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(54) Title: METHOD AND TRAFFIC MANAGEMENT SYSTEM FOR OPERATING MULTIPLE MOTOR VEHICLES

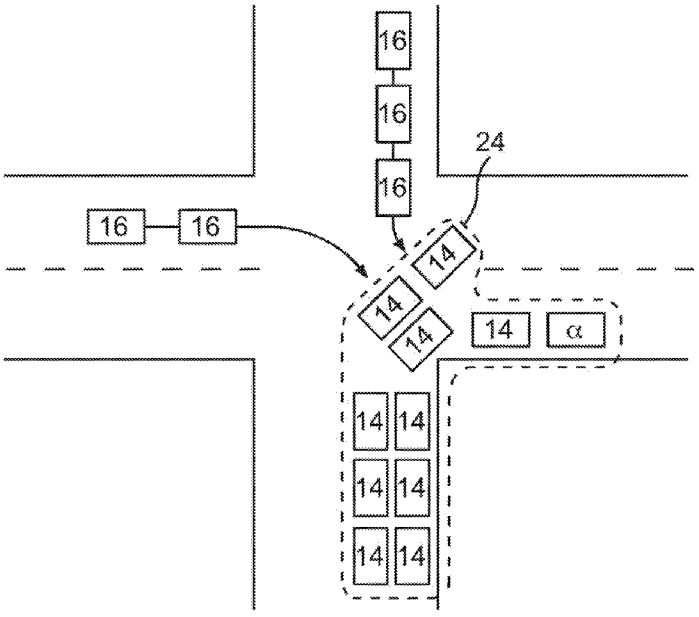

Fig. 6

(57) Abstract: The invention relates to a method for operating multiple motor vehicles including the steps of: a) presetting a starting area (12); b) determining those motor vehicles (14), which are disposed in the preset starting area (12) and have at least one common intermediate destination (18) along their respective navigation routes (20); c) associating at least a part of the determined motor vehicles (14) with a vehicle cluster (24); d) determining, which of the motor vehicles (14) associated with the vehicle cluster (24) is least distant from the intermediate destination (18), and setting this motor vehicle (14) as a guiding vehicle (α); e) controlling the vehicle cluster such that the guiding vehicle (α) is, in particular autonomously, navigated to the intermediate destination (18), and the remaining motor vehicles (14) of the vehicle cluster (24), in particular autonomously, follow the guiding vehicle (α), wherein the vehicle cluster (24) is separated if a predetermined disturbance of the vehicle cluster (24) has been detected. Furthermore, the invention relates to a traffic management system (10) for operating multiple motor vehicles (14).

Method and traffic management system for operating multiple motor vehicles

Field of the Invention

The invention relates to a method and a traffic management system for operating multiple motor vehicles.

Background Art

From the prior art, it is already known to combine motor vehicles to vehicle clusters to collectively navigate these motor vehicles to a destination. Therein, particular in large cities, the problem can occur that the cohesion of such vehicle clusters during the navigation of the motor vehicles cannot be ensured with increased traffic volume.

KR 10261195 A discloses a method for controlling a vehicle group formation. This group formation corresponds to the car cluster according to the invention. Different vehicles exchange information about their respective destination. Based on this information, those vehicles having the same destination are combined to a group. The vehicles belonging to the same group are arranged in a line and accelerated or decelerated in the same way.

JP 2006300655 A shows a group navigation method. An individual route searched by a navigation device of a vehicle is compared with a master route, which describes a route for a group navigation for a group of cars. Differences between the individual route and the master route can be displayed.

JP 2009-250637 A shows a method for controlling the travel of a group of

vehicles and prevents the group of vehicles from being separated from each other. Therefore a communication device acquires information about separation points, such as positional information, temporary stops, traffic lights, crossings, information on the changing timing of traffic lights and crossings, traffic information at junctions and intersections. A travel route for the group of vehicles is set on the basis of this information.

According to JP 2010-271189 A A route information providing device is configured to provide route information to a plurality of vehicles which belong to a vehicle group travelling to the same destination point. A detection unit detects positions of the vehicles in the vehicle group, respectively. A sensing unit senses a state of the vehicles continuing to stop for a prescribed period or more. A searching unit searches routes for respectively guiding the vehicles in the vehicle group to prescribed points when such a state is sensed that at least one vehicle in the vehicle group continues to stop for the prescribed period or more. A transmitting unit transmits information of the searched routes to the vehicles in the vehicle group, respectively.

DE 10 2012 212 339 A1 shows a method for grouping several cars to one group of cars travelling along the same route. The different cars can communicate with each other by car2x-communication for identifying cars with similar routes. The focus of the grouping is on energy efficiency.

US 2006 0161341 A1 shows a navigation method for a group of cars. A group of two or more vehicles, each vehicle comprising a communication unit coupled with a navigation unit, wherein one vehicle of the group is classified as master vehicle leading the group and the remaining vehicles

of the group are classified as slave vehicles following the master vehicle, travel together. A central remote navigation server provides the vehicles with a navigation service, wherein the navigation server calculates for each of the slave vehicles route instructions such that the slave vehicles are instructed to follow the master vehicle. The route instructions are transmitted to the slave vehicles via a communication network.

Summary of the Invention

Technical problem to be solved

It is the object of the present invention to provide a method and a traffic management system for operating multiple motor vehicles, by means of which it can be reacted to traffic-related disturbances of a vehicle cluster in improved manner.

