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(54) Remote diagnosis of vehicles

Ferndiagnose von Fahrzeugen

Diagnostic de véhicules à distance

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Description**BACKGROUND TO THE INVENTION AND PRIOR ART**

[0001] The present invention relates generally to solutions for fault diagnosis of vehicles.

[0002] In particular, the invention relates to a system for diagnosis of vehicle, comprising a central processor resource configured to communicate wirelessly with at least one vehicle, and a local module located in the respective vehicle and configured

to receive diagnosis commands from the central processor resource,

to cause execution of said diagnosis commands concerning at least one unit connected to a network in the vehicle, leading to at least one command response, and to return said at least one command response to the central processor resource.

[0003] The invention also relates to a method, a computer programme and a computer-readable medium corresponding to this system.

[0004] It is generally preferred to minimise the time which a motor vehicle spends at workshops for servicing or repairs. This applies in particular to commercial vehicles, e.g. trucks and buses, for which a maximum degree of effective utilisation is desired. There are therefore various current solutions for remotely identifying and, wherever possible, remedying faults which occur on vehicles. Even if a fault cannot be remedied locally, it is most commonly advantageous if it can be identified before the vehicle reaches the workshop or before a repairer reaches the vehicle. This makes it possible to prepare for the repair, leading to minimisation of outage time.

[0005] Specifications DE 10 2006 044 896, JP 2009-150798, US 7,668,643, US 2005/0251304, US 2006/0122748 and US 2008/0183484 describe various solutions for remote diagnosis of motor vehicles which involve a central server connected to a local network in the vehicle.

[0006] Further examples of relevant prior art can be found in specifications DE 10 2004 056434, US2005/154500 and EP1253415.

PROBLEMS ASSOCIATED WITH PRIOR ART

[0007] However, none of the above specifications describes a satisfactorily safe remote diagnosis. A problem arising from the possibility of remote access to descriptions of a vehicle's functionality, represented for example by so-called ECUs (electronic control units), is that it makes it possible for unauthorised persons to study and manipulate vital vehicle parameters. This might lead to safety consequences concerning the vehicle's behaviour in critical situations. Moreover, competing vehicle manufacturers and business operators who provide repair and maintenance services might be afforded access to data which the vehicle manufacturer wishes to keep se-

cret.

SUMMARY OF THE INVENTION

[0008] The object of the present invention is therefore to propose a solution which solves the above problems and therefore makes safe remote diagnosis of motor vehicles possible both as regards control of their programmable units and as regards the data integrity of those units.

[0009] According to an aspect of the invention, the object is achieved by the system described in the introduction whereby the central processor resource includes a superordinate diagnosis unit adapted to generating diagnosis commands in the form of control instructions. The local module is itself adapted to exclusively executing diagnosis commands in response to said control instructions from the central processor resource.

[0010] This system is advantageous in that the vehicle can thus only be remote-diagnosed from an authorised central processor resource. At the same time, it is of course also possible at a workshop to connect diagnosis equipment directly to the vehicle's internal network in order to conduct a conventional diagnosis.

[0011] According to this aspect of the invention, the local module is adapted, before executing a diagnosis command, to checking whether it is associated with one or more conditions relating to operating the vehicle, e.g. the brakes not being activated. The local module is adapted to only executing diagnosis commands if all of the associated operation-related conditions are fulfilled. This reduces the risk that the proposed remote diagnosis might put at risk, or interfere with, important vehicle functions during operation of the vehicle.

[0012] Still according to this aspect of the invention, the local module is also configured to monitor, while executing a diagnosis command, any conditions associated with it. If at least one of said associated conditions is found not to be fulfilled while it is executing the diagnosis command, the local module is configured to cease executing it. The risk of interference with important vehicle functions can thus be further reduced.

[0013] Still according to this aspect of the invention, the local module is configured to resume execution of the diagnosis command if, after a cessation, all of the conditions associated with it are again found to be fulfilled. The risk of potential interference with important vehicle functions can thus be minimised while at the same time making a remote diagnosis take relatively little time.

[0014] According to an embodiment of this aspect of the invention, a set of parameters for the conditions relating to operation of the vehicle is supposed to be defined by the superordinate diagnosis unit. This means that the complexity of the local module can be kept low and the superordinate diagnosis unit can dynamically indicate which magnitudes have to be tested for a certain condition and within what limit values the respective condition is regarded as fulfilled.

[0015] According to a further embodiment of this aspect of the invention, the superordinate diagnosis unit is configured to issue diagnosis commands iteratively by generating a first diagnosis command, receiving at least one command response thereto and generating on the basis thereof at least a second diagnosis command, and so on. A typical diagnosis situation does in fact entail repeated questions before a proper diagnosis can be arrived at. To this end, it is normal to determine a suitable follow-up question to at least one previous diagnosis command.

