

Description

Title of Invention: THROWING GAME DEVICE, INFORMATION PROCESSING DEVICE, INFORMATION PROCESSING METHOD, AND PROGRAM

Technical Field

[0001]

The present invention relates to a throwing game device, an information processing device, an information processing method, and a program.

Background Art

[0002]

Various throwing game devices for performing throwing games have conventionally been proposed. For example, Patent Literature 1 discloses a darts game device that can perform calculation of points, number of throws, number of rounds, and so forth, in a darts game called Zero One.

Citation List

Patent Literature

[0003]

Patent Literature 1: Patent Publication JP-A-2010-190487

Summary of Invention

Technical Problem

[0004]

In darts games such as Zero One and the like, points of segments, where darts hit, are subtracted, in order, from a score that is set in advance, and when a

player succeeds in matching his/her score with a reference value such as zero or the like, the player finishes. Accordingly, a segment that the player should hit with the next throw in order to finish with a minimal count of throws is not necessarily a segment with the highest points, hence sundry variations are conceivable in accordance with the score. However, variations of segments that should be hit with the next throw are highly diverse in accordance with the score and strategy, hence ascertaining the same requires a high degree of mastery for players.

[0005]

Accordingly, in light of the above, an object of the present invention is to provide a throwing game device, an information processing device, an information processing method, and a program that can improve amusement qualities of throwing games.

Solution to Problem

[0006]

An information processing device according to an aspect of the present invention, that outputs display data relating to a throwing game, in which points associated with a segment, which a throwing object hits, from among a plurality of segments provided on a target are sequentially subtracted from a score, and finishing is decided by making the score match a reference value, includes a per-segment least throws count calculating unit that calculates a per-segment least throws count that is a smallest count of throws necessary to make the score match the reference value, in association with each segment from among the plurality of segments, in a case of assuming that the throwing object hits the segment in a next throw, a display data generating unit that generates display data for displaying at

least one segment from among the plurality of segments in a display form based on the per-segment least throws count associated with the segment, and an output unit that outputs the display data.

[0007]

According to this aspect, at least one segment from among the plurality of segments is displayed in a display form based on the per-segment least throws count that is the smallest count of throws necessary to make the score match the reference value, in a case of assuming that the throwing object hits this segment in the next throw. Accordingly, the player can comprehend the per-segment least throws count of at least one segment, and amusement qualities of the throwing game can be improved.

Advantageous Effect of Invention

[0008]

According to the present invention, a throwing game device, an information processing device, an information processing method, and a program that can improve amusement qualities of throwing games can be provided.

Brief Description of Drawings

[0009]

[Figure 1] Figure 1 is a schematic frontal view illustrating an example of an external appearance of a darts game device 10.

[Figure 2] Figure 2 is a block diagram illustrating an example of a hardware configuration of the darts game device 10.

[Figure 3] Figure 3 is a schematic diagram illustrating an example of an external appearance of a target 101A.

[Figure 4] Figure 4 is a functional block diagram illustrating examples of a functional unit that a control device 111 has.

[Figure 5] Figure 5 is a diagram showing an example of a data structure of a checkout table.

[Figure 6] Figure 6 is a diagram illustrating an example of a screen G displayed by display data generated by an output data generating unit.

[Figure 7] Figure 7 is a flowchart showing an example of operations of the darts game device 10.

Description of Embodiments

[0010]

A preferred embodiment of the present invention will be described with reference to the attached drawings. (Note that items denoted by the same signs in the drawings have the same or equivalent configurations.)

[0011]

(1) Darts Game Device 10

Figure 1 is a schematic frontal view illustrating an example of an external appearance of a darts game device 10. Figure 2 is a block diagram illustrating an example of a hardware configuration of the darts game device 10.

[0012]

The darts game device 10 is a game device for playing a darts game (an example of a throwing game), and is configured including various configurations

inside and outside of a housing that is substantially a cuboid. The darts game device 10 includes, for example, a dartboard 101, segment detecting units 102, a communication device 103, an operating device 104, a display device 105, an audio output device 106, card slots 107, a card RW unit 108, a coin inlet unit 109, an external storage interface 110, and a control device 111.

[0013]

A target 101A that is substantially circular is provided to the dartboard 101. The target 101A is provided with a plurality of segments defined by a distance and a direction from a center located substantially at the center of the target 101A. These segments are defined by frames, for example, that are erected on the target 101A. A plurality of receiving holes, which are capable of receiving darts (an example of throwing objects), are provided in the segments that the target 101A is provided with. When a dart thrown by a player reaches one of the receiving holes, the dart can be held by this receiving hole, in a form in which a part of the dart is inserted (stabbed) therein. The segment containing the receiving hole in which the dart is held is the segment that the player has hit with the dart in this throw, and points associated with this segment are to be given to the player.

[0014]

The target 101A will now be described with reference to Figure 3. Figure 3 is a schematic diagram illustrating an example of an external appearance of the target 101A. The target 101A is provided with types of segments, which are an inner bullseye IB, an outer bullseye OB, an inner single segment ISS, an outer single segment OSS, a triple segment TS, and a double segment DS.