This object is solved by a method for operating multiple motor vehicles as well as by a traffic management system having the features of the independent claims. Advantageous configurations with convenient and non-trivial developments of the invention are specified in the dependent claims.

Technical solution

In the method according to the invention for operating multiple motor vehicles, the following steps are performed:

a) presetting a starting area;

b) determining those motor vehicles, which are disposed in the preset starting area and have at least one common intermediate destination along their respective navigation routes;

c) associating at least a part of the determined motor vehicles with a

vehicle cluster;

d) determining, which of the motor vehicles associated with the vehicle cluster is least distant from the intermediate destination, and setting this motor vehicle as a guiding vehicle;

e) controlling the vehicle cluster such that the guiding vehicle is, in particular autonomously, navigated to the intermediate destination and the remaining motor vehicles of the vehicle cluster, in particular autonomously, follow the guiding vehicle, wherein the vehicle cluster is separated if a predetermined disturbance of the vehicle cluster has been detected.

The method in particular finds application in large cities, wherein the starting area is preferably preset between two busy traffic junctions such as for example intersections. The determination of those motor vehicles, which are disposed in the preset starting area and have at least one common intermediate destination along their respective navigation routes, can for example be effected by a so-called Car2Car communication or by means of a traffic management system, which obtains corresponding navigation information from the individual motor vehicles.

Therein, the association of at least a part of the determined motor vehicles, which have at least one common intermediate destination, can be effected according to very different criteria. For example, it can be preset that the vehicle cluster is to have not more than two to twenty motor vehicles according to how the traffic situation up to the intermediate destination constitutes. The control of the vehicle cluster, thus of all of the motor vehicles associated with the vehicle cluster, is preferably effected such that the motor vehicles are either fully autonomously navigated up to the intermediate destination or at least corresponding navigation indications

are displayed in the motor vehicles such that respective drivers of the motor vehicles can keep the junction to the vehicle cluster associated with them as possible.

During the control of the vehicle cluster, therein, communication between the individual motor vehicles and/or by a corresponding traffic management system can be ensured such that information about the driving behavior of the individual motor vehicles within the vehicle cluster can be provided at all times, wherein the individual motor vehicles are controlled as possible depending on that such that the vehicle cluster is not separated during the navigation to the intermediate destination.

If a predetermined disturbance of the vehicle cluster along the navigation up to the intermediate destination is detected, the vehicle cluster is separated. Therein, it can either be provided that the vehicle cluster is for example separated into multiple vehicle clusters, wherein the vehicle clusters then in turn are controlled such that the individual vehicle clusters are navigated up to the intermediate destination. Alternatively, it is also possible that individual motor vehicles are excluded from the vehicle cluster if this should be required to be able to navigate the remaining vehicle cluster to the intermediate destination as fast as possible. A disturbance of the vehicle cluster can for example again be detected by a Car2Car communication between the individual motor vehicles of the vehicle cluster or by means of the traffic management system.

By the method according to the invention, it can be ensured that motor vehicles combined to a vehicle cluster can be navigated to a common intermediate destination in particularly efficient manner. If disturbances

should occur during the navigation to the intermediate destination, which should prevent a particularly fast navigation of all of the motor vehicles of the vehicle cluster to the intermediate destination, it is provided according to the invention to separate the vehicle cluster such that at least some of the motor vehicles can still be particularly fast navigated to the intermediate destination.

In advantageous development of the invention, it is provided that in method step c) those motor vehicles are associated with the vehicle cluster, which satisfy a preset criterion. The preset criterion can for example be that approximately equally powerful vehicles are selected and associated with the vehicle cluster. Alternatively or additionally, it can also be provided that similar vehicle types such as for example trucks, conventional passenger cars, motorcycles and the like are selected and associated with the vehicle cluster. Thereby, it can be ensured that the motor vehicles associated with the vehicle cluster can be navigated up to the intermediate destination with identical speed and/or acceleration as possible, such that the vehicle cluster is not unnecessarily impeded for example by power or size differences between the motor vehicles.

A further advantageous embodiment of the invention provides that in method step c) a maximum number of vehicles is preset depending on a traffic situation, which are associated with the vehicle cluster. The traffic situation can for example be detected and evaluated along a route up to the intermediate destination, in the starting area or the like. With particularly high traffic density, it can for example be advantageous to combine a lower number of motor vehicles. By presetting the maximum number of vehicles depending on the traffic situation, which are associated with the vehicle cluster, for example, particularly agile vehicle

clusters can be formed, which can be navigated up to the intermediate destination without separation of the vehicle cluster in particularly simple manner.

According to a further advantageous embodiment of the invention, it is provided that during method step e) the vehicle cluster is controlled such that overtaking maneuvers within the vehicle cluster are inhibited at least along a partial section up to the intermediate destination. Thereby, unnecessary disturbances within the vehicle cluster can be inhibited. If the motor vehicles are fully autonomously navigated or controlled up to the intermediate destination, the inhibition of the overtaking maneuvers can be particularly simply effected. With manual control of the motor vehicles, it can for example be provided that corresponding warning indications are displayed within the motor vehicles, which advert the respective drivers not to perform an overtaking maneuver within the vehicle cluster.