[0016] According to another embodiment of this aspect of the invention, the local module comprises local software adapted to controlling the local module's interaction with the vehicle's internal network and with the superordinate diagnosis unit. The local software is also configured to be updatable from the central processor resource. This means that the whole diagnosis process can be adjusted and controlled very effectively from the central processor resource.

[0017] According to another aspect of the invention, the object is achieved by the method described in the introduction whereby the central processor resource is supposed to include a superordinate diagnosis unit adapted to generating diagnosis commands in the form of control instructions. To this end, the method comprises execution of diagnosis commands in the vehicle exclusively in response to control instructions from the central processor resource. Further specifications about this method are indicated by the above discussion pertaining to the corresponding proposed system. Furthermore, the advantages of this method and of its preferred embodiments are also indicated by the above discussion pertaining to the proposed system.

[0018] According to a further aspect of the invention, the object is achieved by a computer programme which can be directly downloaded to the internal memory of a computer and comprises software for controlling the steps according to the method proposed above when said programme is run on a computer.

[0019] According to a further aspect of the invention, the object is achieved by a computer-readable medium which has stored on it a programme adapted to enabling a computer to control the steps according to the method proposed above.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The present invention is explained below in more detail on the basis of embodiments described by way of examples with reference to the attached drawings.

- Figure 1 is a schematic diagram of a preferred remote diagnosis system,
- Figure 2 is a flowchart illustrating the general method according to the invention, and
- Figure 3 is a flowchart illustrating a preferred embodiment of the method according to the inven-

tion.

DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0021] We refer initially to Figure 1 depicting an embodiment of a system according to the invention. The system comprises a central processor resource 100 and at least one vehicle 180. The central processor resource 100 is configured to communicate wirelessly with a designated vehicle 180 via at least one network, such as Internet and a mobile communication network 160 (e.g. represented by a WLAN, GSM network or 3G network). To this end, the central processor resource 100 includes a superordinate diagnosis unit 110 adapted to generating diagnosis commands DC in the form of control instructions CI.

[0022] Before such control instructions can be generated, however, an identification procedure has normally to be conducted. This procedure determines what electronic components and software components are incorporated in the electrical system of the vehicle 180. On the basis of the information obtained during the identification procedure about the specification and configuration of the vehicle 180, the central processor resource 100 can begin to take diagnostic information from the vehicle 180, particularly its electrical system. Diagnostic information may for example comprise information about fault codes from control units (e.g. ECUs) of the vehicle 180, statistics about how the vehicle 180 has been used during a historical period, and current and historical values for sensors and actuators in the vehicle's electrical system.

[0023] As the control units in the vehicle 180 contain many different types of information (in varying formats), the commands needed for controlling different control units (and versions of them) generally differ considerably from one another. A relatively advanced logic and knowledge database is therefore required to be able to decide on the basis of the configuration of a given vehicle 180 what are appropriate diagnosis commands DC/control instructions CI for it. According to the invention, this functionality is located in the central processor resource 100.

[0024] To provide the superordinate diagnosis unit 110 with a diagnosis interface in relation to vehicles, each vehicle 180 is equipped with a local module 182. The local module 182 is adapted to exclusively executing diagnosis commands DC in the form of control instructions CI from the central processor resource 100. Assurance is thus provided that only authorised control means have access to a network 184 in the vehicle 180 and to the units connected thereto, here exemplified by the unit marked 186.

[0025] Following control instructions CI received, the local module 182 causes execution of at least one diagnosis command DC concerning at least one unit 186 which is connected to the internal network 184 of the vehicle 180. Said at least one diagnosis command DC

itself results in at least one command response R which is returned to the central processor resource 100 via the local module 182 and the network/networks 150, 160.

[0026] As the vehicle 180 may be of very great complexity, the superordinate diagnosis unit 110 is with advantage configured to issue diagnosis commands DC iteratively depending on the results arising from the questions posed/diagnosis commands DC issued. This means that a first diagnosis command DC is produced and at least one first command response R is received. On the basis of said at least one first command response R, the superordinate diagnosis unit 110 then issues at least a second diagnosis command DC which results in at least one second command response R, and so on.

[0027] Producing a diagnosis command DC may involve substantial parts of the resources of a control unit. If a diagnosis procedure is conducted during operation of the vehicle 180, there is therefore risk that the procedure might put at risk, or at least interfere with, important vehicle functions. According to an embodiment of the invention, a given diagnosis command DC may therefore be associated with one or more conditions relating to operation of the vehicle 180. Examples of such conditions are the brakes not being activated, the vehicle's speed being below a certain value and a power take-off not being activated. In this case the local module 182 only executes a diagnosis command DC if all of the operation-related conditions associated with it are fulfilled. Specifically, according to this embodiment of the invention, the local module 182 is adapted, before executing a diagnosis command DC, to checking whether it is associated with one or more conditions relating to operation of the vehicle 180, and to only executing it if all of the operation-related conditions associated with it are fulfilled.

