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INFORMATION PROCESSING DEVICE

Abstract

An information processing device, that includes a processor, the processor being configured to increase a brightness of an intra-vehicle monitor provided in front of a driver seat, and display, overlaid on the monitor, a specifying layer in which, among vehicle information related to a vehicle displayed at the monitor, an opacity of a first region, which is a specifying region at which is displayed first information that is specified information, is made lower than an opacity of a second region at which is displayed second information that is the vehicle information other than the specified information.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is based on and claims priority under 35 USC 119 from Japanese Patent Application No. 2024-018890 filed on Feb. 9, 2024, the disclosure of which is incorporated by reference herein.

BACKGROUND

Technical Field

[0002] The present disclosure relates to an information processing device.

Related Art

[0003] Japanese Patent Application Laid-open (JP-A) No. 2013-57568 discloses a meter display device capable of improving the visibility of information obtained from a position of a pointer.

SUMMARY

[0004] An aspect of the present disclosure is an information processing device, including a processor. The processor is configured to increase a brightness of an intra-vehicle monitor provided in front of a driver seat, and display, overlaid on the monitor, a specifying layer in which, among vehicle information related to a vehicle displayed at the monitor, an opacity of a first region, which is a specifying region at which is displayed first information that is specified information, is made lower than an opacity of a second region at which is displayed second information that is the vehicle information other than the specified information.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. **1** is a block diagram illustrating a hardware configuration of a vehicle.

[0006] FIG. **2** is a flowchart illustrating a flow of specifying processing.

[0007] FIG. **3**A is an explanatory diagram illustrating a specifying layer.

[0008] FIG. **3**B is an explanatory diagram illustrating a specifying layer.

[0009] FIG. **3**C is an explanatory diagram illustrating a specifying layer.

[0010] FIG. **4** is a first explanatory view illustrating changes in illumination color of gauges.

[0011] FIG. **5** is a second explanatory view illustrating changes in illumination color of gauges.

[0012] FIG. **6** is a third explanatory view illustrating changes in illumination color of gauges.

DESCRIPTION OF THE INVENTION

[0013] Explanation follows regarding a vehicle **10** according to the present exemplary embodiment.

[0014] FIG. **1** is a block diagram illustrating a hardware configuration of a vehicle **10**. As illustrated in FIG. **1**, the vehicle **10** is provided with a meter ECU **20**. The meter ECU **20** is an example of an information processing device.

[0015] The meter ECU **20** is configured including a CPU (Central Processing Unit) **21** that is a hardware processor, a ROM (Read Only Memory) **22**, a RAM (Random Access Memory) **23**, a storage **24**, an in-vehicle communication interface (I/F) **25**, an input/output I/F **26**, and a wireless communication I/F **27**. The CPU **21**, the ROM **22**, the RAM **23**, the storage **24**, the in-vehicle communication I/F **25**, the input/output I/F **26**, and the wireless communication I/F **27** are connected so as to be capable of communicating with each other via an internal bus **28**.

