
(57) Abstract: An electronic game played on a plane Baduk board may be boring compared to other games. Also, the game may be difficult to be displayed on a small screen. When a hexahedral Baduk board is used, a grid pattern is drawn on each of surfaces of the hexahedral Baduk board. A parallelepiped shape and a stone is placed on an intersection of the grid pattern on the hexahedral Baduk board.
GAME SYSTEM USING CUBIC BADUK BOARD AND METHOD THEREOF

TECHNICAL FIELD

The present invention relates to a game system and method using a hexahedral Baduk board, and more particularly, to a game system and method using a hexahedral Baduk board with six surfaces, wherein a grid pattern is drawn on each surface and the hexahedral Baduk board is provided in a cyber space, so that a game is played by placing stones on the intersections of the grid patterns.

BACKGROUND ART

Baduk or Five in a Row is a game played by placing stones on a grid board. The game is played by alternately placing black and white stones on the vacant intersections of a grid on the Baduk board. To win a Five in a Row game, five stones have to be sequentially placed in a line in a horizontal, vertical, or diagonal direction on the Baduk board. In Baduk, a player wins when he/she controls a larger part of the board than the opponent by capturing the opponent's stone(s) by surrounding them using his/her stones.

Also, a game based on a Baduk board is provided as a game program for one player or two players in a cyber space in a terminal such as personal computers or mobile phones. However, since the present Five in a Row or Baduk game programs are played on a plane plane, the programs hardly provide visually exciting features, compared to other game programs.

Recently, many people increasingly enjoy games using mobile terminals such as mobile phones, personal data assistants (PDAs), or portable medial players (PMPs). However, when a Baduk board having a grid of 19x19 lines is displayed on a screen of the mobile terminal, the size of the displayed board is too small so that it may be difficult to identify the lines and stones. Accordingly, people lose interest in the above
games, and thus, it is not worth providing the above game programs through mobile terminals.

**DETAILED DESCRIPTION OF THE INVENTION**

**TECHNICAL PROBLEM**

The present invention provides a game system for playing Five in a Row or Baduk on a hexahedral Baduk board.

The present invention provides a game system for playing Five in a Row or Baduk on a hexahedral Baduk board, and a computer readable recording medium having recorded thereon a program for executing the game method.

**TECHNICAL SOLUTION**

According to an aspect of the present invention, there is provided a game system using a hexahedral Baduk board, which comprises a screen output unit outputting the hexahedral Baduk board, wherein a grid pattern is formed on each of six surfaces forming the outside of hexahedral Baduk board of a hexahedral shape and a plurality of horizontal lines and vertical lines forming the grid pattern are connected to the horizontal lines and vertical lines of an adjacent surface, and displaying stones to be placed at an intersection of the horizontal lines and the vertical lines of the Baduk board and selected by a player of a game, an input unit receiving an input of the player about the position of an intersection where the stone is placed and a surface of the hexahedral Baduk board, a storage unit storing the positions of stones selected by the player, and a calculation unit determining winning and losing of the game according to a rule set before the game starts using the position of the stone selected by the player.

According to an aspect of the present invention, there is provided a game method using a hexahedral Baduk board, which comprises outputting the hexahedral Baduk board, wherein a grid pattern is formed on each of six surfaces forming the outside of the hexahedral Baduk board of a parallelepipedal shape and a plurality of horizontal lines and vertical lines forming the grid pattern are connected to the
horizontal lines and vertical lines of an adjacent surface, receiving an input of a game player about the position of an intersection of the horizontal lines and the vertical lines where a stone is placed in the hexahedral Baduk board, storing the positions of stones selected by the game player, and determining winning and losing of a game according to a rule set before the game starts using the position of the stone selected by the game player.

The game is Five in a Row and the game is Baduk.

The number of each of the horizontal lines and the vertical lines of the grid pattern on each surface of the hexahedral Baduk board in three dimensions is 6-9.

When stones are placed at a vertex and on an edge line of the hexahedral Baduk board, an intersection in a linear direction subsequent to the vertex is at least one of intersections in a horizontal direction, a vertical direction, and a diagonal direction closest to the vertex among a plurality of intersections on a surface that does not contact the edge line on which the stones are placed. The position of an intersection in a linear direction subsequent to the vertex of the stones placed on the edge line connected to the vertex in the hexahedral Baduk board is set before the player starts the game.

According to an aspect of the present invention, there is provided a computer readable recording medium having recorded thereon a program for executing any of the above methods

ADVANTAGEOUS EFFECTS

According to the present invention, since a game is played on a hexahedral Baduk board, the interest in the game may double. Also, the game may be sufficiently enjoyed on a small output screen. Furthermore, a spatial sense may be developed by playing the game.

DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a screen of a game according to an embodiment of the present invention;
FIG. 2 illustrates an output screen of a rectangular plane Baduk board and an output screen of a hexahedral Baduk board in three dimensions;

FIG. 3 is a block diagram illustrating a configuration of a game system according to an embodiment of the present invention;

FIG. 4 illustrates a case where a sphere type stone is placed on a Baduk board;

FIG. 5 illustrates an output screen when the stones used for the Baduk board according to the present invention are not three-dimensional;

FIG. 6 illustrates an output screen when the stones used for the Baduk board according to the present invention are of a sphere type;

FIG. 7 is a development figure of the Baduk board;

FIGS. 8-10 respectively illustrate output screens when the third surface, the fifth surface, and the fourth surface of the Baduk board of FIG. 7 are separately output;

FIG. 11 illustrates the Baduk board of FIG. 7 that is output in three dimensions;

FIGS. 12 and 13 are for explaining a situation when a stone is placed at a vertex of a Baduk board for a Five in a Row game;

FIG. 14 is a flowchart for explaining a game method according to an embodiment of the present invention; and

FIG. 15 illustrates an output screen of the game play when the stones according to the present invention are of a sphere type.

BEST MODE

FIG. 1 illustrates a screen of a game according to an embodiment of the present invention. According to the present invention, a game is played by placing stones on a hexahedral Baduk board such as a parallelepiped, wherein a grid pattern is drawn on each surface as shown in FIG. 1. The surfaces do not respectively independently form a separate Baduk board, but are connected to one another to integrally form a single Baduk board. Thus, each edge line formed by two adjacent surfaces of the hexahedral Baduk board may be a horizontal line or a vertical line according to the position of two adjacent surfaces. The horizontal or vertical lines forming a grid pattern on each surface of the hexahedral Baduk board are respectively connected to another horizontal or vertical lines of the grid pattern on an adjacent surface.
In the present embodiment, the Baduk board may be a rectangular parallelepiped, in particular, a regular parallelepiped or a cube in order to display a portion of the hexahedral Baduk board as large as possible on a small display of a mobile phone. Also, the number of the horizontal or vertical lines of the grid formed on each surface of the parallelepiped may be 6-9. If there are too many horizontal or vertical lines on one surface, the grid pattern on each surface of the hexahedral Baduk board appears too small to be identified on a small screen of a mobile terminal such as a mobile phone.

When the number of positions to place stones on the hexahedral Baduk board increases, interest in playing the game by rotating the parallelepiped is lost, which is not the purpose of the present invention. In contrast, when the number of the horizontal or vertical lines embodied on one surface is too small, the game may not be smoothly played or may not be finished even when all six surfaces are used.

The game embodied by the present invention may be provided for a single player to play against a computer or for two players to play against each other. In the case of two players, the two players alternately place stones on the hexahedral Baduk board displayed in a single device or each of the players connects to a server and plays the game in an online game method.

When the hexahedral Baduk board is, for example, a parallelepiped, use of all six surfaces or only a part of the surfaces may result in a great difference in conditions to be considered in the game play or in a method of calculating the winner according to a game rule. For example, when only the surfaces located in a line in the development figure of the parallelepiped are used for the game, there is no difference in the game method from a game using a plane Baduk board of a simple plane rectangular shape.

FIG. 2 illustrates an output screen of a plane rectangular Baduk board and an output screen of a hexahedral Baduk board shaped as a square pole. Referring to FIG. 2, when only a dotted portion 20 is output on a screen because the entire portion of a plane rectangular Baduk board 10 having 6x24 lines cannot be displayed on the screen, an output portion 30 is a plane Baduk board having a grid of 6x6 lines. The output portion 30 is substantially the same as any one of surfaces of a Baduk board 40
in which a grid pattern of 6x6 horizontal and vertical lines is formed only on the
consecutive four surfaces in a line.

That is, since the plane Baduk board 10 has the same shape as any of the
development figures of the Baduk board 40 shaped as a square pole with a hole in the
core thereof, the game method, strategy, and screen configuration are substantially the
same for the plane Baduk board 10 and the Baduk board 40. However, when two
surfaces are used in addition to the four surfaces in use, a variety of game rules may
be applied to a stone placed at a vertex of the parallelepiped, thereby increasing the
interest in the game. Also, there may be a variety of methods in determining a winner
according to the game rule in the game system. A detailed method will be described
later.