[0028] As operationally critical conditions which allow one or more diagnosis commands DC to be executed may cease to be fulfilled after execution of such a command has begun, the local module 182 according to an embodiment of the invention is further configured to apply the procedure of monitoring, during execution of a diagnosis command DC, any conditions associated with it, and of ceasing to execute it if one or more of said associated conditions is found not to be fulfilled.

[0029] In addition, with the object of minimising lead-time for a command response R, the local module 182 is with advantage configured to resume executing a diagnosis command DC as soon as all of the conditions associated with it are again found to be fulfilled. Depending on the amount of time its completion takes and whether said conditions are fulfilled and not fulfilled, the execution of a given diagnosis command may of course be halted and resumed more than once.

[0030] As mentioned above, each condition relating to operation of the vehicle 180 for deciding whether execution of a diagnosis command DC is allowed is defined by one or more parameters, e.g. an indicated speed range, no activation of manually initiated braking, no activation of the power take-off of the vehicle 180 or a requirement

for the steering wheel angle deflection to be within an indicated range. For the sake of flexibility and to keep down the complexity of the local module 182, it is preferred that the set of parameters which indicate respective conditions relating to operation of the vehicle 180 be defined by the superordinate diagnosis unit 110.

[0031] According to an embodiment of the invention, the local module 182 contains local software adapted to controlling its interaction with the network 184 in the vehicle 180 and with the superordinate diagnosis unit 110. The local software is also configured to be updatable from the central processor resource 100 so that the diagnostic process can be controlled and adjusted effectively from the central processor resource.

[0032] It is also preferred that the central processor resource 100 be configured to function in accordance with the instructions in central software which is executed in the processor resource 100. It is therefore advantageous if the central processor resource 100 includes, or is in some other way linked to, a memory module M containing software which, when executed in the central processor resource 100, causes the procedure described above to be applied.

[0033] To summarise, the general method according to the invention will now be described with reference to the flowchart in Figure 2. A first step 210 checks whether a diagnosis command has been received in the local module of a vehicle. If such is the case, a step 220 follows, otherwise the procedure loops back and comes to a halt at step 210. Step 220 checks whether a diagnosis command received consists exclusively of control instructions from the central processor resource. If such is the case, a step 230 follows, otherwise the procedure loops back to step 210. Step 230 executes the diagnosis command defined by the control instructions, whereupon a corresponding command response is generated. A step 240 then returns the command response to the central processor resource, followed by the procedure looping back to step 210.

[0034] Figure 3 is a flowchart illustrating a preferred embodiment of the proposed method.

[0035] As above, two initial steps 210 and 220 check whether a diagnosis command has been received and whether it is based solely on control instructions from the central processor resource. If such is the case, the next step 310 checks whether the diagnosis command received is associated with one or more conditions relating to operation of the vehicle. If it is found that the command is not associated with any such conditions, this finding is followed by the executing step and reporting step 230 and 240 respectively as above, after which the procedure loops back to step 210.

[0036] If on the contrary the diagnosis command is associated with at least one condition relating to operation of the vehicle, step 310 is followed by a step 320 which checks whether said condition/s is/are fulfilled. If one or more conditions are not fulfilled, the procedure loops back and comes to a halt at 320. Otherwise step 230

follows.

[0037] The method steps described with reference to Figures 2 and 3 may be controlled by means of programmed computer apparatus. In addition, even if the embodiments of the invention described above with reference to the diagrams comprise a computer and processes conducted in a computer, the invention extends to computer programmes, especially computer programmes on or in a carrier, suited to practically implementing the invention. The programme may be in the form of source code, object code, a code intermediate between source and object code, e.g. in partly compiled form, or in any other form suitable for use in implementing the process according to the invention. The carrier may be any entity or device capable of carrying the programme. For example, the carrier may comprise a storage medium such as a flash memory, an ROM (read only memory), e.g. a CD (compact disc) or semiconductor ROM, EPROM (electrically programmable ROM), EEPROM (erasable EPROM) or a magnetic recording medium, e.g. a floppy disc or a hard disc. The carrier may also be a transmitting carrier such as an electrical or optical signal which can be conveyed by an electrical or optical cable or via radio or in some other way. Where the programme is in the form of a signal which can be conveyed directly by cable or some other device or means, the carrier may take the form of such a cable, device or means. Alternatively the carrier may be an integrated circuit in which the programme is embedded and which is adapted to conducting, or to being used in conducting, the relevant processes.