In further advantageous development of the invention, it is provided that during method step e) the vehicle cluster is controlled depending on a detected traffic situation such that the motor vehicles travel in a formation adapted to the detected traffic situation. The respective formations can for example be preset according to different criteria. For example, it can be provided that all of the motor vehicles travel one behind the other as strung in a bead chain one behind the other, thus in single-row manner. Alternatively, it can for example also be provided that the vehicles travel in two-row manner next to each other and strung one behind the other. Moreover, it can be provided that certain preset gaps are preset between the individual motor vehicles within their formation. According to traffic situation, the formation of the vehicle cluster is selected such that the

entire vehicle cluster can be passed though the traffic in particularly undisturbed manner until the vehicle cluster has been navigated up to the intermediate destination.

A further advantageous embodiment of the invention provides that during method step e) the vehicle cluster is controlled such that respective distances between the motor vehicles are minimized to a predetermined distance at least along a partial section up to the intermediate destination, in particular if the motor vehicles are in a traffic jam. Thereby, it can in particular be prevented that the vehicle cluster occupies too much space on a lane, which would impair further traffic participants in their advancement in particular in case of a traffic jam or in stagnant traffic.

A further advantageous embodiment of the invention provides that during method step e) the vehicle cluster is controlled such that one of the motor vehicles blocks other traffic participants at least at a road branch such that in turning of the remaining motor vehicles into the road branch, influence on these motor vehicles by the blocked traffic participants is prevented. Thereby, it can be ensured that the vehicle cluster can remain together even in turning into a road branch without individual motor vehicles of the vehicle cluster being separated from the vehicle cluster by impediment by other traffic participants.

In further advantageous development of the invention, it is provided that as soon as it is detected during method step e) that at least one further traffic participant is to be added to the vehicle cluster, the vehicle cluster is controlled such that a gap for receiving the further traffic participants is established between one of the present motor vehicles of the vehicle cluster. For example, it is conceivable that by corresponding Car2Car

communication or by a traffic management system, the vehicle cluster is informed that a further motor vehicle with the same intermediate destination desires to join to the vehicle cluster. In that a gap for receiving the further traffic participant is established between the present motor vehicles of the vehicle cluster, the following and joining motor vehicle can be integrated in the existing vehicle cluster in simple manner.

A further advantageous embodiment of the invention provides that as soon as it is detected during method step e) that at least one vehicle of the vehicle cluster deviates from a preset way of driving by a preset tolerance amount, this vehicle is excluded from the vehicle cluster. The preset way of driving can for example include a predetermined distance to the preceding vehicle of the vehicle cluster or a predetermined direction of travel or the like. Therein, the tolerance amount is preferably preset depending on the speed of the guiding vehicle or for example depending on an average speed of the vehicle cluster. In that individual motor vehicles of the vehicle cluster are excluded from the vehicle cluster with a deviation from the preset way of driving, it can be ensured that the vehicle cluster having the remaining motor vehicles can reach the intermediate destination in particular undisturbed and fast manner.

In further advantageous development of the invention, it is provided that as soon as it is detected during method step e) that the guiding vehicle deviates from a preset way of driving by a preset tolerance amount, the guiding vehicle is excluded from the vehicle cluster, wherein one of the remaining motor vehicles of the vehicle cluster is set as the new guiding vehicle and the vehicle cluster is controlled such that the new guiding vehicle is navigated to the intermediate destination and the remaining motor vehicles of the vehicle cluster follow the new guiding vehicle.

Thereby, it can be ensured that even if the motor vehicle previously set as the guiding vehicle deviates from a preset way of driving, for example with respect to a preset speed or a direction of travel, the vehicle cluster can still particularly reliably and fast reach the intermediate destination. Preferably, that motor vehicle still remaining in the vehicle cluster is set as the new guiding vehicle, which is in the frontmost position viewed in direction of travel after the original guiding vehicle.

According to a further advantageous embodiment of the invention, it is provided that as soon as it is detected during method step e) that a distance between two vehicles of the vehicle cluster traveling one behind the other is exceeded by a preset tolerance amount, for example due to traffic light control or another disturbance of the vehicle cluster during the navigation to the intermediate destination, the vehicle cluster is divided into a first vehicle cluster including the guiding vehicle and a second vehicle cluster, wherein a second guiding vehicle is set for the second vehicle cluster and the second vehicle cluster is controlled such that the second guiding vehicle is navigated to the intermediate destination and the remaining motor vehicles of the second vehicle cluster follow the second guiding vehicle. By the adequate division of the vehicle cluster into two smaller vehicle clusters, it can be ensured that even with a disturbance of the original vehicle cluster, all of the vehicles of the vehicle cluster can still reach their intermediate destination in particularly undisturbed and fast manner by the division into two vehicle clusters.

The traffic management system according to the invention is adapted to operate multiple motor vehicles according to the method according to the invention or according to an advantageous embodiment of the method according to the invention. Therein, advantageous configurations of the

method according to the invention are to be regarded as advantageous configurations of the traffic management system, wherein the traffic management system in particular has means for performing the method steps.

Further advantages, features and details of the invention are apparent from the following description of preferred embodiments as well as based on the drawing. The features and feature combinations mentioned above in the description as well as the features and feature combinations mentioned below in the description of figures and/or shown in the figures alone are usable not only in the respectively specified combination, but also in other combinations or alone without departing from the scope of the invention.

Below, embodiments of the invention are explained in more detail based on schematic drawings.