[0016] The CPU **21** executes various programs, and controls each unit. Namely, the CPU **21** loads a program from the ROM **22** or the storage **24**, and executes the program using the RAM **23** as a work space. The CPU **21** controls each of the above configurations and performs various arithmetic processing in accordance with programs stored in the ROM **22** or the storage **24**.
[0017] The ROM **22** stores various programs and various data. The RAM **23** temporarily stores programs or data as a work space.
[0018] The storage **24** is configured by a storage device that is a non-transitory recording medium such as an embedded multiple media card (eMMC) or a universal flash storage (UFS), and various programs and various data are stored. An information processing program **24**A is stored in the storage **24**. The information processing program **24** A is a program for causing the CPU **21** to execute specifying processing (see FIG. **2**), described later.
[0019] The in-vehicle communication I/F **25** is an interface for connecting to another ECU **30**. A communication standard according to the CAN protocol is used as the interface. The in-vehicle communication I/F **25** is connected to the external bus **29**. Note that plural ECUs are provided for respective functions of the vehicle **10** in addition to the ECU **30**.
[0020] The input/output I/F **26** is an interface for communicating with an onboard device **40** installed in the vehicle **10**.
[0021] The onboard device **40** includes various devices installed in the vehicle **10**. The vehicle **10** includes a sensor group **42** and a monitor **44**, as examples of onboard devices **40**.
[0022] The sensor group **42** includes, for example, sensors for detecting a state of the vehicle **10** and circumstances in the vicinity of the vehicle **10**, such as 3D-LiDAR, a millimeter wave sensor, an infrared sensor, a winker sensor, an accelerator position sensor, a vehicle speed sensor, a steering angle sensor, an angular velocity sensor, a GPS (Global Positioning System) sensor, an illumination sensor, a gyro sensor, and an acceleration sensor. The sensor group **42** outputs detection results of each sensor to the meter ECU **20**, the ECU **30**, and the like.
[0023] The monitor **44** is provided at a meter panel disposed in front of the driver seat of the vehicle **10**, and is a liquid crystal monitor for displaying suggestions for operation related to functions of a vehicle **10**, and images and the like related to explanation of these functions. The monitor **44** is an example of “a display unit”.
[0024] The wireless communication I/F **27** is a wireless communication module for communicating with external devices. As the wireless communication module, communication standards such as 5G, LTE, Wi-Fi (registered trademark), and Bluetooth (registered trademark) are used, for example.
[0025] The CPU **21** of the meter ECU **20** has, as functional configuration, an acquisition unit **21**A and a control unit **21**B. Each functional configuration is realized when the CPU **21** reads out and executes the information processing program **24**A stored in the storage **24**.
[0026] The acquisition unit **21**A acquires various types of information. For example, the acquisition unit **21**A acquires data input from the ECU **30** via the in-vehicle communication I/F **25**, data input from the sensor group **42** via the input/output I/F **26**, and the like, as various types of information.
[0027] The control unit **21**B performs display control related to display at the monitor **44**. For example, as the display control, the control unit **21** B appropriately changes the display content of the monitor **44**, or adjusts the luminance of the monitor **44**.
[0028] FIG. **2** is a flowchart illustrating a flow of specifying processing executed by the meter ECU **20**. Specifying processing is performed by the CPU **21** reading the information processing program **24**A from the storage **24**, deploying the information processing program **24**A in the RAM **23**, and executing the program. As an example, the specifying processing is automatically performed repeatedly each time a predetermined period of time elapses.
[0029] In step S**10** illustrated in FIG. **2**, the CPU **21** determines whether or not permission conditions for changing the travel performance of the vehicle **10** have been satisfied. Here, when the CPU **21** determines that the permission conditions have been satisfied (step S**10**: YES), the processing proceeds to step S**11**. When the CPU **21** determines that the permission conditions have

not been satisfied (step S**10**: NO), the CPU **21** ends the specifying processing. In the present exemplary embodiment, the permission condition is a condition for increasing the vehicle speed at which the speed limiter of the vehicle **10** is actuated, as an example of changing the travel performance of the vehicle **10**. As an example, in cases in which the current position of the vehicle **10** measured by the GPS sensor included in the sensor group **42** belongs to a predetermined travel area, the CPU **21** determines that the permission condition has been satisfied. The predetermined travel area is, for example, a circuit field in which motor sports are performed, a rally course, or the like.

[0030] In step S**11**, the CPU **21** displays on the monitor **44** a shift-up indicator **54** (see FIG. **3** etc.) that notifies the driver of the vehicle **10** of the timing for shifting gear upward as vehicle information regarding the vehicle **10**. Then, the CPU **21** proceeds to step S**12**. The shift-up indicator **54** is an example of "specified information". Here, in the vehicle **10**, the travel performance of the vehicle **10** is changed by another ECU **30** based on the CPU **21** displaying the shift-up indicator **54** on the monitor **44**. Thus, in the vehicle **10**, for example, turbo lag is reduced, the upper limit vehicle speed at which the speed limiter of the vehicle **10** is actuated is raised, or the output of the cooling fan is maximized.