[0038] The invention is not restricted to the embodiments described with reference to the diagrams but may be varied freely within the scope of the claims set out below.

Claims

1. A system for diagnosis of vehicles, comprising a central processor resource (100) configured to communicate wirelessly with at least one vehicle (180), and a local module (182) located in the respective vehicle (180) and configured to receive diagnosis commands (DC) from the central processor resource (100), to cause execution of said diagnosis commands (DC) concerning at least one unit (186) connected to a network (184) in the vehicle (180), leading to at least one command response (R), and to return said at least one command response (R) to the central processor resource (100), whereby the central processor resource (100) includes a superordinate diagnosis unit (110) adapted to generating diagnosis commands (DC) in the form of control instructions (CI), and the local module (182) is adapted to exclusively executing diagnosis commands (DC)

in response to said control instructions (CI) from the central processor resource (100), whereby the local module (182) is adapted, before executing a diagnosis command (DC), to checking whether it is associated with one or more conditions relating to operation of the vehicle (180), and to only executing it if all of the operation-related conditions associated with it are fulfilled, said conditions comprising at least one of an indicated vehicle speed range, no activation of manually initiated braking, no activation of the power take-off of the vehicle (180) or a requirement for the steering wheel angle deflection to be within an indicated range, whereby the local module (182) is further configured to monitor, when executing a diagnosis command (DC), any conditions associated with it, and to cease executing the diagnosis command (DC) if one or more of said associated conditions are found not to be fulfilled, and whereby the local module (182) is further configured to resume executing the diagnosis command (DC) if all of the conditions associated with it are again found to be fulfilled.

2. The system according to claim 1, whereby a set of parameters for said one or more conditions relating to operation of the vehicle (180) is defined by the superordinate diagnosis unit (110).

3. The system according to any one of the foregoing claims, whereby the superordinate diagnosis unit (110) is configured to issue diagnosis commands (DC) iteratively by receiving at least one command response (R) in response to a first diagnosis command (DC), and on the basis thereof generating at least a second diagnosis command (DC).

4. The system according to any one of the foregoing claims, whereby the local module (182) contains local software adapted to controlling its interaction with the network (184) in the vehicle (180) and with the superordinate diagnosis unit (110), which local software is configured to be updatable from the central processor resource (100).

5. A method for diagnosis of vehicles (180), comprising wireless communication between a central processor resource (100) and a local module (182) in the vehicle (180), which communication caters for receiving in the local module (182) at least one diagnosis command (DC) from the central processor resource (100) and responding thereto by executing said at least one diagnosis command (DC) concerning at least one unit (186) connected to a network (184) in the vehicle (180), thereby leading to at least one command response (R), and

returning said at least one command response (R) to the central processor resource (100), whereby the central processor resource (100) includes a superordinate diagnosis unit (110) adapted to generating diagnosis commands (DC) in the form of control instructions (CI), and the method comprises executing diagnosis commands (DC) in the vehicle (180) exclusively in response to said control instructions (CI) from the central processor resource (100), checking, before a diagnosis command (DC) is executed, whether it is associated with one or more conditions relating to operation of the vehicle (180), and only executing the diagnosis command (DC) if all of the operation-related conditions associated with it are fulfilled, said conditions comprising at least one of an indicated vehicle speed range, no activation of manually initiated braking, no activation of the power take-off of the vehicle (180) or a requirement for the steering wheel angle deflection to be within an indicated range, monitoring, during execution of the diagnosis command (DC), any conditions associated with it, ceasing to execute the diagnosis command (DC) if one or more of said associated conditions are found not to be fulfilled, and resuming execution of the diagnosis command (DC) if all of the conditions associated with the latter are again found to be fulfilled.

6. The method according to claim 5, whereby a set of parameters for said one or more conditions relating to operation of the vehicle (180) is defined by the superordinate diagnosis unit (110).
7. The method according to any one of claims 5 to 6, comprising iterative issue of diagnosis commands (DC) by receiving at least one command response (R) in the superordinate diagnosis unit (110), and on the basis thereof generating at least one further diagnosis command (DC).
8. A computer programme which can be directly downloaded to the internal memory (M) of a computer and comprises software for controlling the steps according to any of claims 5 to 7 when said programme is run on the computer.
9. A computer-readable medium (M) which has stored on it a programme which is adapted to enabling a computer to control the steps according to any of claims 5 to 7.