Brief Description of the Drawings

There show:

Fig. 1 a schematic illustration of a traffic management system and multiple motor vehicles, wherein some of the motor vehicles are combined to a vehicle cluster and are navigated to a common intermediate destination;

Fig. 2 a schematic illustration of a possible formation of the vehicle cluster, wherein the individual motor vehicles travel one behind the other in single-row manner;

Fig. 3 a schematic illustration of a further possible formation of the vehicle cluster, wherein the motor vehicles travel one behind the

other in two-row manner;

Fig. 4 a schematic illustration of a further possible formation of the vehicle cluster, wherein the motor vehicles travel one behind the other in X-shaped manner;

Fig. 5 a schematic illustration of a further possible formation of the motor vehicles within the vehicle cluster, wherein the motor vehicles travel one behind the other in two-row manner and laterally offset to each other;

Fig. 6 a schematic illustration of an intersection, wherein the vehicles of the vehicle cluster turn right and two of the motor vehicles of the vehicle cluster position themselves within the intersection such that they block further motor vehicles not associated with the vehicle cluster such that the remaining motor vehicles of the vehicle cluster can also turn right without problem; and

Fig. 7 a schematic illustration of a junction of a road with a road, on which the vehicle cluster travels, wherein three of the motor vehicles of the vehicle cluster are positioned at the junction such that they block the junction.

Detailed Description of Embodiments

In the figures, identical or functionally identical elements are provided with identical reference characters.

By means of a traffic management system 10, a starting area 12 is preset. The starting area 12 is preferably between two busy traffic junctions here not illustrated in more detail, such as for example intersections, roundabouts or the like within a busy city area. By the traffic

management system 10, it is determined, which of the motor vehicles 14, 16 disposed in the city area 12 have at least one common intermediate destination along their respective navigation routes 20 to their respectively individual navigation destinations 22. Therein, it can be provided that the individual motor vehicles 14, 16 can communicate with each other via corresponding communication links, wherein it can also be provided that all of the motor vehicles 14, 16 can communicate their individual navigation destinations 22 via corresponding communication links to the traffic management system 10.

At least a part of the determined motor vehicles 14, which have a common intermediate destination 18, are combined to a vehicle cluster 24. By means of the traffic management system 10 or alternatively by a communication between the individual motor vehicles 14, it is determined, which of the motor vehicles 14 associated with the vehicle cluster 24 is least distant from the intermediate destination 18, wherein this motor vehicle 14 is set as the guiding vehicle α by the traffic management system 10. Subsequently, the vehicle cluster 24 is controlled by means of the traffic management system 10 such that the guiding vehicle α is navigated to the intermediate destination 18 and the remaining motor vehicles 14 of the vehicle cluster 24 follow the guiding vehicle α, wherein the vehicle cluster 24 is separated if a predetermined disturbance of the vehicle cluster 24 is detected during the navigation. Preferably, the motor vehicles 14 associated with the vehicle cluster 24 and thus also the guiding vehicle α are controlled by means of the traffic management system 10 such that the motor vehicles 14 and the guiding vehicle α are fully autonomously navigated up to the intermediate destination 18. Alternatively, it is also possible that the drivers of the

motor vehicles of the vehicle cluster 24 can also manually control their motor vehicles 14, α, wherein corresponding navigation indications are displayed.

Preferably, those motor vehicles 14 are associated with the vehicle cluster 24, which approximately have the same engine power, or if the motor vehicles 14 each are to be associated with similar vehicle types such as for example trucks, conventional passenger cars, motorcycles or the like. Thereby, a particularly homogeneous vehicle cluster 24 is provided, which can be navigated up to the intermediate destination 18 in particularly simple and reliable manner without required separation of the vehicle cluster 24.

Moreover, a maximum number of vehicles is preset by the traffic management system 10 depending on a traffic situation in the city area 12 and/or along a route up to the intermediate destination 18, which are associated with the vehicle cluster 24. Moreover, the vehicle cluster 24 is controlled by means of the traffic management system 10 such that overtaking maneuvers within the vehicle cluster 24 are preferably inhibited up to the intermediate destination.

Therein, the vehicle cluster 24 is controlled depending on a detected traffic situation such that the motor vehicles α, 14 travel in a formation adapted to the detected traffic situation. In the figures 2 to 5, different possible formations of the vehicle cluster 24 are schematically illustrated. For example, it is possible that the vehicle cluster 24 is controlled such that the motor vehicles α, 14 travel one behind the other in a single-row line. Alternatively, it is also possible that the vehicle cluster 24 is controlled by means of the traffic management system 10 such that the

motor vehicles α, 14 travel in a two-row arrangement. Moreover, it is also possible that the vehicle cluster 24 is controlled by means of the traffic management system 10 such that the motor vehicles α, 14 travel in a type of X formation. Further, it is also possible that the vehicle cluster 24 is controlled by means of the traffic management system 10 such that the motor vehicles α, 14 again travel in two-row manner, wherein the individual motor vehicles of the respective rows are disposed offset to each other, thus, the vehicle cluster 24 travels in a type of Y formation. Therein, the respective formation of the vehicle cluster 24 can be varied adapted to the present traffic situation along the navigation up to the intermediate destination 18 such that the vehicle cluster 24 can be navigated up to the intermediate destination 18 without separation thereof.

Moreover, it can be provided that the vehicle cluster 24 is controlled such that at least along a partial section up to the intermediate destination 18, respective distances between the motor vehicles α, 14 are minimized to a preset distance if the motor vehicles α, 14 should be in a traffic jam or in a stagnant traffic situation. Preferably, the distances between the motor vehicles α, 14 of the vehicle cluster 24 are reduced to a minimum, for example to few centimeters, half a meter or the like. Thereby, it can be ensured that in particular in a jam situation or in a traffic situation with stagnant traffic, the vehicle cluster 24 occupies a particularly small traffic area and thus impedes further motor vehicles as little as possible.

