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Q1

[Claim 1]

A cardiothoracic ratio calculation device for calculating a cardiothoracic ratio based on a chest radiograph, comprising:

a measurement-position estimation unit that estimates a lung's right end position, a lung's left end position, a heart's right end position, and a heart's left end position in the chest radiograph; and

a cardiothoracic ratio calculation unit that calculates a cardiothoracic ratio based on the lung's right end position, the lung's left end position, the heart's right end position, and the heart's left end position that are estimated, wherein

the measurement-position estimation unit divides the chest radiograph into a plurality of horizontal regions and, for each of the horizontal regions, detects a lung's right end candidate and a lung's left end candidate based on pixel values and detects a heart's right end candidate and a heart's left end candidate based on differential values of the pixel values in a horizontal direction, and

the measurement-position estimation unit further extracts a specific one of the horizontal regions based on a distance between a lung's middle point determined by the lung's right end candidate and the lung's left end candidate and a heart's middle point determined by the heart's right end candidate and the heart's left end candidate or a ratio of the distance to a lung width determined by the lung's right end candidate and the lung's left end candidate, and estimates a lung's right end candidate, a lung's left end candidate, a heart's right end candidate, and a heart's left end candidate in the extracted horizontal region as the lung's right end position, the lung's left end position, the heart's right end position, and the heart's left end position.

[Claim 2]

The cardiothoracic ratio calculation device according to claim 1, wherein, assuming that the pixel values are higher as X-ray transparency is higher, the measurement-position estimation unit detects a position of a lowest pixel value within a predetermined range

from a right end of the each of the horizontal regions as the lung's right end candidate, and

detects a position of a lowest pixel value within a predetermined range from a left end of the each of the horizontal regions as the lung's left end candidate.

[Claim 3]

The cardiothoracic ratio calculation device according to claim 1 or 2, wherein the measurement-position estimation unit detects a position of a largest differential value in a negative direction between the lung's right end candidate and the lung's left end candidate in the each of the horizontal regions as the heart's right end candidate, and

detects a position of a largest differential value in a positive direction between the lung's right end candidate and the lung's left end candidate in the each of the horizontal regions as the heart's left end candidate.

Q2

There is conventionally known technology called blockchain. This technology is a scheme of synchronizing the same record among a large number of nodes on a network. When a new record is added to the existing records, a block that is a unit of record takes over the content of a preceding block (a hash) and is sequentially added in a chainlike manner. For this reason, this technology is called blockchain. In general, the term blockchain refers to the structure of a database in which blocks are linked in a chainlike manner. However, this term may be used in a broad sense, for example, to cover a scheme of operating as a P2P network or a scheme of approving transactions, and the definition of this term is not determined at this time. Accordingly, in the present specification, "blockchain" is used in the former, narrow sense and "blockchain technology" is used in the latter, broad sense in order to avoid confusion between them.

Since blockchain technology has many advantages of zero down time, difficulty of falsification, and low cost, for example, it is beginning to attract attention not only in virtual currencies including Bitcoin and currencies derived therefrom but also as a method of managing

information related to various assets as transactions. For example, Non-Patent Document 1 describes use of blockchain, which can have an important role for establishing reliability, for proof of existence of various documents and proof of identity.

Blockchain technology mainly includes a public node method and a private node method. The public node method is a method in which anyone can participate as a node on a network. Meanwhile, the private node method is a method in which only an authorized person can participate as a node on a network.

Q3

<When backfire occurs>

In the burner 100, when backfire R enters from the burner element 15, the thermally expandable member 22 is caused to thermally expand toward the inner circumferential side by heat of the backfire R, thereby forming a thermally expandable member 222 with the opening 22H blocked.

Consequently, the opening 22H of the thermally expandable member 222 (22) is blocked, and thus heat of the backfire R and the ultraviolet rays L emitted from the flame F produced by the burner element 15 are prevented from reaching the flame detection sensor 23.

In the present embodiment, for example, a controller (not shown) is configured to determine that the burner 100 is burning normally when the flame detection sensor 23 is detecting the ultraviolet rays L, and determine that backfire or misfire occurs when the amount of the ultraviolet rays L detected by the flame detection sensor 23 is equal to or less than a set threshold (a case where the amount is zero is also included).

As a result, when misfire of the burner 100 occurs and the ultraviolet rays L are no longer emitted, when the thermally expandable member 22 thermally expands and the flame detection sensor 23 stops detecting the ultraviolet rays L as shown in FIG. 3(B), and when the detected amount of the ultraviolet rays L is equal to or less than the threshold, it is determined that misfire or backfire occurs in the burner 100.