[0015]

The inner bullseye IB, which is circular, is disposed at the center of the target 101A. The outer bullseye OB, which is ring-shaped, is disposed on a periphery of the inner bullseye IB. The inner single segment ISS, which is fan-shaped, is disposed on a periphery of the outer bullseye OB. The triple segment TS, which is fan-shaped, is disposed on a periphery of the inner single segment ISS. The outer single segment OSS, which is fan-shaped, is disposed on a periphery of the triple segment TS. The double segment DS, which is fan-shaped, is disposed on a periphery of the outer single segment OSS.

[0016]

The inner single segment ISS, the outer single segment OSS, the double segment DS, and the triple segment TS are associated with labels of numbers from 1 to 20, in each radial direction. In the present disclosure, there are cases in which the inner bullseye IB and the outer bullseye OB are referred to as “bullseye”, the single segment ISS and the single segment OSS as “single”, the triple segment TS as “triple”, and the double segment DS as “double”, respectively. Also, in the present disclosure, expressions such as “S5” or the like are used in some cases, making use of signs indicating the types of segments (S for single segment, D for double segment, and so forth), and the label that the segment is associated with, for example.

[0017]

Each segment may be associated with points to be awarded to a player when successful in hitting (hitting the target) this segment with the dart, as described below, for example. The inner bullseye IB may be associated with predetermined points (e.g., 50 points), for example. The outer bullseye OB may be associated with predetermined points, for example. The predetermined points associated with the

outer bullseye OB may be the same points (e.g., 50 points) associated with the inner bullseye IB (fat bullseye), or may be half the points (e.g., 25 points) associated with the inner bullseye IB (separate bullseye). In a case of a separate bullseye, there are cases in which the inner bullseye IB is referred to as “double bullseye”, and the outer bullseye OB as “single bullseye”, respectively. The inner single segment ISS and the outer single segment OSS may be associated with the points of the label associated with the segments. The double segment DS may be associated with double the label associated with the segment, for example. The triple segment TS may be associated with triple the label associated with the segment, for example.

[0018]

The darts game device 10 according to the present embodiment is applicable to any darts game, and in particular is applicable to a darts game in which winning or losing is determined in accordance with a total value of points associated with segments hit by darts from among the plurality of segments provided to a target, as compared to a reference value.

[0019]

In the present disclosure, a case of applying the darts game device 10 according to the present embodiment to a darts game called Zero One will be described as one example. In Zero One, a match is made up of a plurality of rounds. In each round, each player throws a predetermined number of (e.g., three) darts. The players start with a starting points set in advance as a starting score. The value of the starting points is not limited in particular, and may optionally set to be a value of which the smallest digit is 1, such as for example 301 points, 501 points, or the like, or may be a value of which the smallest digit is a value other than 1, such as 0 or the like. Each time a dart hits a segment, the player deletes

(subtracts) the points for the segment where the dart hit from the score, and the value that is obtained is a new score. Further, when the score successfully matches a reference value (e.g., 0), this player finishes. In this way, the player that reaches the score of 0 first is the winner. Conversely, when the dart hits a segment with points greater than the score, this is a bust (BUST), and the player does not finish and is subjected to a penalty that is set in advance. How to handle a case of bust can be stipulated optionally, and may be, for example, for the player to take turns with the next player even though he/she has not thrown three darts yet, and for the score to default to the score when starting the round.

[0020]

In Zero One, a segment that must be hit by the first throw may be set as an in option. For example, the in option may include a “double in” in which a double must be hit by the first throw, or a “master in” in which a double or a triple must be hit with a minimal count of throws. Note that an “open in” may be set, in which any segment may be hit by the first throw.

[0021]

In Zero One, an “open out” rule may be set in which there is no restriction on which segment must be hit by the dart when finishing, or a rule may be set in which a particular segment must be hit by the dart when finishing, as an out option. The particular segment that must be hit by the dart when finishing is not restricted in particular, and for example may be one of a double segment DS and the inner bullseye IB (“double out” rule), or may be one of a double segment DS, a triple segment TS, the inner bullseye IB, and the outer bullseye OB (“master out” rule).

[0022]

Figure 1 and Figure 2 will be referenced again. The segment detecting units 102 are for detecting which segment that the dart thrown by the player hit, with a plurality thereof being provided corresponding to each of the segments of the target 101A provided to the dartboard 101. In the present embodiment, when a dart thrown by the player hits a particular segment, this segment of the dartboard 101 moves slightly rearward under impact of the dart. The segment detecting units 102 detect the displacement of this segment of the dartboard 101, and send a detection signal indicating the segment where the dart hit to the control device 111. The segment detecting units 102 may be configured as membrane switches, for example, made up of a plurality of electrical contacts that conduct when subjected to external pressure, and membrane sheets, which are laminated.

[0023]

The communication device 103 includes a communication interface circuit for connecting the darts game device 10 to a communication network, and performing communication over the communication network. The communication device 103 supplies data, received from other information processing devices via the communication network, to the control device 111. The communication device 103 also transmits data supplied from the control device 111 to other information processing devices via the communication network.