Patentansprüche

1. System zur Diagnose von Fahrzeugen, umfassend eine Zentralprozessoreinrichtung (100), die zum drahtlosen Kommunizieren mit wenigstens einem Fahrzeug (180) eingerichtet ist, und ein lokales Modul (182), das in dem entsprechenden Fahrzeug (180) angeordnet und dazu eingerichtet ist Diagnosebefehle (DC) von der Zentralprozessoreinrichtung (100) zu empfangen, eine Ausführung der zumindest eine Einheit (186), die mit einem Netzwerk (184) in dem Fahrzeug (180) verbunden ist, betreffenden Diagnosebefehle (DC) zu veranlassen, was zu mindestens einer Befehlsantwort (R) führt, und die mindestens eine Befehlsantwort (R) an die Zentralprozessoreinrichtung (100) zurückzuliefern, wobei die Zentralprozessoreinrichtung (100) eine übergeordnete Diagnoseeinheit (110) enthält, welche Diagnosebefehle (DC) in Gestalt von Steueranweisungen (CI) zu erzeugen vermag, und das lokale Modul (182) dazu eingerichtet ist, Diagnosebefehle (DC) ausschließlich in Antwort auf die Steueranweisungen (CI) von der Zentralprozessoreinrichtung (100) auszuführen, wobei das lokale Modul (182) vor einem Ausführen eines Diagnosebefehls (DC) dazu eingerichtet ist zu überprüfen, ob er einer oder mehreren einen Betrieb des Fahrzeugs (180) betreffenden Bedingungen zugehörig ist, und ihn nur auszuführen, falls alle der ihm zugehörigen, einen Betrieb betreffenden Bedingungen erfüllt sind, wobei diese Bedingungen einen angegebenen Fahrzeuggeschwindigkeitsbereich und/oder keine Aktivierung eines manuell initiierten Bremsvorgangs und/oder keine Aktivierung des Nebenabtriebs des Fahrzeugs (180) und/oder eine Anforderung, dass der Lenkradeinschlag sich innerhalb eines angegebenen Bereichs befindet, umfassen, wobei das lokale Modul (182) ferner dazu eingerichtet ist beim Ausführen eines Diagnosebefehls (DC) jegliche ihm zugehörige Bedingungen zu überwachen, und ein Ausführen des Diagnosebefehls (DC) zu beenden, falls eine oder mehrere dieser zugehörigen Bedingungen als nicht erfüllt erkannt werden, und wobei das lokale Modul (182) ferner dazu eingerichtet ist, ein Ausführen des Diagnosebefehls wieder aufzunehmen, falls alle der ihm zugehörigen Bedingungen als wieder erfüllt erkannt werden.
2. System nach Anspruch 1, wobei ein Parametersatz für die eine oder die mehreren einen Betrieb des Fahrzeugs (180) betreffenden Bedingungen durch die übergeordnete Diagnoseeinheit (110) festgelegt ist.

