受験番号：28IPE018

問 1

1.

A head mounted display device, comprising:

a image generation unit configured to generate a first image for displaying a first virtual image and a second image serving as an eye guiding image for displaying a second virtual image for assisting movement of an eye of a user toward the first virtual image;

an image display unit configured to display the generated first and second images and output display light of the first and second images;

a see-through projection optical unit disposed in front of the eye of the user, the see-through projection optical unit including a first part configured to project, to the eye of the user, the display light of the first and second images, and a second part through which the user visually recognizes actual view; and

a control unit configured to control the image generation unit.

4.

The head mounted display device according to any of claims 1 to3, wherein,

the second virtual image is displayed in the vicinity of the first virtual image on a virtual image display plane of the first virtual image, and

the second virtual image is a virtual image of an eye guiding object serving as the eye guiding image, and at least one of color and brightness of the eye guiding object, and a position of the eye guiding object on the virtual image display plane changes over time.

5.

The head mounted display device according to claim 4, wherein,

when the eye guiding object is an object of which position on the virtual image display plane changes, and

when the forward direction with respect to the user is defined as a first direction, the left-right direction perpendicular to the first direction and parallel to a line segment connecting the left and right eyes of the user is defined as a second direction, and the up-down direction perpendicular to both of the the first and second directions and parallel to the vertical line is defined as a third direction,

the control unit is configured to cause the second virtual image to move on the

virtual image display plane along a part of an arc extending in a line symmetric manner with respect to a straight line extending in the second direction so that the position of the second virtual image in the second direction and the position of the second virtual image in the third direction are simultaneously changed.

問２

There are known charging and discharging systems for supplying electric power from a storage battery of an electric vehicle to home electrical loads and charging a storage battery of an electric vehicle by home commercial power supply.

In the conventional charging and discharging system, when a storage battery of an electric vehicle is charged by commercial power supply, power conditioner for electric vehicles provided as housing equipment is provided for converting AC voltage to certain DC voltage, in other words, for converting AC power into DC power. On the other hand, when electric power from the storage battery of the electric vehicle is supplied to the home electrical loads, the power conditioner for electric vehicles converts DC voltage (DC power) output from the storage battery of the electric vehicle into AC voltage (AC power) to supply the AC voltage to the home electrical loads. An example of such a energy charging and discharging system including a power conditioner for electric vehicles is a charging and discharging system disclosed in Patent Literature 1.

In power conditioners for electric vehicles used in conventional charging and discharging systems having charging function for storage batteries of electric vehicles, when discharging operation for discharging storage battery DC voltage from a storage battery of an electric vehicle is performed, communication processing is performed between the power conditioner for electric vehicles and the electric vehicle, and the establishment of the communication processing is required for initiating the above-described discharging operation based on a reason described later. Therefore, if the above-described communication processing is not established, the above-described discharging operation cannot be performed.

The reason why the communication processing is required for initiating the discharging operation is that applying voltage to the charging and discharging terminal of the electric vehicle when the above-described communication processing is not established may result in a dangerous situation including the risk of electric shock.

＊翻訳についてのコメント

「電機自動車用」は「電気自動車」の誤記と解釈し修正して翻訳いたしました。

「電気自動車通信との間で」は、「電気自動車との間で」の誤記と解釈し修正して翻訳いたしました。

問 3

(A)

One of the problems of the gradient descent method is difficultly in selection of the learning rate. When a lower learning rate is selected, improvement in the accuracy of the DNN (accuracy rate or error) becomes slower, and thus longer time required for the learning process. On the other hand, when a higher learning rate is selected, learning progression initially becomes faster, and thus time required until certain extent of accuracy is achieved becomes shorter. However, sometimes the learning may fail in the middle of the learning process and the significantly lowered (deteriorated) accuracy cannot be recovered, on the contrary.

(A')

(B)

Further, in the learning process, the accuracy of the DNN may initially greatly improve, and then may gradually deteriorate. In such a case, the gradual deterioration may be prevented by re-selecting the learning rate.

Fig. 6 is a graph for illustrating the problem in the gradient descent method. The curve of the error E in Fig. 6 is the same as the curve in Fig. 5. However, learning rate η in the example of Fig. 6 is set to a constant value higher than that in Fig. 5. In the figure, t represents time in the learning cycle, and W at each t represents weight at time t. The curve of error E in Fig. 6 includes a minimum point of the error E (weight = Wmin) and a local minimum point of the error E (weight = Wlocal). The needed weight is the weight Wmin which gives the minimum error E, and the weight Wlocal is weight which gives a local solution of the error E. The minimum error E gives best accuracy in the output of the DNN. In the DNN to which the initial weight W1 at t = 1 is set, gradient $\partial E/\partial w$ is a negative value having a large absolute value, and thus the updated weight W2 significantly shifts in the positive (right) direction, and the error function E (W2) also significantly decreases.

(B')