[0024]

The operating device 104 is for the player to perform various types of operations, and is made up of operation buttons and so forth that are provided on an operation panel, for example. The operating device 104 according to the present embodiment is operated by the player when, for example, selecting various types of darts games (e.g., Zero One, cricket, etc.).

[0025]

The display device 105 is an example of an output device, and has a function of displaying various types of screens related to darts games, on the basis of display data supplied from the control device 111. Specifically, the display device 105 may be, for example, a liquid crystal display, an organic EL display, or the like.

[0026]

The audio output device 106 is another example of an output device, and has functions of outputting audio (audio output) relating to darts games, on the basis of audio signals supplied from the control device 111. Specifically, the audio output device 106 is made up of a speaker or the like that can amplify audio signals with a digital amplifier or the like and perform audio output thereof, for example.

[0027]

The card slots 107 are insertion inlets for players to insert player cards that they own. The darts game device 10 according to the present embodiment is provided with four card slots 107, such that up to four teams can perform match play (this does not limit the maximum number of players). Player cards are an example of media, and may be configured so as to be capable of recording identification information (ID) of the player, history of statistics in past matches, and so forth, for example. The card RW unit 108 is configured to be capable of reading and writing such information recorded in the player cards inserted into the card slots 107, for example.

[0028]

The coin inlet unit 109 is provided with an inlet from which coins are inserted, and a sensor for detecting coins inserted from the inlet. In the present embodiment

gameplay is enabled by the player inserting a predetermined number of coins from the coin inlet. Note that the darts game device 10 may be configured to enable gameplay by techniques such as electronic settlement payment or the like, using prepaid payment means such as electronic money or the like.

[0029]

The external storage interface 110 is an interface to which external storage such as, for example, flash memory (USB memory), or the like, can be connected. The functions of the darts game device 10 according to the present embodiment may be realized by a settings file read in from the external storage connected to the external storage interface 110, for example.

[0030]

The control device 111 includes a processor 112, memory 113, and storage 114. The control device 111 centrally controls various types of configurations that the darts game device 10 has.

[0031]

The processor 112 may be made up of a CPU (Central Processing Unit), and controls various types of processing in the darts game device 10 by executing programs stored in the memory 113. For example, various types of functional units that the darts game device 10 has can be temporarily stored in the memory 113, and thereupon realized primarily as programs running on the processor 112.

[0032]

The memory 113 is a storage medium that has random access memory (RAM) or the like, which functions as a storage region for data, and a work area for

the processor 112, for example. The memory 113 temporarily stores data necessary when executing the programs executed by the processor 112.

[0033]

The storage 114 is a nonvolatile storage medium such as, for example, a hard disk drive (HDD) or the like. The storage 114 stores operating systems and various types of programs. Additionally, the storage 114 can store various types of databases (DB) or the like. Such programs and data are loaded to the memory 113 as necessary, and are referenced by the processor 112. Note that the programs may be storable in non-transitory recording media such as USB memory, CD-ROMs, and so forth. Also, the programs may be supplied to the storage 114 by an optional transmission medium (communication network, broadcast waves, etc.) capable of transmitting the programs. Note that an embodiment of the present invention may be realized in a form of data signals embedded in carrier waves, in which the programs are embodied by electronic transmission.

[0034]

(2) Functional Configuration of Control Device 111

A functional configuration of the control device 111 will be described with reference to Figure 4. The control device 111 is an example of an information processing device. Figure 4 is a functional block diagram illustrating an example of functional units that the control device 111 has. The control device 111 has, for example, a storage unit 11 and a control unit 12, as functional units realized by the processor 112, the memory 113, the storage 114, and so forth, that the control device 111 has.

[0035]

The storage unit 11 stores data that is necessary for processing of the darts game device 10. The storage unit 11 may store match data of darts games, for example. The match data may include, for example, players to participate in a match, rules of the match (in options, out options, score at the point of starting the match, etc.), points per throw associated with each player, number of throws and number of rounds, value of the score that is updated with each throw, and so forth.

[0036]

The storage unit 11 stores a checkout table, for example. Figure 5 is a diagram showing an example of a data structure of the checkout table. The checkout table is associated with the value of the score, and is a table of combinations (arrangements) of segments to be hit by darts to take the score to 0. In the example shown in Figure 5, the rows at the far left column show particular scores, and the columns to the right show combinations (arrangements) of segments to be hit by darts to take the score to 0, for each number of throws.

[0037]

In the checkout table, in a case in which the score is “32” for example, “(D16)” is shown in the column for count of throws of “1”. This indicates that in a case in which the next throw hits D16, the player finishes. Also, in a case in which the score is “32” for example, “(D15, D1)” is shown in the column for count of throws of “2”. This indicates that in a case in which the next throw hits D15 and the subsequent throw hits D1, the player finishes. In the same way, for example, “(D14, D2)” indicates that in a case in which the next throw hits D14 and the subsequent throw hits D2, the player finishes.

[0038]

The checkout table may be configured to include, regarding part or all of the score, all possible arrangements regarding the score. Alternatively, the checkout table may be configured to include, regarding part or all of the score, just a part of the possible arrangements regarding the score. In a case in which the checkout table includes just a part of the arrangements, this part may be, for example, part or all of possible arrangements under predetermined rules such as master out, double out, or the like, may be just arrangements based on a predetermined theory, or may be arrangements associated with a particular user, although this can be set in any way.