Moreover, it can be provided that as soon as it is detected during the navigation of the vehicle cluster 24 to the intermediate destination 18, that at least one further traffic participant is to be added to the vehicle cluster 24, the vehicle cluster 24 is controlled such that a gap for

receiving the further traffic participant is established between one of the present motor vehicles α, 14 of the vehicle cluster 24. A joining motor vehicle, which has the same intermediate destination 18 as the other motor vehicles α, 14 of the vehicle cluster 24, can therefore join to the vehicle cluster 24 in simple manner and move into the provided gap.

As soon as it is detected that one of the motor vehicles 14 of the vehicle cluster 24 deviates from a preset way of driving, for example a distance to the preceding motor vehicle α, 14, with respect to a direction of travel or the like, by a preset tolerance amount depending on speed, this motor vehicle 14 is excluded from the vehicle cluster 24 so as not to impede the advancement of the remaining motor vehicles α, 14 of the vehicle cluster 24.

This can also be effected if it is detected that the guiding vehicle α deviates from a preset way of driving by a preset tolerance amount. The guiding vehicle α is then also excluded from the vehicle cluster 24. One of the remaining motor vehicles 14 of the vehicle cluster 24 is set as the new guiding vehicle α' by means of the traffic management system 10 and the vehicle cluster 24 is controlled such that the new guiding vehicle α' is navigated to the intermediate destination and the remaining motor vehicles 14 of the vehicle cluster 24 follow the new guiding vehicle α'.

As soon as it is determined that a distance between two motor vehicles 24 of the vehicle cluster 24 traveling one behind the other is exceeded by a preset tolerance amount, for example due to an unfavorable traffic light control or the like, the vehicle cluster 24 is divided into a first vehicle cluster 24' including the guiding vehicle α and a second vehicle cluster 24", wherein a second guiding vehicle α" is set for the second vehicle

cluster 24" and the second vehicle cluster 24" is controlled such that the second guiding vehicle α" is navigated to the intermediate destination and the remaining motor vehicles 14 of the second vehicle cluster 24" follow the second guiding vehicle α".

In Fig. 6, a road intersection not denoted in more detail is schematically illustrated. As is apparent, the entire vehicle cluster 24 is about to turn right within the intersection. In order to allow undisturbed turning right of the entire vehicle cluster 24, it is provided that the vehicle cluster 24 is controlled by means of the traffic management system 10 such that at least some of the motor vehicles 14 of the vehicle cluster 24 position themselves within the intersection such that they inhibit turning of further motor vehicles 16 to the same direction as the vehicle cluster 24. In other words, some of the motor vehicles 14 of the vehicle cluster 24 are controlled such that they position themselves within the intersection such that they block further motor vehicles 16 as long as the entire vehicle cluster 24 can perform the turning operation in undisturbed manner and without separation of the vehicle cluster.

In Fig. 7, in a schematic illustration, a road junction with a road traveled by the vehicle cluster 24 is schematically illustrated. The vehicle cluster 24 is controlled by means of the traffic management system 10 such that some of the motor vehicles 14, three of the motor vehicles 14 according to the present illustration, position themselves at a junction such that further motor vehicles 16 cannot turn into the same road, on which the vehicle cluster 24 is advanced. Therein, the motor vehicles 14 blocking the junction remain in their blocking position until the remaining motor vehicles α, 14 of the vehicle cluster 24 have passed the junction. As soon as this has occurred, the further motor vehicles 14, which previously have

blocked the junction, again join to the vehicle cluster 24. Thereafter, the further motor vehicles 16 can pass the junction without problem and travel the same road as the vehicle cluster 24.

What is claimed is:

1. Method for operating multiple motor vehicles (14), including the steps of:
   a) presetting a starting area (12);
   b) determining those motor vehicles (14), which are disposed in the preset starting area (12) and have at least one common intermediate destination (18) along their respective navigation routes (20);
   c) associating at least a part of the determined motor vehicles (14) with a vehicle cluster (24);
   d) determining, which of the motor vehicles (14) associated with the vehicle cluster (24) is least distant from the intermediate destination (18), and setting this motor vehicle (14) as a guiding vehicle (α);
   e) controlling the vehicle cluster such that the guiding vehicle (α) is, in particular autonomously, navigated to the intermediate destination (18), and the remaining motor vehicles (14) of the vehicle cluster (24), in particular autonomously, follow the guiding vehicle (α), wherein the vehicle cluster (24) is separated if a predetermined disturbance of the vehicle cluster (24) has been detected.
2. Method according to claim 1,
   characterized in that
   in method step c), those motor vehicles (14) are associated with the vehicle cluster (24), which satisfy a preset criterion.
3. Method according to claim 1 or 2,
   characterized in that

in method step c), a maximum number of motor vehicles (14) is preset depending on a traffic situation, which are associated with the vehicle cluster (24).