FIG. 3 is a block diagram illustrating a configuration of a game system according
to an embodiment of the present invention. Referring to FIG. 3, the game system
according to the present embodiment includes a screen output unit 110, an input unit
120, a calculation unit 130, and a storage unit 140.

The screen output unit 110 outputs on a screen an image of a hexahedral
Baduk board having six surfaces, wherein a grid pattern is drawn on each surface.
When a game player selects one of the surfaces of the hexahedral Baduk board to be
output, the screen output unit 110 changes the output image by rotating the hexahedral
Baduk board or simply replacing the output image of the selected surface of the
hexahedral Baduk board. When the player selects a particular intersection of the grid
pattern on the hexahedral Baduk board, the screen output unit 110 controls the screen
to display an image of the hexahedral Baduk board in which a stone is placed on the
selected intersection of the grid pattern.

Each of the surfaces of the hexahedral Baduk board output by the screen output
unit 110 has the grid pattern. The horizontal and vertical lines of the grid pattern on
each surface of the hexahedral Baduk board are connected to those of the grid pattern
on an adjacent surface. The shape of the hexahedral Baduk board output by the
screen output unit 110 may be either a regular parallelepiped or a rectangular
parallelepiped. A regular parallelepiped is preferable. Also, the number of horizontal
or vertical lines of the grid pattern is preferably 6-9 as described above.
When the hexahedral Baduk board is displayed on the screen, only one of the six surfaces of the hexahedral Baduk board may be displayed, or the hexahedral Baduk board is displayed in a perspective view as shown in FIG. 1 such that three surfaces around a vertex may be simultaneously seen.

Also, when one of the six surfaces of the hexahedral Baduk board is output to the screen, the surface selected by the player may be displayed on the entire screen. Alternatively, by dividing the screen into six areas, the respective surfaces may be displayed on the six areas of the screen. For example, when the respective surfaces of the hexahedral Baduk board are referred to as the first surface, second surface, third surface, fourth surface, fifth surface, and six surface, the screen is divided into six areas and the first to six surfaces may be respectively displayed in the divided areas.

The above screen output methods may be selected by the player. For example, when the size of the screen is larger than a predetermined size, such as, a monitor for a personal computer, the stones may be identified even when the respective surfaces are displayed at the same time. However, for a small output screen such as a screen for a mobile phone, when the respective surfaces are output at the same time, it is difficult to identify the positions of the stones so that it may be preferable to output any one of the surfaces.

In the present embodiment, the stone output by the screen output unit 110 may have a sphere shape or a regular polyhedral shape. The center of the sphere or regular polyhedron may be located at the intersection of the horizontal and vertical lines of the grid pattern.

FIG. 4 illustrates a case where a sphere type stone 210 is placed on a Baduk board 220. Referring to FIG. 4, the screen output unit 110 outputs the position of the stone 210 such that a center 221 of the stone 210 matches an intersection 221 of the horizontal and vertical lines of the Baduk board 220. The stone is of a sphere type or a regular polyhedron in order to minimize a difference in the presentation view according to the position of the stone when the stone is displayed on the screen.

If the stone is displayed in two-dimensional manner so as to closely contact the surface of the Baduk board, the stones placed on the edge line and at the vertex of the Baduk board may be partially displayed as shown in FIG. 5, which is not visually good to the player. However, when the stones are of a sphere type as shown in FIG. 4 and
placed on the Baduk board such that the center of the stone may match the
intersection points of the grid pattern, the stones placed on the edge line and at the
vertex of the Baduk board may be clearly and completely displayed as shown in FIG. 6,
which is visually good to the player. Furthermore, when the hexahedral Baduk board
which is displayed three-dimensionally is rotated, there is no need to change the shape
of the stone according to the position thereof that changes according to the rotation of
the hexahedral Baduk board.

FIG. 15 illustrates an output screen of the game play when the stones according
to the present invention are of a sphere type. As shown in FIG. 15, the stones placed
on the edge line and at the vertex of the hexahedral Baduk board appear to be visually
smooth and natural.

The input unit 120 receives a selection signal for rotation of the hexahedral
Baduk board input by a player and selects a position of a stone.

The storage unit 140 stores the position of the stones placed on each surface of
the hexahedral Baduk board for each player.

The calculation unit 130 calculates winning and losing of a game according to
the positions of stones by applying a rule of a game.

A method of calculating the winning and losing of a game is based on a rule of
the game that is already set. For example, in a Five in a Row game, when five stones
of the same color are sequentially placed in a line, a player wins the game. It is
important that, when the stones are placed on the edge line or at the vertex of the
Baduk board, the sequentially placed stones are arranged on different surfaces of the
Baduk board. Whether the stones are places in a line is basically determined based
on the placement of the stones in a line on a development figure of the hexahedral
Baduk board.