[0031] In step S**12**, the CPU **21** increases the brightness of the monitor **44**. As an example, the CPU **21** increases the luminance value of the entire monitor **44** by a predetermined amount. Then, the CPU **21** proceeds to step S**13**.

[0032] In step S**13**, among the vehicle information displayed on the monitor **44**, the CPU **21** causes a specifying layer **60** (see FIG. **3**B), in which the opacity of a specifying portion **62** (see FIG. **3**B) in which the shift-up indicator **54** is displayed, is lower than the opacity of the remaining portion **64** (see FIG. **3**B) in which other vehicle information is displayed, to be superimposed on the monitor **44**. Then, the CPU **21** ends the specifying processing.

[0033] Explanation follows regarding an example in which the specifying layer **60** is superimposed on the monitor **44**, with reference to FIGS. **3**A to **3**C.

[0034] FIG. **3**A shows vehicle information displayed on the monitor **44**. In FIG. **3**A, gear stage information **50**, rotational speed information **52**, and a shift-up indicator **54** are displayed as vehicle information.

[0035] The gear stage information **50** indicates a gear stage of the vehicle **10**. In FIG. **3**A, "3" is displayed as the gear stage information **50**, indicating that the gear stage is third gear.

[0036] The rotation speed information **52** indicates the engine rotation speed of the vehicle **10**. In FIG. **3**A, "4000 r/min" is displayed as the rotation speed information **52**, indicating that the engine rotation speed is 4000 revolutions per minute.

[0037] The shift-up indicator **54** includes plural gauges **55** that are aligned along the left-right direction in the monitor **44** and that are illuminated in conjunction with an increase in the engine speed of the vehicle **10**. In FIG. **3**A, a total of 14 rectangular gauges **55** are illustrated at the left and right sides of a center portion of the monitor **44** in the left-right direction, with 7 gauges at the left side and 7 gauges at the right side. In the following, the seven left gauges **55** included in the shift-up indicator **54** are sometimes collectively referred to as a left gauge group **56**, and the seven right gauges **55** are sometimes collectively referred to as a right gauge group **58**. The left and right direction is an example of a "predetermined direction". Note that the plural gauges **55** are not limited to being aligned along the left-right direction in the monitor **44**, and may be aligned along the up-down direction. In such cases, the up-down direction is an example of the "predetermined direction".

[0038] In FIG. **3**A, all the gauges **55** are represented in white, indicating that none of the gauges **55** is illuminated.

[0039] FIG. **3**B shows a specifying layer **60**. The specifying layer **60** has the same size and shape as the monitor **44** illustrated in FIG. **3**A. The specifying layer **60** is a layer for lowering the transmittance of light emitted by the monitor **44**. The specifying layer **60** is generated by