4. Method according to any one of the preceding claims, characterized in that during method step e), the vehicle cluster (24) is controlled such that overtaking maneuvers within the vehicle cluster (24) are inhibited at least along a partial section up to the intermediate destination (18).
5. Method according to any one of the preceding claims, characterized in that during method step e), the vehicle cluster (24) is controlled depending on a detected traffic situation such that the motor vehicles (14) travel in a formation adapted to the detected traffic situation.
6. Method according to any one of the preceding claims, characterized in that during method step e), the vehicle cluster (24) is controlled such that respective distances between the motor vehicles (14) are minimized to a preset distance at least along a partial section up to the intermediate destination, in particular if the motor vehicles (14) are in a traffic jam.
7. Method according to any one of the preceding claims, characterized in that during method step e), the vehicle cluster (24) is controlled such that one of the motor vehicles (14) blocks other traffic participants (16) at least at a road branch such that upon turning of the remaining motor vehicles (14) into the road branch, influence on these motor vehicles (14) by the blocked traffic participants (16) is prevented.
8. Method according to any one of the preceding claims,

characterized in that

as soon as it is detected during method step e) that at least one further traffic participant is to be added to the vehicle cluster (24), the vehicle cluster (24) is controlled such that a gap for receiving the further traffic participant is established between one of the present motor vehicles (14) of the vehicle cluster (24).

9. Method according to any one of the preceding claims,

characterized in that

as soon as it is detected during method step e) that one of the motor vehicles (14) of the vehicle cluster (24) deviates from a preset way of driving by a preset tolerance amount, this motor vehicle (14) is excluded from the vehicle cluster (24).

10. Method according to any one of the preceding claims,

characterized in that

as soon as it is detected during method step e) that the guiding vehicle (α) deviates from a preset way of driving by a preset tolerance amount, the guiding vehicle (α) is excluded from the vehicle cluster (24), wherein one of the remaining motor vehicles (14) of the vehicle cluster (24) is set as the new guiding vehicle (α) and the vehicle cluster (24) is controlled such that the new guiding vehicle (α) is navigated to the intermediate destination and the remaining motor vehicles of the vehicle cluster (24) follow the new guiding vehicle (α).

11. Method according to any one of the preceding claims,

characterized in that

as soon as it is detected during method step e) that a distance between two motor vehicles (14) of the vehicle cluster (24) traveling one behind the other is exceeded by a preset tolerance amount, the vehicle

cluster (24) is divided into a first vehicle cluster (24') including the guiding vehicle (α) and a second vehicle cluster (24”), wherein a second guiding vehicle (α”) is set for the second vehicle cluster (24”) and the second vehicle cluster (24”) is controlled such that the second guiding vehicle (α”) is navigated to the intermediate destination and the remaining motor vehicles (14) of the second vehicle cluster (24”) follow the second guiding vehicle (α”).

12. Traffic management system (10), which is adapted to operate multiple motor vehicles (14) according to a method according to any one of the preceding claims.

