of the at least one load carrier unit. With respect to the possible implementation and the provided advantages, it is referred to the above explanations which apply also with respect to this method.
A further example refers to a use of at least one load carrier unit for transporting and/or storing goods, wherein the at least one load carrier unit comprises data storage means configured to store at least identification data comprising at least information with respect to the type of goods and the amount of the goods transported by and/or stored on the load carrier unit in a system or method explained above. Further examples refer to a use of at least one data collection point configured to provide a data exchange between at least one load carrier unit in a

system/method explained above, a use of analysis data as input data for an analysis algorithm for estimating and/or predicting the stock quantities and/or product consumption and/or transport times and/or required replenishment in a system/method explained above, and to a use of analysis data as input data for a simulation and/or optimization of a system/method explained above, e.g. financial optimization, cash flow optimization, payment optimization and/or factoring optimization.

The analysis algorithm for estimating and/or predicting the stock quantities and/or transport times and/or required replenishment in a system/method explained above can be performed by a central computing device or a cloud computing solution. In this respect, it is preferred that analysis algorithm is based on the results of a machine-learning algorithm. The machine-learning algorithm preferably comprises decision trees, naive Bayes classifications, nearest neighbors, neural networks, convolutional neural networks, generative adversarial networks, support vector machines, linear regression, logistic regression, random forest and/or gradient boosting algorithms. Preferably, the machine-learning algorithm is organized to process an input having a high dimensionality into an output of a much lower dimensionality. Such a machine-learning algorithm is termed “intelligent” because it is capable of being “trained”. The algorithm may be trained using records of training data. A record of training data comprises training input data and corresponding training output data. The training output data of a record of training data is the result that is expected to be produced by the machine-learning algorithm when being given the training input data of the same record of training data as input. The deviation between this expected result and the actual result produced by the algorithm is observed and rated by means of a “loss function”. This loss function is used as a feedback for adjusting the parameters of the internal processing chain of the machine-learning algorithm. For example, the parameters may be adjusted with the optimization goal of minimizing the values of the loss function that result when all training input data is fed into the machine-learning algorithm and the outcome is compared with the corresponding training output data. The result of this training is that given a relatively small number of records of training data as “ground truth”, the machine-learning algorithm is enabled to perform its job well for a number of records of input data that higher by many orders of magnitude.

The present disclosure also relates to a computer program or computer program element configured to execute the above explained method, on an appropriate apparatus or system. The computer program element might therefore be stored on a computer unit, which might also be part of an example. This computing unit may be configured to perform or induce performing of the steps of the method described above. Moreover, it may be configured to operate the components of the above described apparatus and/or system. The computing unit can be configured to operate automatically and/or to execute the orders of a user. A computer program may be loaded into a working memory of a data processor. The data processor may thus be equipped to carry out the method according to one of the preceding examples.

This exemplary example of the present disclosure covers both, a computer program that right from the beginning uses the present disclosure and computer program that by means of an update turns an existing program into a program that uses the present disclosure.

Further on, the computer program element might be able to provide all necessary steps to fulfill the procedure of an exemplary example of the method as described above.
According to a further exemplary example of the present disclosure, a computer readable medium, such as a CD-ROM, USB stick or the like, is presented wherein the computer readable medium has a computer program element stored on it, which computer program element is described by the preceding section. A computer program may be stored and/or distributed on a suitable medium, such as an optical storage medium or a solid state medium supplied together with or as part of other hardware, but may also be distributed in other forms, such as via the internet or other wired or wireless (tele-) communication systems.
However, the computer program may also be presented over a network like the World Wide Web and can be downloaded into the working memory of a data processor from such a network. The use of cloud computing solutions is also possible. According to a further exemplary example of the present disclosure, a medium for making a computer program element available for downloading is provided, which computer program element is arranged to perform a method according to one of the previously described examples of the disclosure.
As result, the present disclosure provides a system/method with which financial and statistical processes can be supported/authenticated; flow of goods can be monitored and can be controlled; inventory can be kept at an optimal level across the related companies and a "delivery on demand" can be provided; "just in time" deliveries are possible; ordering, booking, delivery, invoicing, insuring, release, banking, financing, tokenization, payments and clearings - also via e-money-, and generating and sharing of tax, customs and statistical data as components of business management processes can be carried out quickly, traceably, automatically, optimized and authenticated; wherein all these processes/operations can be triggered by the physical transport of a load carrier unit, e.g. a sensor-controlled pallet or other units as described above that can be uniquely identified.
Based on generated data from processes already carried out, the system can compare, analyze and predict the model used, e.g. required storage quantities, transport times, optimize order processing, simulate/model optimized processes to increase efficiency.
The present disclosure also relates to a system for determining the transport routes and/or the position of goods, comprising: at least one load carrier unit for transporting and/or storing goods, wherein the at least one load carrier unit comprises data storage means configured to store at least identification data comprising at least information with respect to the type of goods and the amount of the goods transported by and/or stored on the load carrier unit; at least one data collection point, wherein the at least one data collection point comprises communication means and/or scanning means configured to obtain at least the identification data; at least one route and/or position evaluation means configured to determine the route and/or the position of the at least one load carrier unit based on the data exchange between the at least one data collection point and the at least one load carrier unit; at least one triggering means configured to trigger a predetermined operation on at least one computer unit depending on the determined route and/or position of the at least one load carrier unit. In this example, the identification data can be provided, for example, by a label, such as a so-called Global Transport Label, which is scanned