3. System nach einem der vorhergehenden Ansprüche, wobei die übergeordnete Diagnoseeinheit (110) dazu eingerichtet ist, Diagnosebefehle (DC) iterativ auszugeben durch
 Empfangen mindestens einer Befehlsantwort (R) in Reaktion auf einen ersten Diagnosebefehl (DC), und basierend darauf
 Erzeugen wenigstens eines zweiten Diagnosebefehls (DC). 5
4. System nach einem der vorhergehenden Ansprüche, wobei das lokale Modul (182) lokale Software enthält, die dazu eingerichtet ist, seine Interaktion mit dem Netzwerk (184) in dem Fahrzeug (180) und der übergeordneten Diagnoseeinheit (110) zu steuern, wobei die lokale Software dazu konfiguriert ist, von der Zentralprozessoreinrichtung (100) aktualisierbar zu sein. 10
5. Verfahren zur Diagnose von Fahrzeugen (180), umfassend
 eine Drahtloskommunikation zwischen einer Zentralprozessoreinrichtung (100) und einem lokalen Modul (182) in dem Fahrzeug (180), wobei die Kommunikation sorgt für
 ein Empfangen zumindest eines Diagnosebefehls (DC) von der Zentralprozessoreinrichtung (100) in dem lokalen Modul (182) und ein Antworten darauf durch
 Ausführen des zumindest einen, wenigstens eine Einheit (186), die mit einem Netzwerk (184) in dem Fahrzeug (180) verbunden ist, betreffenden Diagnosebefehls (DC), was zu mindestens einer Befehlsantwort (R) führt, und
 Zurückliefern der mindestens einen Befehlsantwort (R) an die Zentralprozessoreinrichtung (100), wobei die Zentralprozessoreinrichtung (100) eine übergeordnete Diagnoseeinheit (110) enthält, die Diagnosebefehle (DC) in Gestalt von Steueranweisungen (CI) zu erzeugen vermag, und wobei das Verfahren umfasst
 Ausführen von Diagnosebefehlen (DC) in dem Fahrzeug (180) ausschließlich in Antwort auf die Steueranweisungen (CI) von der Zentralprozessoreinrichtung (100),
 Überprüfen, bevor ein Diagnosebefehl (DC) ausgeführt wird, ob er einer oder mehreren einen Betrieb des Fahrzeugs (180) betreffenden Bedingungen zugehörig ist, und
 Ausführen des Diagnosebefehls (DC) nur dann, falls alle der ihm zugehörigen, einen Betrieb betreffenden Bedingungen erfüllt sind, wobei die Bedingungen einen angegebenen Fahrzeuggeschwindigkeitsbereich und/oder keine Aktivierung eines manuell initiierten Bremsvorgangs und/oder keine Aktivierung des Nebenabtriebs des Fahrzeugs (180) und/oder eine Anforderung, dass der Lenkradeinschlag sich innerhalb eines angegebenen Bereichs befindet, 20
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6. Verfahren nach Anspruch 5, wobei ein Parametersatz für die eine oder die mehreren einen Betrieb des Fahrzeugs (180) betreffenden Bedingungen durch die übergeordnete Diagnoseeinheit (110) festgelegt wird.
7. Verfahren nach einem der Ansprüche 5 bis 6, umfassend eine iterative Ausgabe von Diagnosebefehlen (DC) durch
 Empfangen mindestens einer Befehlsantwort (R) in der übergeordneten Diagnoseeinheit (110), und basierend darauf
 Erzeugen wenigstens eines weiteren Diagnosebefehls (DC).
8. Computerprogramm, welches unmittelbar in dem internen Speicher (M) eines Computers heruntergeladen werden kann und Software enthält zum Steuern der Schritte nach einem der Ansprüche 5 bis 7, wenn das Programm auf dem Computer abläuft.
9. Computerlesbares Medium (M), welches auf sich ein Programm gespeichert hat, das dazu eingerichtet ist, einen Computer dazu zu befähigen, die Schritte nach einem der Ansprüche 5 bis 7 zu steuern.

Revendications

1. Système pour un diagnostic de véhicules, comprenant
 une ressource de processeur central (100) configurée pour communiquer sans fil avec au moins un véhicule (180), et
 un module local (182) situé dans le véhicule respectif (180) et configuré
 pour recevoir des commandes de diagnostic (DC) à partir de la ressource de processeur central (100),
 pour provoquer l'exécution desdites commandes de diagnostic (DC) concernant au moins une unité (186) connectée à un réseau (184) dans le véhicule (180), entraînant au moins une réponse de commande (R),
 et
 pour renvoyer ladite au moins une réponse de commande (R) à la ressource de processeur central (100),
 dans lequel la ressource de processeur central (100)