[0039]

The control unit 12 has a match progress unit 12a, a per-segment least throws count calculating unit 12b, a target least throws count deciding unit 12c, a recommended segment selecting unit 12d, an output data generating unit 12e, and an output control unit 12f.

[0040]

The match progress unit 12a executes control to cause the match of the darts game in the darts game device 10 to progress. The match progress unit 12a accepts operations relating to progress of the darts game from, for example, a player via the operating device 104 or the like. The match progress unit 12a detects the segments where darts thrown by the players hit, and perform recording thereof in the storage unit 11 as match data. Also, the match progress unit 12a may decide winning or losing of each player on the basis of data such as the score or the like, and store information regarding this winning or losing in the storage unit 11.

[0041]

The per-segment least throws count calculating unit 12b calculates a per-segment least throws count in association with each segment of the target 101A. This per-segment least throws count is the smallest value of the count of throws (including the next throw) necessary for the current score to match the reference value, in a case of assuming that the dart will hit this segment in the next throw. For example, in a case in which the current score is “32”, under conditions of the dart hitting D16 in the next throw, a throw count of at least one (D16) is necessary for the score 32 to match the reference value (0 points). Accordingly, in a case in which the current score is “32”, the per-segment least throws count associated with D16 is “1 (throw)”. In the same way, in a case in which the current score is “32”, under conditions of the dart hitting D15 in the next throw, a throw count of at least two (e.g. D15 and S2) is necessary for the score 32 to match the reference value (0 points). Accordingly, in a case in which the current score is “32”, the per-segment least throws count associated with D15 is “2 (throws)”. Note that the per-segment least throws count calculating unit 12b may determine that per-segment least throws count cannot be calculated for segments regarding which a hit would result in a bust.

[0042]

While the calculation method for the per-segment least throws count is not limited in particular, this may be a method in which, for example, difference between the score and the reference value is calculated, optional throwing patterns (combination of segments), assuming that the dart will hit this segment in the next throw, are checked for whether the player will finish thereby on the basis of the difference, and the smallest value of each of the count of throws in the finishing throwing patterns is decided to be the per-segment least throws count. Note that

when checking whether throwing patterns (combination of segments) will finish, segments with more points associated therewith may be prioritized in the checking.

[0043]

Note that in calculation of the per-segment least throws count, the checkout table may be referenced. Specifically, a configuration may be made in which the difference between the score and the reference value is calculated, a predetermined value is continuously subtracted until a value of a score contained in the checkout table is reached, and thereupon, in a case in which the results of the subtraction are the value of the score contained in the checkout table, the smallest value of the count of throws of the throwing patterns associated with the scores in the checkout table may be decided as being the per-segment least throws count. Note that while the predetermined value to be subtracted from the score can be optionally set, this may be a fixed value such as, for example, 60 points corresponding to T20, 50 points corresponding to a bullseye, or the like. Also, the predetermined value may be, under predetermined conditions such as a case in which the score is a predetermined value or lower, or the like, a value based on the score or the like (e.g., a value obtained by multiplying the score by a predetermined proportion), for example.

[0044]

The target least throws count deciding unit 12c decides a target least throws count. This target least throws count is the smallest value of the per-segment least throws count associated with each segment of the target 101A. The target least throws count deciding unit 12c decides upon the smallest of the per-segment least throws count associated with each segment of the target 101A, calculated by the

per-segment least throws count calculating unit 12b, for example, as being the target least throws count.

[0045]

The recommended segment selecting unit 12d selects a segment regarding which hitting is recommended (recommended segment) from among the segments of the target 101A. The recommended segment selecting unit 12d may select the recommended segment from the segments of the target 101A, on the basis of predetermined selection conditions. The selection conditions may be stipulated including at least one of the following first minor condition through fourth minor condition, or any other minor condition. The selection conditions may be able to be optionally stipulated in accordance with the rules of the darts game, and for example, a plurality of minor conditions may be included as and conditions, a plurality of minor conditions may be included as or conditions, and an order of priority may be set for each of the minor conditions. In some cases, a segment that is a subject of determination regarding whether or not it falls under being a recommended segment may be referred to as "subject segment" below.

[0046]

The first minor condition may be a condition based on a throw count difference associated with each segment of the target 101A. This throw count difference is a value obtained by subtracting the target least throws count from the per-segment least throws count associated with each segment of the plurality of segments. The first minor condition may be, for example, that the throw count difference associated with the subject segment (segment that is a subject of determination regarding whether or not a recommended segment) is equal to or less than a predetermined threshold value (example of first threshold value). This

threshold value may be any number of 0, 1, 2, or 3 or more here. In particular, a segment with a throw count difference of 0 is a segment regarding which the player can finish with the least count of throws in the target 101A.