combining, for example, the three elements of hue, lightness, and saturation.
[0040] As illustrated in FIG. **3**B, the specifying layer **60** is configured including a specifying portion **62** that is rectangular in shape, and a remaining portion **64** other than the specifying portion **62**. The specifying portion **62** is a portion that covers the display area of the shift-up indicator **54** on the monitor **44** in a state in which the specifying layer **60** is superimposed on the monitor **44**. The specifying portion **62** is formed in a size and shape that enables it to cover the display area of the shift-up indicator **54**.
[0041] Note that the opacity of the specifying portion **62** is lower than the opacity of the remaining portion **64**. After the specifying layer **60** in the present exemplary embodiment has set an overall opacity that lowers the transmittance of light emitted by the monitor **44** by a predetermined amount, the specifying portion **62** is generated by opening a gap in a portion that covers the display region of the shift-up indicator **54** when superimposed on the monitor **44**. Thus, the opacity of the specifying portion **62** becomes “0”, and when the specifying layer **60** is superimposed on the monitor **44**, the transmittance of light emitted from the display region of the shift-up indicator **54** is not reduced.
[0042] FIG. **3**C illustrates a display example of a case in which the specifying layer **60** illustrated in FIG. **3**B is superimposed on the monitor **44** illustrated in FIG. **3**A. As illustrated in FIG. **3**C, the specifying layer **60** and the monitor **44** are overlaid such that respective end portions—specifically, the four corners—match. Thus, in the monitor **44** illustrated in FIG. **3**C, the specifying portion **62** covers the display region of the shift-up indicator **54**, such that the light transmittance of the monitor **44** emitted from this display region is not reduced. Further, in the monitor **44**, the remaining portion **64** overlaps areas other than the display region, such that the transmittance of light from the monitor **44** emitted from these areas is reduced. Note that in FIG. **3**C, by representing portions in the vicinity of the shift-up indicator **54** in white, and representing other portions in color, this indicates that only the transmittance of light emitted from the display region of the shift-up indicator **54** in the monitor **44** is not reduced.
[0043] Explanation follows regarding changes in the illumination color of the gauges **55**, with reference to FIGS. **4** to **6**.
[0044] FIG. **4** is a first explanatory view illustrating changes in illumination color of the gauges **55**. Similarly to in FIG. **3**, gear stage information **50**, rotational speed information **52**, and a shift-up indicator **54** are displayed as vehicle information on the monitor **44** illustrated in FIGS. **4** to **6**.
[0045] Note that in FIG. **4**, “6000 r/min” is displayed as the rotation speed information **52**, indicating that the engine rotation speed is 6000 revolutions per minute. In FIG. **4**, with an increase in the engine speed, four gauges **55** from the left in the fourth gauge group **56** and four from the right in the fourth gauge group **58** are illuminated. At such time, as a function of the control unit **21**B, the CPU **21** gradually illuminates the gauges **55** from both left and right end portions of the monitor **44** toward the center. In the case of FIG. **4**, the CPU **21** first illuminates the first gauge **55** from the left of the left gauge group **56** and the first gauge **55** from the right of the right gauge group **58**. Next, the CPU **21** further illuminates the second gauge **55** from the left of the left gauge group **56** and the second gauge **55** from the right of the right gauge group **58**. Next, the CPU **21** further illuminates the third gauge **55** from the left of the left gauge group **56** and the third gauge **55** from the right of the right gauge group **58**. Finally, the CPU **21** illuminates the fourth gauge **55** from the left of the left gauge group **56** and the fourth gauge **55** from the right of the right gauge group **58**, and establishes the illumination state illustrated in FIG. **4**.
[0046] Further, in FIG. **4**, the four gauges **55** from the left in the left gauge group **56** and the four gauges **55** from the right in the right gauge group **58** are represented by vertical line hatching, which indicates that these gauges **55** are illuminated with a green illumination color.
[0047] FIG. **5** is a second explanatory view illustrating changes in the illumination colors of the gauges **55**.
[0048] Note that in FIG. **5**, “6500 r/min” is displayed as the rotation speed information **52**,

indicating that the engine rotation speed is 6500 revolutions per minute. In FIG. **5**, in conjunction with the increase in engine speed, the fifth and sixth gauges **55** from the left of the left gauge group **56** and the fifth and sixth gauges **55** from the right of the right gauge group **58** are illuminated in a different illumination color from that of the four gauges **55** from the left in the left gauge group **56** and the four gauges **55** from the right in the fourth gauge group **58**.