- comprend, une unité de diagnostic superordonnée (110) adaptée à la génération des commandes de diagnostic (DC) sous la forme d'instructions de contrôle (CI), et le module local (182) est adapté à l'exécution exclusive des commandes de diagnostic (DC) en réponse auxdites instructions de contrôle (CI) de la ressource centrale du processeur (100), dans lequel le module local (182) est adapté, avant l'exécution d'une commande de diagnostic (DC), pour la vérification de s'il est associé à une ou plusieurs conditions par rapport au fonctionnement du véhicule (180), et à l'exécution uniquement si toutes les conditions liées au fonctionnement qui y sont associées sont remplies, lesdites conditions comprenant au moins une d'une plage de vitesse du véhicule indiquée, aucune activation du freinage déclenché manuellement, aucune activation de la prise de force du véhicule (180) ou une exigence relative au fait que la déviation angulaire du volant se situe dans une plage indiquée, dans lequel le module local (182) étant en outre configuré pour surveiller, lors de l'exécution d'une commande de diagnostic (DC), l'une quelconque des conditions qui y sont associées, et pour cesser l'exécution de la commande de diagnostic (DC) s'il est constaté qu'une ou plusieurs desdites conditions associées ne sont pas remplies, et dans lequel le module local (182) est en outre configuré pour reprendre l'exécution de la commande de diagnostic (DC) s'il est constaté que toutes les conditions qui y sont associées sont à nouveau remplies.
2. Système selon la revendication 1, dans lequel un ensemble de paramètres pour lesdites une ou plusieurs conditions relatives au fonctionnement du véhicule (180) est défini par l'unité de diagnostic superordonnée (110).
 3. Système selon l'une quelconque des revendications précédentes, dans lequel l'unité de diagnostic superordonnée (110) est configurée pour émettre des commandes de diagnostic (DC) itérativement par la réception d'au moins une réponse de commande (R) en réponse à une première commande de diagnostic (DC), et sur base de la génération d'au moins une deuxième commande de diagnostic (DC).
 4. Système selon l'une quelconque des revendications précédentes, dans lequel le module local (182) contient un logiciel local adapté à la commande de son interaction avec le réseau (184) dans le véhicule (180) et avec l'unité de diagnostic superordonnée (110), lequel logiciel local est configuré pour pouvoir être mis à jour à partir de la ressource de processeur central (100).
 5. Procédé pour le diagnostic des véhicules (180), comprenant
 - une communication sans fil entre une ressource de processeur central (100) et un module local (182) dans le véhicule (180), dont la communication est destinée à la réception dans le module local (182) d'au moins une commande de diagnostic (DC) à partir de la ressource de processeur central (100) et en y répondant par l'exécution de ladite au moins une commande de diagnostic (DC) concernant au moins une unité (186) connectée à un réseau (184) dans le véhicule (180), entraînant ainsi au moins une réponse de commande (R), et le renvoi de ladite au moins une réponse de commande (R) à la ressource de processeur central (100), dans lequel la ressource de processeur central (100) comprend l'unité de diagnostic superordonnée (110) adaptée à la génération des commandes de diagnostic (DC) sous la forme d'instructions de contrôle (CI), et le procédé comprend l'exécution de commandes de diagnostic (DC) dans le véhicule (180) exclusivement en réponse auxdites instructions de contrôle (CI) à partir de la ressource de processeur central (100), la vérification, avant qu'une commande de diagnostic (DC) ne soit exécutée, de si elle est associée à une ou plusieurs conditions liées au fonctionnement du véhicule (180), et l'exécution de la commande de diagnostic (DC) uniquement si toutes les conditions liées au fonctionnement qui y sont associées sont remplies, lesdites conditions comprenant au moins une d'une plage de vitesse du véhicule indiquée, aucune activation du freinage déclenché manuellement, aucune activation de la prise de force du véhicule (180) ou une exigence relative au fait que la déviation angulaire du volant se situe dans une plage indiquée, la surveillance, durant l'exécution de la commande de diagnostic (DC), de l'une quelconque des conditions qui y sont associées, en cessant d'exécuter la commande de diagnostic (DC) si une ou plusieurs desdites conditions associées ne sont pas remplies, et la reprise de l'exécution de la commande de diagnostic (DC) si toutes les conditions associées à cette dernière sont à nouveau remplies.
 6. Procédé selon la revendication 5, dans lequel un ensemble de paramètres pour lesdites une ou plusieurs conditions relatives au fonctionnement du véhicule (180) est défini par l'unité de diagnostic superordonnée (110).
 7. Procédé selon l'une quelconque des revendications 5 à 6, comprenant une émission itérative des commandes de diagnostic (DC) par

la réception d'au moins une réponse de commande (R) dans l'unité de diagnostic superordonnée (110), et sur base de celle-ci la génération d'au moins une commande de diagnostic supplémentaire (DC).

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8. Programme informatique qui peut être directement téléchargé sur la mémoire interne (M) d'un ordinateur et qui comprend un logiciel pour le contrôle des étapes selon l'une quelconque des revendications 5 à 7, lorsque ledit programme est exécuté sur l'ordinateur. 10
9. Support lisible par ordinateur (M) qui a stocké sur celui-ci un programme qui est adapté pour permettre à un ordinateur de contrôler les étapes selon l'une quelconque des revendications 5 à 7. 15

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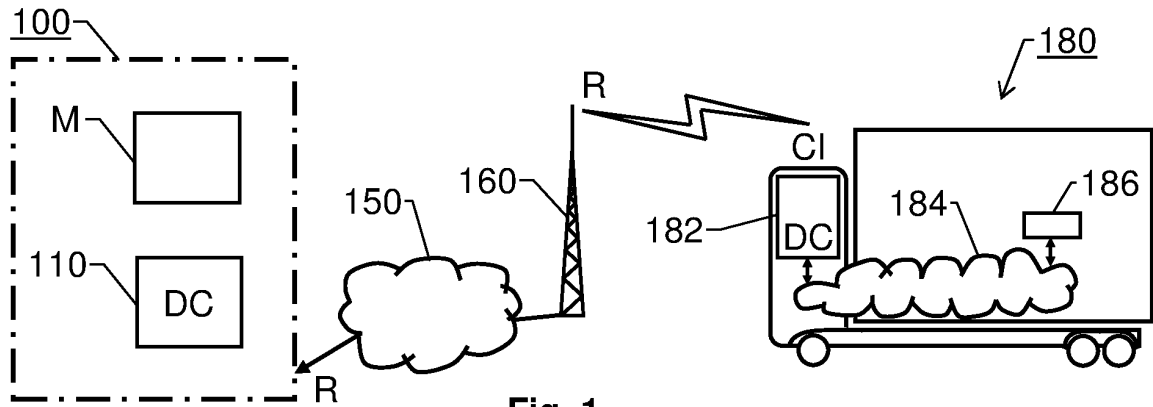


