問１．
【請求項１】
A cardiothoracic ratio calculating device for calculating a cardiothoracic ratio based on a chest X-ray image, the cardiothoracic ratio calculating device comprising:

a measurement position estimation unit configured to estimate a lung right end position, a lung left end position, a heart right end position, and a heart left end position in the chest X-ray image,

a cardiothoracic ratio calculation unit configured to calculate a cardiothoracic ratio based on the lung right end position, the lung left end position, the heart right end position, and the heart left end position that are estimated, wherein

the measurement position estimation unit divides the chest X-ray image into a plurality of horizontal regions, detects a lung right end candidate and a lung left end candidate based on a pixel value in each of the plurality of horizontal regions, and detects a heart right end candidate and a heart left end candidate based on a differential value of the pixel value in a horizontal direction, and

further, based on a distance between a lung midpoint determined by the lung right end candidate and the lung left end candidate and a heart midpoint determined by the heart right end candidate and the heart left end candidate, or a ratio of the distance to a lung width determined by the lung right end candidate and the lung left end candidate, a specific horizontal region is extracted, and a lung right end candidate, a lung left end candidate, a heart right end candidate and a heart left end candidate in the specific horizontal region extracted are respectively inferred to be a lung right end position, a lung left end position, a heart right end position, and a heart left end position.

【請求項２】
The cardiothoracic ratio calculating device according to claim 1, wherein

in a case that the pixel value increases as an X-ray transmittance increases,

the measurement position estimation unit

detects, in a region within a predetermined range from a right edge of a horizontal region of the plurality of horizontal regions, a position with a lowest pixel value as the lung right end candidate, and

detects, in a region within a predetermined range from a left edge of a horizontal region of the plurality of horizontal regions, a position with a lowest pixel value as the lung left end candidate.

【請求項３】

The cardiothoracic ratio calculating device according to any one of claims 1 and 2, wherein

　　　　the measurement position estimation unit

　　　　detects, as the heart right end candidate, a position where the differential value is largest in a negative direction between the lung right end candidate and the lung left end candidate in a horizontal region of the plurality of horizontal regions, and

　　　　detects, as the heart left end candidate, a position where the differential value is largest in a positive direction between the lung right end candidate and the lung left end candidate in a horizontal region of the plurality of horizontal regions.

問２．

　A technique called a blockchain has been known. The technique is a mechanism to synchronize the same record between a number of nodes in a network, and in a case that a new record is added to an existing record, a block serving as a recording unit determines the content (hash) of the immediately preceding block, and the block is added one after another in a chain. That is why the technique is called the blockchain. In general, the term blockchain may refer to the structure of a database in which blocks are connected in a chain, and the term blockchain may also be used in a broad sense that includes a mechanism for operating as a P2P network and a mechanism for transaction approval, so the definition of the term blockchain is currently not clear. Therefore, in the present specification, in order to prevent confusion between the two usages, the former is referred to as "blockchain" when the term is used in a narrow sense, and the latter is referred to as "blockchain technique" when the term is used in a broad sense.

　The blockchain technique has many advantages such as zero downtime, difficulty in alteration, and low cost, so the blockchain technique is also beginning to attract attention as a method of managing, as transactions, information of not only virtual currencies including Bitcoin and its derivatives but also various assets. For example, Non-Patent Literature 1 describes that a blockchain, which can play an important role to establish reliability, is used for proof of existence and proof of identity of various documents.

　The blockchain technique is generally categorized into a public node method and a private node method. The public node method is a method in which anyone can participate as a node in a network. On the other hand, the private node method is a method in which only those who are authorized as nodes in a network can participate.

問３.

In a case of Flashback

In the burner 100, in a case that a flashback R enters from the burner element 15, as illustrated in FIG. 3B, the heat of the flashback R causes the heat-expandable member 22 to thermally expand toward the inner peripheral side, thereby forming a heat-expandable member 222 in which the opening 22H is closed.

As a result, the closed opening 22H of the heat-expandable member 222 (22) prevents the heat of the flashback R and the ultraviolet L emitted by the flame F generated by the burner element 15 from arriving at the flame detection sensor 23.

In the present embodiment, the control unit (not illustrated) is configured to determine that, for example, in a case that the flame detection sensor 23 detects ultraviolet L, the burner 100 is normally burning, and in a case that the amount of ultraviolet light L detected by the flame detection sensor 23 is equal to or less than a configured threshold (including zero), either a flashback or a misfire event has occurred.

As a result, in a case that the burner 100 misfires and does not emit the ultraviolet L, and in a case that the heat-expandable member 22 thermally expands and the flame detection sensor 23 does not detect the ultraviolet L as illustrated in FIG. 3B, or in a case that the amount of the ultraviolet L detected is equal to or less than the threshold, it is determined that either a flashback or a misfire event has occurred in the burner 100.