IN-VEHICLE UNIT, IN-VEHICLE SYSTEM, AND VEHICLE

BACKGROUND

Technical Field

[0001] The present disclosure relates to an in-vehicle unit, an in-vehicle system, and a vehicle.

Related Art

[0002] Japanese Patent Application Laid-Open (JP-A) No. H11-053289 (Patent Document 1) proposes an information processing device. An expansion unit such as a peripheral device or expansion board/card connected to the information processing device is provided with a storage device used to hold software data, for example driver software. When this peripheral device or the like is connected to the information processing device, the expansion software data held in the storage device is read and forwarded to the information processing device. The information processing device compares the version of the forwarded software data against that of software data in its own storage device, and writes the more recent version of the software data to memory for the expansion software data of the information processing device to use in driving or information processing of the peripheral device or the like.

[0003] However, although Patent Document 1 is capable of installing software corresponding to the connected hardware in order to enable the hardware to be used, if this hardware is later disconnected and no longer used, the software remains in the information processing device. There is room for improvement in this respect, since this is detrimental to efficient usage of the storage capacity of the information processing device.

SUMMARY

[0004] In consideration of the above circumstances, the present disclosure provides an in-vehicle unit, an in-vehicle system, and a vehicle capable of installing software corresponding to connected hardware, and also enabling more efficient use of storage capacity.

[0005] An in-vehicle unit according to a first aspect includes a detection section configured to detect whether or not predetermined hardware is connected to the in-vehicle unit, a communication section configured to perform external communication, and a control section configured to control so as to receive software corresponding to the hardware via the communication section and install the software in cases in which connection of the hardware to the in-vehicle unit has been detected by the detection section, and to perform at least one type of processing out of compression processing to compress the software or deletion processing to delete the software in cases in

which ~~non-connection~~ disconnection of the hardware from the in-vehicle unit has been detected by the detection section.

[0006] According to the first aspect, the detection section detects whether or not the predetermined hardware is connected, and the communication section performs communication with an external server or the like.

[0007] In cases in which connection of the hardware has been detected by the detection section, the control section controls so as to receive the software corresponding to the hardware via the communication section and install the software. This enables retrofitted hardware to be used.

[0008] In cases in which non-connection of the hardware has been detected by the detection section, the control section performs at least one out of the compression processing to compress the software or the deletion processing to delete the software. Namely, the compression processing or deletion processing enables storage capacity to be secured in cases in which the hardware has been disconnected and is no longer used, thereby enabling this storage capacity to be used more efficiently.

[0009] Configuration may be made such that when performing the compression processing, the control section performs the compression processing in cases in which a state of the non-connection detected by the detection section satisfies a predetermined first condition. This enables the storage capacity to be used more efficiently. Moreover, should the hardware be reconnected, the software can easily be used again.

[0010] Configuration may be made such that when performing the compression processing and the deletion processing, the control section performs the deletion processing in cases in which a predetermined second condition has been satisfied after the first condition has been satisfied. Software with a low usage frequency is thus deleted, enabling the storage capacity to be used more efficiently.

[0011] Moreover, configuration may be made wherein the control section is configured to adjust the second condition to a predetermined condition according to a storage capacity of a storage section in which the software is stored, and then determine whether or not the adjusted second condition has been met. This enables the deletion processing to be performed more readily as the storage capacity decreases, thereby enabling the storage capacity to be used more efficiently.

[0012] Moreover, configuration may be made wherein the control section is configured to adjust the first condition to a predetermined condition according to a storage capacity of a storage section in which the software is stored, and then determine whether or not the adjusted first condition has been met. This enables the compression processing to be performed more readily as the storage capacity decreases, thereby enabling the storage capacity to be used

more efficiently.

[0013] Moreover, configuration may be made wherein the control section further performs decompression processing to decompress the software in cases in which connection of the hardware has been detected by the detection section after the first condition has been satisfied. This enables the software to easily be used again, without the need to reinstall the software when the hardware is reconnected.

[0014] Moreover, configuration may be made wherein the control section performs at least one out of the compression processing or deletion processing by external remote operation via the communication section. This enables the capacity required to store compression and deletion programs in the in-vehicle unit to be reduced, thus enabling the storage capacity to be used even more efficiently.