Fig. 1

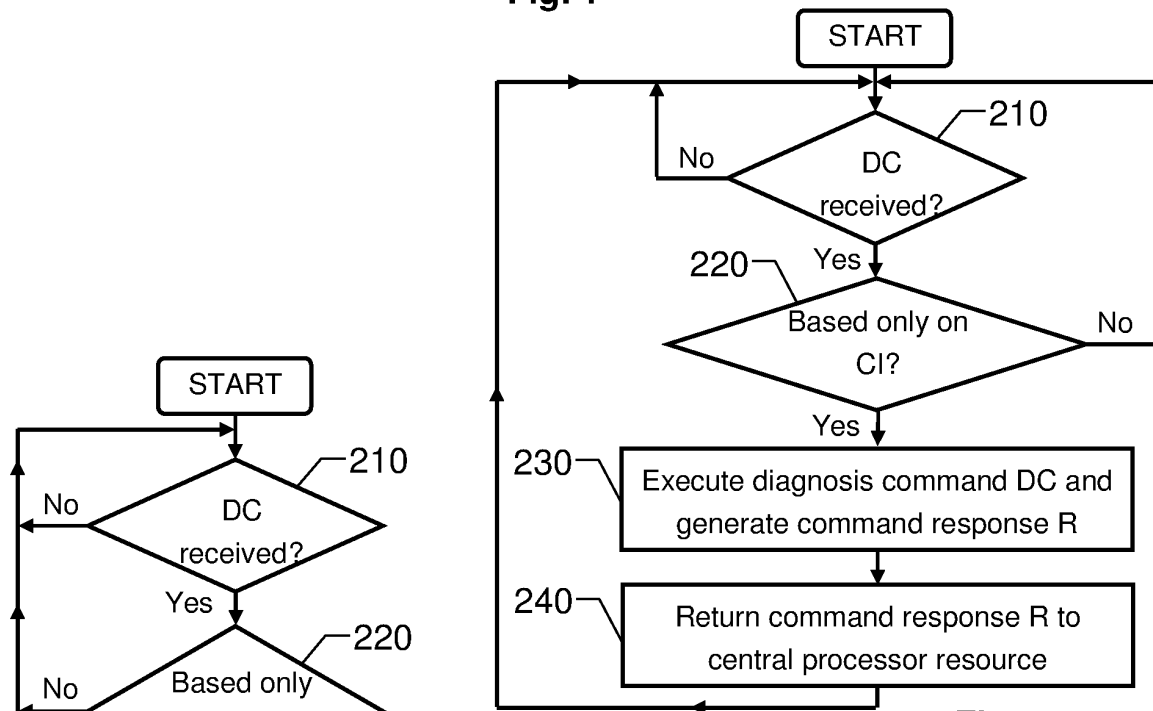


Fig. 2

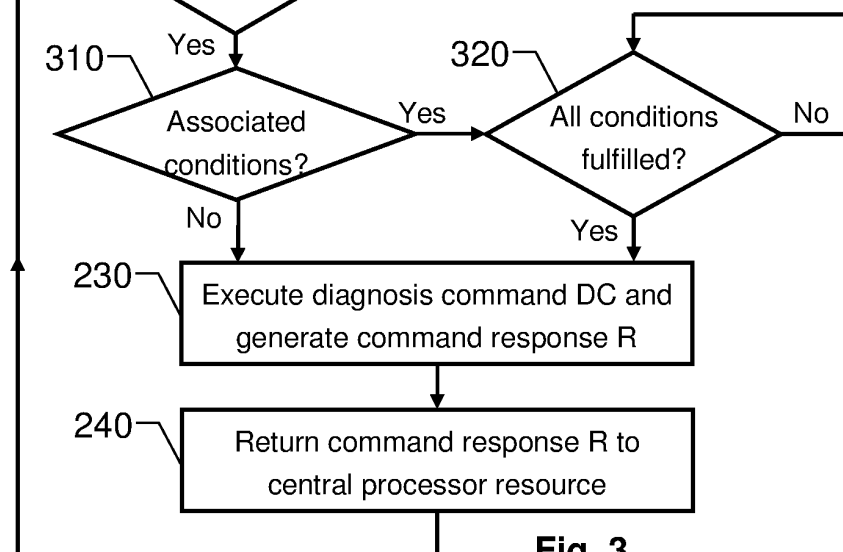


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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