[0047]

Also, the first minor condition may be that, for example, a sum of the throw count difference associated with the subject segment and the throw count difference associated with at least one adjacent segment that is adjacent to this segment is a predetermined threshold value (example of second threshold value) or lower. This threshold value may be any number of 0, 1, 2, or 3 or more here. Taking into consideration not only the throw count difference of the subject segment but also the throw count difference of adjacent segments, in the selection of the recommended segment, enables the throw count difference of segments that are likely to be actually hit by a dart in a case in which the subject segment happens to be missed to be taken into consideration as well.

[0048]

Adjacent segments can be optionally set, and for example, may include segments that are adjacent to the subject segment by sides and/or by points, may include segments that are adjacent to the subject segment with one or a plurality of segments interposed therebetween, and may include segments associated with points adjacent to points with which the subject segment is associated.

[0049]

The second minor condition may be a condition based on the type of subject segment. Types of segments here may include, for example, single, double, triple, inner bullseye, and outer bullseye. The second minor condition may be that, for

example, the subject segment is a single, the subject segment is a double, the subject segment is a triple, the subject segment is the inner bullseye, or that the subject segment is the outer bullseye.

[0050]

Also, in the second minor condition, an order of priority may be set among these plurality of types. The second minor condition enables in options and out options to be handled, for example. Also, the second minor condition enables recommendations of segments to be made in accordance with the level of the players, such as recommending a single segment for a novice, and recommending a double segment or a triple segment for an advanced player, for example.

[0051]

The third minor condition may be a condition based on the points associated with the subject segment. The third minor condition may be that the points associated with the subject segment is a predetermined threshold value or higher, for example. The predetermined threshold value can be optionally set, and for example, may be any value selected from 1 to 60 or the like, such as 18 or the like.

[0052]

Also, the third minor condition may be that the points associated with the subject segment and the score are in a predetermined relation, for example. The predetermined relation may be, for example, that a value obtained by subtracting the points associated with the subject segment from the score (i.e., the new score in a case that the subject segment is hit) is a predetermined value. The predetermined value can be optionally set, and for example, may be a numerical value that is not a bogey number (e.g., a number of which the smallest digit is one of 0, 1, 4, and 7). A

bogey number here may be, for example, a disadvantageous score, such as a particular score that cannot be finished in one round, or the like.

[0053]

The fourth minor condition may be that the score is included in a predetermined range that is specified for the recommended segment. For example, a segment to be selected as a recommended segment may be specified in advance with a predetermined range set in advance with regard to the score. Specifically, in a case in which the score is greater than a predetermined value (e.g., 240 points), for example, the bullseye may be specified as the recommended segment to be selected. This fourth minor condition may be that in a case in which the score is within this predetermined range, this segment that is specified in advance is selected as the recommended segment.

[0054]

A specific example of a selection method of the recommended segment will be described below. Note that a situation will be assumed in which an in option is not set, or an in option is already set and also started (at least one throw has been performed).

[0055]

In a case of employing a fat bullseye, when the score is greater than 240 points, the bullseye (inner bullseye IB and outer bullseye OB) may be selected as the recommended segment (fourth minor condition). In a case of employing a fat bullseye, when the score is 240 points or lower, T20, which has the highest points, may be selected as the recommended segment (third minor condition).

[0056]

In a case of employing a separate bullseye, T20, T19, and T18 may be set as candidates for the recommended segment (third minor condition). Further, in a case in which T20, T19, and T18 are set as candidates for the recommended segment, and further the following conditions regarding the throw count difference are compared in order from above, and the number of candidate segments is one, this candidate segment may be selected as the recommended segment (first minor condition).

(i) The throw count difference is 0.

(ii) The throw count difference of an adjacent single segment is 0.

(iii) With regard to adjacent labels (5 and 1 in the case of T20), the sum of throw count differences of each of single (S5 and S1) segments and triple (T5 and T1) segments is smallest.

Note, however, that in a case in which the remaining count of throws within this round is one throw, a single segment that makes the least significant digit of the score 0, 1, 4, or 7 may be selected as the recommended segment (third minor condition).

[0057]

The output data generating unit 12e generates output data for controlling output of various types of output devices. The output data generating unit 12e may have, for example, a function of a display data generating unit, and may generate display data (an example of output data) to display a predetermined screen on the display device 105. The predetermined screen may be related to the darts game.

[0058]

An example of a screen G that is displayed by the display data generated by the output data generating unit 12e will be described with reference to Figure 6.

The screen G includes regions G0, G1, G2, and G3.

[0059]

The region G0 includes history of points acquired in each round. As illustrated in Figure 6, in this example, 17 points were acquired in round R1, 78 points in round R2, 180 points in round R3, 136 points in round R4, 50 points in round R5, and 8 points in round R6, respectively. Also, assumption will be made that the score at the point of starting the game was 501 points. In this case, the score at the point in time illustrated in Figure 6 is $501 - (17 + 78 + 180 + 136 + 50 + 8) = 32$ points.

[0060]

The segments of the target 101A are illustrated in the region G1. At least one segment in the region G1 is displayed in a display form on the basis of the legend illustrated in the region G3, or the like.