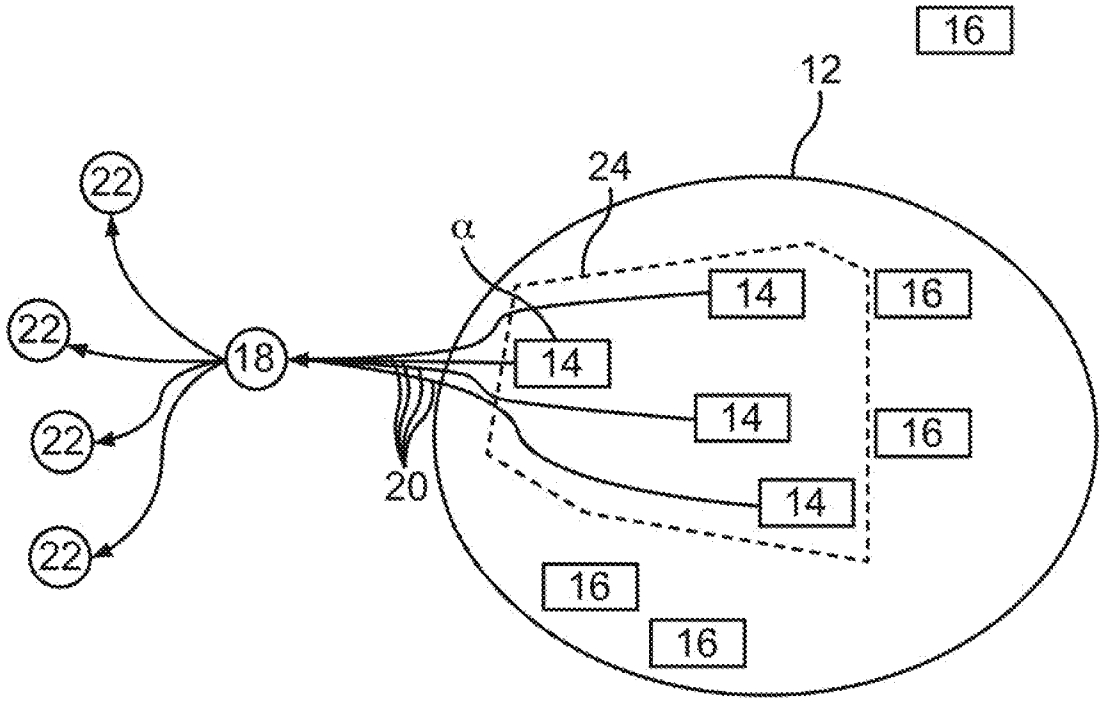

Fig. 1

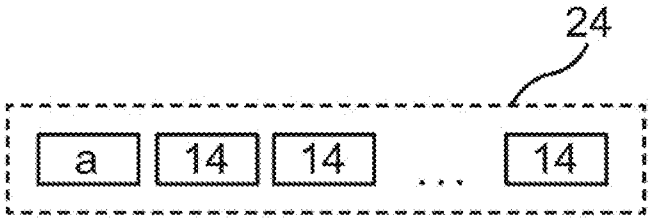

Fig. 2

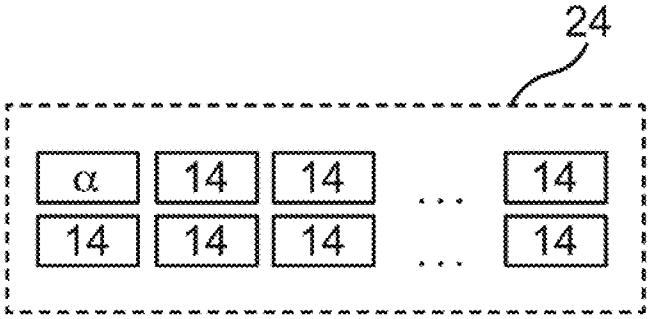

Fig. 3

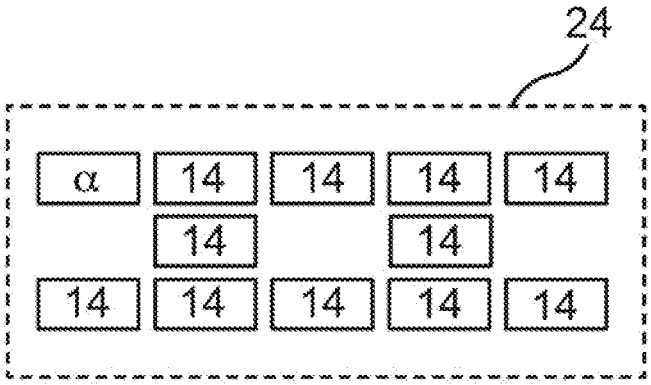

Fig. 4

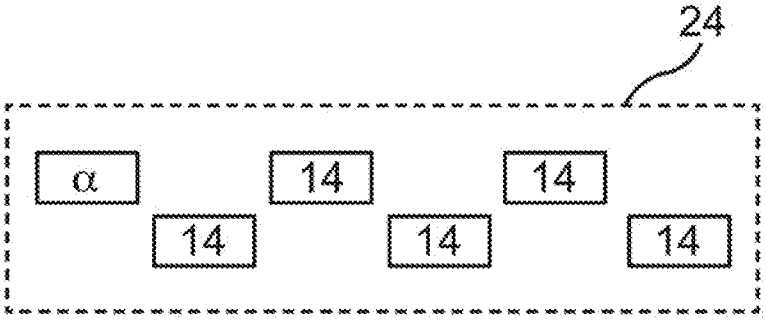

Fig. 5

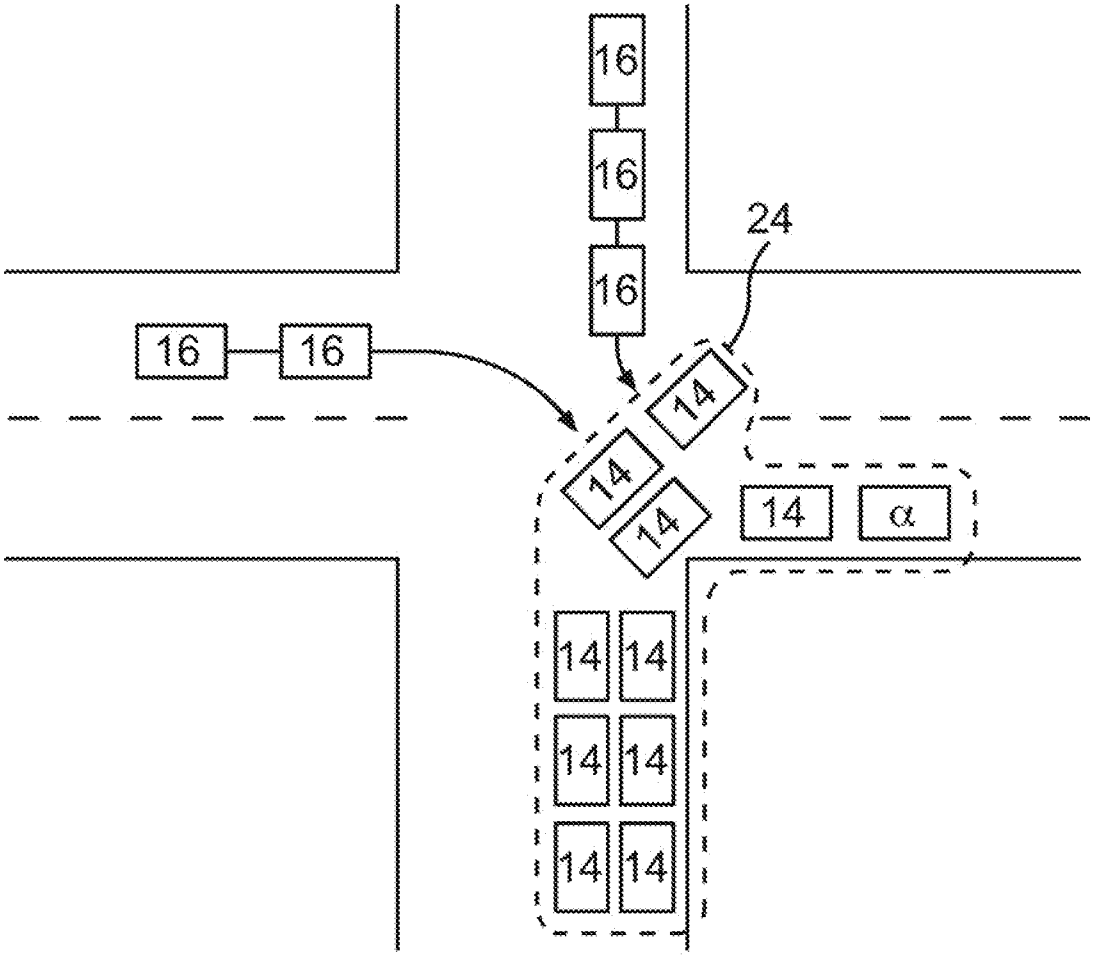

Fig. 6

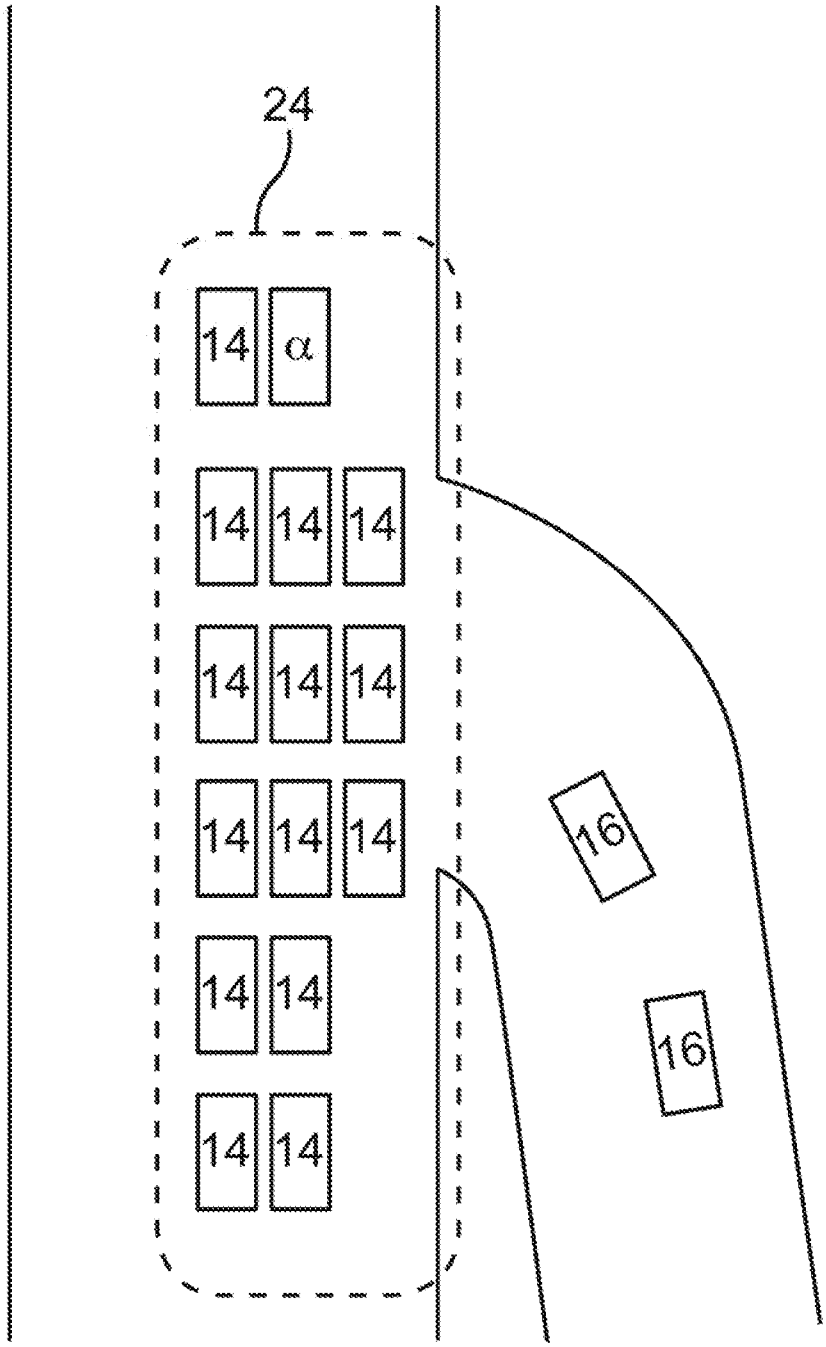

Fig.7

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/050975

A. CLASSIFICATION OF SUBJECT MATTER
INV. G08G1/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G08G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2013/165297 A1 (SCANIA CV AB [SE]) 7 November 2013 (2013-11-07) page 1, lines 4,5 page 2, lines 4-25 page 3, lines 10-12 page 4, lines 8-23 page 5, lines 9-15 page 6, lines 1-15 page 7, lines 1-23 page 8, lines 8-15,21 - page 9, line 25 page 11, lines 7-22 page 12, lines 21-25; figures 1-3 ----- -/--	1-12

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
14 October 2015	21/10/2015

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Fagundes-Peters, D

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/050975

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 2014/107867 A1 (YAMASHIRO TAKAHISA [JP]) 17 April 2014 (2014-04-17) paragraphs [0002] - [0004], [0007] - [0009], [0137]	1-12
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2015/050975

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		WO 2014046602 A1	27-03-2014