[0049] In the case of FIG. **5**, first, the CPU **21** illuminates the fifth gauge **55** from the left of the left gauge group **56** and the fifth gauge **55** from the right of the right gauge group **58** from the illumination state illustrated in FIG. **4**. Then, the CPU **21** further turns on the sixth gauge **55** from the left of the left gauge group **56** and the sixth gauge **55** from the right of the right gauge group **58**, and establishes the illumination state illustrated in FIG. **5**. At such time, as a function of the control unit **21**B, the CPU **21** changes the illumination color of the gauge **55** in accordance with the engine speed. Specifically, the CPU **21** illuminates the fifth and sixth gauges **55** from the left of the left gauge group **56** and the fifth and sixth gauges **55** from the right of the right gauge group **58** with an orange illumination color. Note that in FIG. **5**, the fifth and sixth gauges **55** from the left of the left gauge group **56** and the fifth and sixth gauges **55** from the right of the right gauge group **58** are represented by grid-like hatching. This indicates that these gauges **55** are illuminated in a different illumination color from the other gauges **55** represented by vertical line hatching.

[0050] FIG. **6** is a third explanatory view illustrating changes in illumination color of the gauges **55**.

[0051] Note that in FIG. **6**, “6800 r/min” is displayed as the rotation speed information **52**, indicating that the engine rotation speed is 6800 revolutions per minute. In FIG. **6**, all of the gauges **55** in the left gauge group **56** and the right gauge group **58** are illuminated in conjunction with an increase in the engine speed.

[0052] In the case of FIG. **6**, the CPU **21** illuminates all the gauges **55** in the left gauge group **56** and the right gauge group **58** from the illumination state illustrated in FIG. **5**, and establishes the illumination state illustrated in FIG. **6**. At such time, the CPU **21** illuminates all the gauges **55** as a function of the control unit **21**B, and the illumination color of all the gauges **55** is changed to a specific color when all the gauges **55** are illuminated. Specifically, the CPU **21** changes the illumination colors of all the gauges **55** to a blue illumination color that was not used in the previous illumination states. Thus, in the monitor **44** illustrated in FIG. **6**, by illuminating all the gauges **55** provided in the shift-up indicator **54**, notification is provided that the timing for shifting up from third gear to fourth gear has arrived. Note that in FIG. **6**, all the gauges **55** in the left gauge group **56** and the right gauge group **58** are represented in black, which indicates that these gauges **55** are illuminated with a blue illumination color.

[0053] As explained above, in the meter ECU **20**, the CPU **21** increases the brightness of the monitor **44**, and further, a specifying layer **60**, in which the opacity of the specifying portion **62** at which the shift-up indicator **54** is displayed is lower than the opacity of the remaining portion **64** at which other vehicle information is displayed, is displayed overlaid on the monitor **44**. Thus, according to the meter ECU **20**, by making the brightness of the shift-up indicator **54** displayed on the monitor **44** relatively higher than the brightness of other vehicle information, among the vehicle information displayed on the monitor **44**, the shift-up indicator **54** can be displayed in an emphasized manner compared to other vehicle information.

[0054] Further, in the meter ECU **20**, the CPU **21** displays the shift-up indicator **54** on the monitor **44** based on the permission conditions for changing the travel performance of the vehicle **10** having been satisfied. Thus, according to the meter ECU **20**, in an environment in which the travel performance of the vehicle **10** can be changed, among the vehicle information displayed on the monitor **44**, the shift-up indicator **54** can be displayed in an emphasized manner compared to other vehicle information.

[0055] In the meter ECU **20**, the CPU **21** displays the shift-up indicator **54** at the top of the vehicle information displayed on the monitor **44**. Thus, according to the meter ECU **20**, by displaying the

shift-up indicator **54** at the top of the vehicle information displayed on the monitor **44**, it is possible for the driver to be cognizant of the timing of the shift-up without excessively dropping his/her line of sight while the vehicle **10** is traveling.