[0061]

The display form of at least one segment may be based on the per-segment least throws count associated with this segment, for example. In particular, the display form of at least one segment may be based on, for example, the throw count difference, which is a value obtained by subtracting the target least throws count from the per-segment least throws count associated with this segment. Specifically, the display form of at least one segment may be stipulated by color, shape, movement, or some other element, set in accordance with the throw count difference. For example, in region G3, the segment with stippling (representing green color) with the text of

“QUICKLY” represents the segment with the smallest throw count difference within the target 101A, which is 0. As illustrated in the region G1, D16 is the green segment in this example. Also, in the region G1 for example, segments of a color that is the same as normal display are segments of which the throw count difference is +1. In this example, D1, S2, D2, T2, D3, S4, D4, T4, D5, S6, D6, T6, D7, S8, D8, T8, D9, S10, D10, T10, D11, S12, D12, D13, S14, D14, D15, S16, S18, and S20 are the segments of the color that is the same as normal display. Also, for example, in the region G3, the segment with right-diagonal hatching (representing red color) with the text of “SLOWLY” represents the segments of which the throw count difference is +2. As illustrated in the region G1, in this example, S1, T1, S3, T3, S5, T5, S7, T7, S9, T9, S11, S13, S15, S17, S19, and the outer bullseye OB are red segments.

[0062]

A display form of at least one segment may be a form associated with bust segments, in a case in which the segment is a segment that would result in a bust, for example. In the region G3, for example, the segment with right-diagonal hatching and left-diagonal hatching (representing blue color) with the text of “BUST” represents the segments that would result in a bust. In this example, as illustrated in the region G1, T11, T12, T13, T14, T15, T16, D17, T17, D18, T18, D19, T19, D20, T20, and the inner bullseye IB are blue segments as an example of a display form associated with segments that would result in a bust.

[0063]

In the screen G, the display form of the recommended segment may be enhanced. In this example, a case in which D16 has been selected as the recommended segment is illustrated as an example. The segment of D16 is illustrated as being displayed in an highlighted display form of being surrounded by a

heavy frame. This heavy frame may be colored, such as by yellow or the like. The form of enhancing the display form of the recommended segment is not limited to that illustrated, and other optional techniques may be employed. For example, a form may be used in which a heavy frame or some other object is imparted to the recommended segment, or may be a form in which the color of the recommended segment or this object changes over time (including blinking). Also, text may be displayed such as “triple 20”, “T20”, or the like, to distinguish the recommended segment, or an animation may be displayed in which the display form of the recommended segment is enhanced.

[0064]

The least throws count associated with the current score, i.e., the target least throws count, which is the smallest value from among the per-segment least throws count of each of the segments included in the target 101A, may be displayed in the region G2. Also, the number of rounds required for the target least throws count (least rounds count) may be displayed in the region G2. In the example illustrated in Figure 6, beneath the text of “QUICKEST” is displayed the text of “DARTS 1”, indicating that the target least throws count (the smallest value of the per-segment least throws count of the segments included in the target 101A) is “1”. Also, in the example illustrated in Figure 6, the text of “ROUNDS 1” is displayed to the right side of “DARTS 1”, indicating that the number of rounds necessary in the case of this target least throws count is “1”, as an example. Also, a plurality of rectangular objects are displayed in the lower part of the region G2. The number of these objects filled in solid indicates the target least throws count. In the example illustrated in Figure 6, just one object, at the far right thereof, is filled in solid. This indicates that the target least throws count is one. Note that while an example of

objects being filled in solid in order from the right side is illustrated in the example illustrated in Figure 6, a form may be made in which the objects are filled in solid in order from the left side.

[0065]

Figure 4 will be referenced again. The output data generating unit 12e may have functions of an audio output data generating unit, and may, for example, generate audio output data (an example of output data) for the audio output device 106 to output predetermined audio. The predetermined audio may be related to the darts game, and in particular, related to the per-segment least throws count, the target least throws count, the throw count difference, the recommended segment, the least rounds count, and so forth. The predetermined audio may be, for example, content indicating the per-segment least throws count and throw count difference, the target least throws count, the least rounds count, and so forth, associated with a particular segment. Also, the predetermined audio may be content indicating a particular segment, such as the recommended segment or the like.

[0066]

The output control unit 12f is an example of an output unit, and controls output of various types of output devices on the basis of output data generated by the output data generating unit 12e. The output control unit 12f may display a predetermined screen on the display device 105 on the basis of the display data generated by the output data generating unit 12e, for example. The output control unit 12f may also output predetermined audio from the audio output device 106 on the basis of the audio output data generated by the output data generating unit 12e, for example.

[0067]

(3) Operation Processing

Figure 7 is a flowchart showing an example of operations of the darts game device 10. Operations of the darts game device 10 will be described with reference to Figure 7.

[0068]

(S11) At a predetermined timing, the match progress unit 12a calculates the score of the player, on the basis of match data and so forth that is stored in the storage unit 11. Although not limited in particular, the predetermined timing may include, for example, when a dart is detected to have hit any segment, when an operation performed by a player on the operating device 104 or the like is accepted, when predetermined data or the like is received from another information processing device or the like via the communication device 103, at a periodical timing that is set in advance, and so forth. The match progress unit 12a may, for example, calculate the score by subtracting the total of points of the throws by the player from the score at the point of starting as set in the rules, or may calculate the score by subtracting points of the newest throw from the value of the score prior to the newest throw.