[0015] Note that as in ~~an eighth~~ another aspect, an in-vehicle system may be configured including a detection section configured to detect whether or not predetermined hardware is connected to an in-vehicle unit, an installer configured to control to install software corresponding to the hardware in the in-vehicle unit in cases in which connection of the hardware to the in-vehicle unit has been detected by the detection section, and a control section configured to perform at least one type of processing out of compression processing to compress the software or deletion processing to delete the software in cases in which ~~non-connection~~ disconnection of the hardware from the in-vehicle unit has been detected by the detection section.

[0016] Moreover, as in ~~a ninth~~another aspect, a vehicle may be configured including a detection section configured to detect whether or not predetermined hardware is connected to an in-vehicle unit, a communication section configured to perform external communication, and a control section configured to control so as to receive software corresponding to the hardware via the communication section and install the software in cases in which connection of the hardware to the in-vehicle unit has been detected by the detection section, and to perform at least one type of processing out of compression processing to compress the software or deletion processing to delete the software in cases in which ~~non-connection~~disconnection of the hardware from the in-vehicle unit has been detected by the detection section.

[0017] As described above, the present disclosure is capable of providing an in-vehicle unit, an in-vehicle system, and a vehicle capable of installing software corresponding to connected hardware, and also enabling more efficient use of storage capacity.

BRIEF DESCRIPTION OF DRAWINGS

[0018] Fig. 1 is a diagram illustrating a schematic configuration of an in-vehicle system according to an exemplary embodiment.

WHAT IS CLAIMED IS:

1. An in-vehicle unit comprising:

a detection section configured to detect whether or not predetermined hardware is connected to the in-vehicle unit;

a communication section configured to perform external communication; and

a control section configured to control so as to receive software corresponding to the hardware via the communication section and install the software in cases in which connection of the hardware to the in-vehicle unit has been detected by the detection section, and to perform at least one type of processing out of compression processing to compress the software or deletion processing to delete the software in cases in which ~~non-connection~~disconnection of the hardware from the in-vehicle unit has been detected by the detection section.

2. The in-vehicle unit of claim 1, wherein when performing the compression processing, the control section performs the compression processing in cases in which a state of the ~~non-connection~~ disconnection of the hardware from the in-vehicle unit detected by the detection section satisfies a predetermined first condition.

3. The in-vehicle unit of claim 2, wherein when performing the compression processing and the deletion processing, the control section performs the deletion processing in cases in which a state of the disconnection of the hardware from the in-vehicle unit satisfies a predetermined second condition ~~has been satisfied~~ after the first condition has been satisfied.

4. The in-vehicle unit of claim 3, wherein the control section is configured to adjust the second condition to a predetermined condition according to a storage capacity of a storage section in which the software is stored, and then determine whether or not the adjusted second condition has been met.

5. The in-vehicle unit of any one of claim 2 to claim 4, wherein the control section is configured to adjust the first condition to a predetermined condition according to a storage capacity of a storage section in which the software is stored, and then determine whether or not the adjusted first condition has been met.

6. The in-vehicle unit of any one of claim 2 to claim 5, wherein the control section further

performs decompression processing to decompress the software in cases in which connection of the hardware to the in-vehicle unit has been detected by the detection section after the first condition has been satisfied.

7. The in-vehicle unit of any one of claim 1 to claim 6, wherein the control section performs at least one out of the compression processing or deletion processing by external remote operation via the communication section.

8. An in-vehicle system comprising:

a detection section configured to detect whether or not predetermined hardware is connected to an in-vehicle unit;

an installer configured to control to install software corresponding to the hardware in the in-vehicle unit in cases in which connection of the hardware to the in-vehicle unit has been detected by the detection section; and

a control section configured to perform at least one type of processing out of compression processing to compress the software or deletion processing to delete the software in cases in which ~~non-connection~~disconnection of the hardware from the in-vehicle unit has been detected by the detection section.

9. A vehicle comprising:

a detection section configured to detect whether or not predetermined hardware is connected to an in-vehicle unit;

a communication section configured to perform external communication; and

a control section configured to control so as to receive software corresponding to the hardware via the communication section and install the software in cases in which connection of the hardware to the in-vehicle unit has been detected by the detection section, and to perform at least one type of processing out of compression processing to compress the software or deletion processing to delete the software in cases in which ~~non-connection~~disconnection of the hardware from the in-vehicle unit has been detected by the detection section.