[0056] The shift-up indicator **54** is provided with plural gauges **55** that are illuminated in conjunction with an increase in engine speed. Further, in the meter ECU **20**, in conjunction with an increase in engine speed, the gauges **55** are gradually illuminated from both left and right end portions of the monitor **44** toward the center, and further, the illumination color of the gauges **55** is changed in accordance with the engine speed. Thus, according to the meter ECU **20**, by changing the illumination color of the gauges **55** in accordance with the engine speed, it is possible for the driver to be made aware that the timing for shifting gear upward is approaching.

[0057] In the meter ECU **20**, in a case in which all of the plural gauges **55** are illuminated, the CPU **21** changes the illumination color of all of the gauges **55** to a specific color for illuminating all of the gauges **55**. Thus, the meter ECU **20** enables the driver to be made aware that the timing for shifting up has arrived, as a result of illuminating all the gauges **55** with a specific color.

Other Matters

[0058] In the above exemplary embodiment, the CPU **21** determines that the permission condition has been satisfied when the current position of the vehicle **10** measured by the GPS sensor included in the sensor group **42** belongs to a predetermined travel area. However, the timing at which it is determined by the CPU **21** that the permission condition has been satisfied is not limited thereto. For example, the CPU **21** may determine that the permission condition has been satisfied when a predetermined input operation for changing the travel performance of the vehicle **10** has been performed with respect to the vehicle **10**.

[0059] In the above exemplary embodiment, in the specifying layer **60**, the specifying portion **62** is generated by opening a gap in a portion that covers the display region of the shift-up indicator **54** when superimposed on the monitor **44**. However, the specifying portion **62** is not limited to being generated by opening a gap in the specifying layer **60**. For example, in the specifying layer **60**, the specifying portion **62** may be generated by applying a gradation of color, lightness and darkness, or the like, that is different from other portions to a portion that covers the display region of the shift-up indicator **54** when superimposed on the monitor **44**.

[0060] In the above exemplary embodiment, plural levels of brightness values to be set for the entire monitor **44** are provided, and the CPU **21** may change the degree to which the brightness of the monitor **44** is increased in accordance with a selection by the driver.

[0061] In the above exemplary embodiment, the CPU **21** may change at least one of the brightness of the monitor **44** or the opacity of the specifying layer **60** based on environment information indicating the environment outside the vehicle **10**. For example, in cases in which the amount of light received by an illuminance sensor included in the sensor group **42** is less than a predetermined amount, the CPU **21** may increase the brightness of the monitor **44** and reduce the opacity of the specifying layer **60**.

[0062] The illumination colors of the gauges **55** explained in the above exemplary embodiment are merely examples, and there is no particular limitation on the illumination color.

[0063] In the above exemplary embodiment, the shift-up indicator **54** is an example of specified information; however, the specified information is not limited thereto. For example, the specified information may be, in addition to the shift-up indicator **54**, among the vehicle information relating to the vehicle displayed on the monitor **44**, the gear stage information **50**, information relating to a telltale that gives a warning to the driver, information relating to predetermined instruments, and the like. The specified information is not limited to a single item of vehicle information, and may be plural items of vehicle information such as the gear stage information **50** and the shift-up indicator **54**, for example. When the specified information is plural items of vehicle information, the specifying portion **62** is provided in accordance with the number of items of specified information in the specifying layer **60**. Namely, two or more portions of the specifying layer **60** that

are lower than the opacity of the remaining portion **64** may be provided.

[0064] In the above exemplary embodiment, the region serving as the specifying portion **62** in the specifying layer **60** may dynamically change in conjunction with an increase in the engine speed of the vehicle **10**. For example, the CPU **21** may enlarge the area to become the specifying portion **62** in the specifying layer **60** in accordance with the number of illuminated gauges **55** in the shift-up indicator **54**. In such cases, in the example illustrated in FIG. **4**, the CPU **21** designates portions that cover the four gauges **55** from the left in the left gauge group **56** and the four gauges **55** from the right in the right gauge group **58** as the specifying portion **62**. Thereafter, in a case in which the fifth and sixth gauges **55** from the left in the left gauge group **56** and the fifth and sixth gauges **55** from the right in the right gauge group **58** are illuminated owing to an increase in the engine speed, as in the example illustrated in FIG. **5**, the CPU **21** may enlarge the specifying portion **62** to portions that cover the sixth gauge **55** from the left in the left gauge group **56** and the sixth gauge **55** from the right in the right gauge group **58**.