[0069]

(S12) Next, the per-segment least throws count calculating unit 12b calculates the per-segment least throws count for each segment in the target 101A on the basis of the score calculated in step S11. The per-segment least throws count calculating unit 12b may, for example, calculate the difference between the score and the reference value, check whether the player can finish by any throwing pattern (combination of segments) assuming that the dart will hit this segment in the next

throw, on the basis of this difference, and thereupon decide the smallest value of the count of throws in the finishing throwing patterns to be the per-segment least throws count. Note that the per-segment least throws count calculating unit 12b may, for example, calculate the difference between the score and the reference value, continue to subtract a predetermined value (e.g., 60, which corresponds to T20) until a value of a score included in the checkout table is reached, and thereupon, when the value of the score included in the checkout table is reached, decide the smallest value of the count of throws in the throwing patterns associated with the score in the checkout table to be the per-segment least throws count.

[0070]

(S13) Next, the target least throws count deciding unit 12c decides the target least throws count. The target least throws count deciding unit 12c decides the smallest of the per-segment least throws count, calculated regarding each of the segments calculated in step S12, to be the target least throws count, for example.

[0071]

(S14) Next, the recommended segment selecting unit 12d selects a recommended segment from the segments of the target 101A. The recommended segment selecting unit 12d may select the recommended segment from the segments of the target 101A, on the basis of predetermined selection conditions. The selection conditions may be stipulated including at least one of the aforementioned first minor condition through fourth minor condition, or any other minor condition. The way of stipulation may be able to be set in accordance with the rules of the darts game.

[0072]

(S15) The output data generating unit 12e generates output data for controlling output of various types of output devices, on the basis of the per-segment least throws count calculated in step S12, the target least throws count decided in step S13, and/or the recommended segment selected in step S14. The output data generating unit 12e may generate display data to display a predetermined screen on the display device 105, for example. This display form of at least one segment by the display data may be based on the per-segment least throws count associated with this segment, for example. In particular, this display form of at least one segment may be based on the throw count difference that is a value obtained by subtracting the target least throws count from the per-segment least throws count associated with this segment, for example. The output data generating unit 12e may generate audio output data to output predetermined audio from the audio output device 106, for example. The predetermined audio may be, for example, content indicating the per-segment least throws count and throw count difference, the target least throws count, the least rounds count, and so forth, associated with a particular segment. Also, the predetermined audio may be content indicating a particular segment, such as the recommended segment or the like.

[0073]

(S16) Next, the output control unit 12f controls output by various types of output device on the basis of the output data generated by the output data generating unit 12e. The output control unit 12f may, for example, display a predetermined screen on the display device 105 on the basis of the display data generated by the output data generating unit 12e. Also, the output control unit 12f may, for example, cause the audio output device 106 to output predetermined audio

on the basis of the audio output data generated by the output data generating unit 12e.

[0074]

(4) Modifications

In the above-described embodiment, the control device 111 that the darts game device 10 is equipped with may transmit output data (display data and audio data) to another information processing device via a communication network such as the Internet or the like. The other information processing device may execute various types of output (display output and audio output) on the basis of output data received from the darts game device 10. Thus, this information processing device can be used to comprehend information such as the per-segment least throws count, the throw count difference, the target least throws count, the recommended segment, and so forth, of the match, at a remote site from a venue at which the match of the darts game is being held, for example.

[0075]

In the above-described embodiment, the control device 111 that the darts game device 10 is equipped with has been described as being provided with the functional units illustrated in Figure 4. However, at least a part of the functional units illustrated in Figure 4 may be provided to any information processing device such as a smartphone, tablet terminal, or the like, made up of a processor, memory, storage, and so forth, and not be provided to the darts game device 10. Also, this information processing device may be used in combination with simplified dartboard equipment for domestic use or the like, for example. Specifically, this information processing device may acquire information of a segment that a dart hit, from among

the segments that the dartboard equipment is provided with, on the basis of user operations and communication with the dartboard equipment, and thereupon execute calculation of the per-segment least throws count and the throw count difference, decision of the target least throws count, selection of the recommended segment, generation and output of display data, and so forth.

[0076]

The recommended segment selecting unit 12d may select the recommended segment on at least the basis of information related to the player. This information related to the player is not limited in particular, may include, for example, a type of playstyle (e.g., “aggressive”, “reserved”, “balanced”, etc.) that the player has selected from a membership page. Thus, recommended segments customized in accordance with the playstyle of the player can be selected.

[0077]

The recommended segment selecting unit 12d may select the recommended segment on at least the basis of a machine-learning-trained learning model. This learning model may, for example, be one that has been subjected to machine learning with match data of an optional player (the player him/herself that is the subject of indicating the recommended segment, and further other players at higher levels, etc.) as learning data. The recommended segment selecting unit 12d may then decide upon a recommended segment output by inputting match data of the player in an ongoing match into the learning model, as the recommended segment that is selected. Accordingly, a recommended segment that is appropriate for the player can be selected and displayed, upon the learning model having analyzed throwing habits of each player, game flow of the ongoing match, and so forth.

[0078]

The embodiment described above is for facilitating understanding of the present invention, and is not intended to be used to interpret the present invention restrictively. The elements that the embodiment is provided with, and the layout, materials conditions, shapes sizes, and so forth thereof are not limited to the exemplified ones, and can be changed as appropriate. Also, configurations illustrated in different embodiments can be partially substituted or combined with each other.

Reference Signs List

[0079]

- 10 Darts game device
- 11 Storage unit
- 12 Control unit
- 12a Match progress unit
- 12b Per-segment least throws count calculating unit
- 12c Target least throws count deciding unit
- 12d Recommended segment selecting unit
- 12e Output data generating unit
- 12f Output control unit
- 101 Dartboard
- 102 Segment detecting unit
- 103 Communication device

- 104 Operating device
- 105 Display device
- 106 Audio output device
- 107 Card slot
- 108 Card RW unit
- 109 Coin inlet unit
- 110 External storage interface
- 111 Control device
- 112 Processor
- 113 Memory
- 114 Storage

Claims

[Claim 1] An information processing device outputting display data relating to a throwing game, in which points associated with a segment, which a throwing object hits, from among a plurality of segments provided on a target are sequentially subtracted from a score, and finishing is decided by making the score match a reference value, the information processing device comprising:

a per-segment least throws count calculating unit that calculates a per-segment least throws count that is a smallest count of throws necessary to make the score match the reference value, in association with at least one segment from among the plurality of segments, in a case of assuming that the throwing object hits the segment in a next throw;

a display data generating unit that generates display data for displaying each segment from among the plurality of segments in a display form based on the per-segment least throws count associated with the segment; and

an output unit that outputs the display data.

[Claim 2] The information processing device according to claim 1, further comprising:

a target least throws count deciding unit that decides a target least throws count, which is a smallest value from among the per-segment least throws counts associated with respective segments of the plurality of segments; and

a throw count difference calculating unit that calculates a throw count difference that is a value obtained by subtracting the target least throws count from the per-segment least throws count associated with respective segments of the plurality of segments, wherein

the display data generating unit generates the display data for displaying the at least one segment from among the plurality of segments in the display form based on the throw count difference.

[Claim 3] The information processing device according to claim 2, further comprising:

a recommended segment selecting unit that selects, from the plurality of segments, a recommended segment that is a segment regarding which hitting is recommended, on the basis of predetermined selection conditions, wherein

the display data generating unit generates the display data for displaying the recommended segment in an enhanced manner.

[Claim 4] The information processing device according to claim 3, wherein

the predetermined selection conditions are stipulated including at least one of

a first minor condition that is based on the throw count difference associated with each segment of the plurality of segments,

a second minor condition that is based on a type of each segment of the plurality of segments,

a third minor condition that is based on the points associated with each segment of the plurality of segments, and

a fourth minor condition under which the score is within a predetermined range that is specified for the recommended segment.

[Claim 5] The information processing device according to claim 4, wherein the first minor condition includes a condition under which the throw count difference associated with a subject segment, which is a segment that is to be a candidate for

the recommended segment from among the plurality of segments, is a predetermined first threshold value or lower.

[Claim 6] The information processing device according to claim 4, wherein the first minor condition includes a condition that a sum of the throw count difference associated with a subject segment, which is a segment serving as a candidate for the recommended segment from among the plurality of segments, and the throw count difference associated with an adjacent segment that is at least one segment adjacent to the subject segment is equal to or less than a predetermined second threshold value.

[Claim 7] The information processing device according to claim 3, further comprising:

an audio data generating unit that generates audio data relating to the recommended segment, wherein

the output unit further outputs the audio data.

[Claim 8] An information processing method of outputting display data relating to a throwing game, in which points associated with a segment, which a throwing object hits, from among a plurality of segments provided on a target are sequentially subtracted from a score, and finishing is decided by making the score match a reference value, the method comprising the steps of:

calculating a per-segment least throws count that is a smallest count of throws necessary to make the score match the reference value, in association with each segment from among the plurality of segments, in a case of assuming that the throwing object hits the segment in a next throw;

generating display data for displaying at least one segment from among the plurality of segments in a display form based on the per-segment least throws count associated with the segment; and

outputting the display data.

[Claim 9] A program causing a computer to function as an information processing device that outputs display data relating to a throwing game, in which points associated with a segment, which a throwing object hits, from among a plurality of segments provided on a target are sequentially subtracted from a score, and finishing is decided by making the score match a reference value, the computer being functioned as:

a per-segment least throws count calculating unit that calculates a per-segment least throws count that is a smallest count of throws necessary to make the score match the reference value, in association with each segment from among the plurality of segments, in a case of assuming that the throwing object hits the segment in a next throw;

a display data generating unit that generates display data for displaying at least one segment from among the plurality of segments in a display form based on the per-segment least throws count associated with the segment; and

an output unit that outputs the display data.

[Claim 10] A throwing game device, comprising:

the information processing device according to any one of claims 1 to 7; and
the target.