[0065] Note that various processors other than the CPU may execute the specifying processing that is executed by the CPU **21** loading and executing software (programs) in the above exemplary embodiment. Examples of the hardware processor in such cases include programmable logic devices (PLD) that allow circuit configuration to be modified post-manufacture, such as a field-programmable gate array (FPGA), and dedicated electric circuits, these being processors including a circuit configuration custom-designed to execute specific processing, such as an application specific integrated circuit (ASIC). The specific processing may be executed by one of these various processors, or may be executed by a combination of two or more processors of the same type or different types (such as plural FPGAs, or a combination of a CPU and an FPGA). More specifically, the hardware configuration of these various processors is an electrical circuit including circuit elements such as semiconductor elements and the like in combination.

[0066] In the above exemplary embodiment, an aspect in which the information processing program **24**A is stored (installed) in advance in the storage **24** has been described; however, the present disclosure is not limited thereto. The information processing program **24**A may be provided in a form recorded in a non-transitory computer-readable recording medium, such as a CD-ROM (Compact Disk Read Only Memory), a DVD-ROM (Digital Versatile Disk Read Only Memory), or a USB (Universal Serial Bus) memory. Further, the information processing program **24** A may be downloaded from an external device through a network.

[0067] There are cases in which it is desirable to improve the visibility of some of the information displayed at a display unit inside a vehicle as disclosed in JP-A No. 2013-57568. For example, in such cases, simply by increasing the brightness of the entire display unit, information other than the portion of information for which enhanced visibility was desired is emphasized, and the display content of the display unit becomes a nuisance to the driver.

[0068] Therefore, an object of the present disclosure is to provide an information processing device that, among vehicle information relating to the vehicle displayed at a monitor, can display specified information in a more emphasized manner compared to vehicle information other than the specified information.

[0069] A first aspect of the present disclosure is an information processing device, including a processor. The processor is configured to increase a brightness of an intra-vehicle monitor provided in front of a driver seat, and display, overlaid on the monitor, a specifying layer in which, among vehicle information related to a vehicle displayed at the monitor, an opacity of a first region, which is a specifying region at which is displayed first information that is specified information, is made lower than an opacity of a second region at which is displayed second information that is the vehicle information other than the specified information.

[0070] In the information processing device according to the first aspect, the processor increases the brightness of the monitor, and displays, overlaid on the monitor, a specifying layer in which an opacity of a first region, which is a specifying region at which is displayed first information that is

specified information, is made lower than an opacity of a second region at which is displayed second information that is vehicle information other than the specified information. As a result, according to this information processing device, by making the brightness of the first information displayed at the monitor relatively higher than the brightness of the second information, among the vehicle information displayed at the monitor, the first information can be displayed in an emphasized manner compared to the second information.

[0071] A second aspect of the present disclosure is the information processing device of the first aspect, wherein the processor is configured to display the first information at the monitor based on a permission condition for changing a travel performance of the vehicle having been established.

[0072] In the information processing device according to the second aspect, the processor displays the first information on the monitor based on a permission condition for changing the travel performance of the vehicle having been satisfied. As a result, according to this information processing device, in an environment in which it is possible to change the vehicle travel performance, among the vehicle information displayed at the monitor, the first information can be displayed in an emphasized manner compared to the second information.

[0073] A third aspect of the present disclosure is the information processing device of the first aspect, wherein: the first information is a shift-up indicator that notifies a driver of the vehicle of a timing for shifting gear upward, and the processor is configured to display the shift-up indicator at an uppermost part among the vehicle information displayed at the monitor.

[0074] In the information processing device according to the third aspect, the first information is a shift-up indicator that notifies the driver of the timing for shifting up. Further, the processor causes the shift-up indicator to be displayed at an uppermost part among the vehicle information displayed at the monitor. As a result, according to this information processing device, by making the brightness of the shift-up indicator displayed on the monitor relatively higher than the brightness of the second information, among the vehicle information displayed on the monitor, the shift-up indicator can be displayed in an emphasized manner compared to the second information. In addition, according to this information processing device, by displaying the shift-up indicator at the top of the vehicle information displayed at the monitor, it is possible for the driver to be cognizant of the timing of the shift-up without excessively dropping his/her line of sight while the vehicle **10** is traveling.

[0075] A fourth aspect of the present disclosure is the information processing device of the third aspect, wherein: the shift-up indicator comprises a plurality of gauges that are aligned along a predetermined direction in the monitor and that are illuminated in conjunction with an increase in engine speed of the vehicle, and the processor is configured to, in conjunction with the increase in engine speed, gradually light the gauges from respective ends towards a center in the predetermined direction, and to change an illumination color of the gauges in accordance with the engine speed.

[0076] In the information processing device according to the fourth aspect, the shift-up indicator includes plural gauges that are aligned along a predetermined direction in the monitor and that are illuminated in conjunction with an increase in engine speed. Further, in conjunction with the increase in engine speed, the processor gradually illuminates the gauges from respective ends towards a center in the predetermined direction, and changes the illumination color of the gauges in accordance with the engine speed. As a result, according to this information processing device, by changing the illumination color of the gauges in accordance with the engine speed, it is possible for the driver to be made aware that the timing for shifting up is approaching.

[0077] A fifth aspect of the present disclosure is the information processing device of the fourth aspect, wherein the processor is configured to change the illumination color of all of the gauges to a specific color for use when illuminating all of the gauges in a case in which all of the plurality of gauges are illuminated.

[0078] In the information processing device according to the fifth aspect, in a case in which all of

the plural gauges are illuminated, the processor changes the illumination color of all of the gauges to a specific color for use when illuminating all of the gauges. As a result, according to this information processing device, by illuminating all of the gauges with a specific color, the driver can be made aware that the timing for shifting up has arrived.

Effect of Invention

[0079] As explained above, with the information processing device according to the present disclosure, among vehicle information relating to the vehicle displayed at a monitor, specified information can be displayed in a more emphasized manner compared to vehicle information other than the specified information.

Claims

1. An information processing device, comprising a processor, the processor being configured to increase a brightness of an intra-vehicle monitor provided in front of a driver seat, and display, overlaid on the monitor, a specifying layer in which, among vehicle information related to a vehicle displayed at the monitor, an opacity of a first region, which is a specifying region at which is displayed first information that is specified information, is made lower than an opacity of a second region at which is displayed second information that is the vehicle information other than the specified information.

2. The information processing device of claim 1, wherein the processor is configured to display the first information at the monitor based on a permission condition for changing a travel performance of the vehicle having been established.

3. The information processing device of claim 1, wherein: the first information is a shift-up indicator that notifies a driver of the vehicle of a timing for shifting gear upward, and the processor is configured to display the shift-up indicator at an uppermost part among the vehicle information displayed at the monitor.

4. The information processing device of claim 3, wherein: the shift-up indicator comprises a plurality of gauges that are aligned along a predetermined direction in the monitor and that are illuminated in conjunction with an increase in engine speed of the vehicle, and the processor is configured to, in conjunction with the increase in engine speed, gradually light the gauges from respective ends towards a center in the predetermined direction, and to change an illumination color of the gauges in accordance with the engine speed.

5. The information processing device of claim 4, wherein the processor is configured to change the illumination color of all of the gauges to a specific color for use when illuminating all of the gauges in a case in which all of the plurality of gauges are illuminated.