FIG. 7 is a development figure of the hexahedral Baduk board. When the
Baduk board of FIG. 7 is a plane Baduk board, the winning and losing of a game may
be easily determined by seeing the stones placed on a fifth surface 705, a third surface
703, and a fourth surface 704 of the Baduk board of FIG. 7. However, it would be
difficult to quickly determine the winning or losing if one sees the stones placed on any
one of the surfaces of the hexahedral Baduk board or on the entire hexahedral Baduk
board displayed three-dimensionally, not in a development figure in two dimensions.
FIGS. 8-10 respectively illustrate screens when the third surface 703, the fifth surface 705, and the fourth surface 704 of the Baduk board of FIG. 7 are separately displayed. FIG. 11 illustrates the Baduk board of FIG. 7 that is output in three dimensions.

As shown in FIGS. 8-11, when all six surfaces of a parallelepiped are used as a Baduk board, it is difficult to determine winning and losing compared to a case in which Five in a Row is played simply on a plane Baduk board or only on sequential four surfaces of a square-pole-shaped Baduk board whose development figure makes a rectangle. In particular, as shown in FIG. 12, when the stones are placed on the vertex, the application of a rule may be problematic.

FIG. 13 is a development figure of the hexahedral Baduk board of FIG. 12. Referring to FIG. 13, when a white stone is placed at an intersection 1301 on a horizontal line of the hexahedral Baduk board, five white stones are regarded to be sequentially arranged in a line on the development figure. Also, when a white stone is placed at an intersection 1302 on a vertical line of the hexahedral Baduk board, five white stones are regarded to be sequentially arranged in a line on the development figure.

In this case, when a white stone is placed at any of the intersections 1301 and 1302, a player playing with the white stones is determined to win the game. Also, the player may win only when white stones are placed at both of the intersection 1301 and the intersection 1302. Furthermore, when a white stone is placed at an intersection 1303 in a diagonal direction, making a line on the hexahedral Baduk board in a perspective view, the player playing with the white stones may be determined to win the game.

Accordingly, a variety of rules may be applied with respect to the intersections around the vertex so that a variety of strategies according to the variety of rules may be set which increases interest of the game compared to the Five in a Row played on a plane plane. In addition, interest in the game may be increased by allowing a game player to directly set a direction making a line, from the vertex, at his/her discretion.

The same rule applied in the case of the plane Baduk board which is shaped as a development figure of a hexahedral Baduk board may be used for Baduk, except for
a case in which a stone placed at a vertex and surrounded by the opponent's stones placed the three nearest intersections around the vertex is regarded to be captured.

The calculation unit 130 determines the winning and losing of each player based on the above rule. For example, in Five in a Row, the calculation unit 130 stores information on the positions of the subsequent intersections arranged in horizontal, vertical, and diagonal directions from each intersection on the hexahedral Baduk board and the directions of the subsequent intersections from the intersection that serves as a reference point, for example, in upper, lower, left, right, upper left, upper right, lower left, or lower right directions.

Also, the calculation unit 130 stores a rule of determining the position of a direction of a straight line from a vertex. As described above, the rule may be set by a player in advance in each game. When a player places a stone at an intersection adjacent to another intersection on which another stone is already placed, the calculation unit 130 determines whether the newly placed stone is of the same color and, if affirmative, determines how many stones of the same color are sequentially placed in a line. If five stones of the same color are determined to be sequentially arranged in a line, the player is determined to win the game.

FIG. 14 is a flowchart for explaining a game method according to an embodiment of the present invention. As described above, a game embodied by the present invention may be for a single player playing against a computer or for two players playing against each other. When the game is for two players, the two players may alternately place stones using a single device or each player accesses a server to play the game like an online game.

A method of playing a game for a single player according to an embodiment of the present invention is described below in detail. When the game starts, the screen output unit 110 outputs a hexahedral Baduk board on a screen (1401). As described above, the Baduk board has a regular or rectangular parallelepiped, a grid pattern is drawn on each surface of the parallelepiped, the horizontal and vertical lines of each surface of the Baduk board are connected to those of the adjacent surface, and the number of horizontal or vertical lines drawn on each surface of the Baduk board may be 6-9.
Also, in the case of the hexahedral Baduk board, any one of the six surfaces or
the adjacent three surfaces around a vertex may be displayed at the same time.
When any one of the surfaces of the hexahedral Baduk board is to be displayed, only
one surface selected by a player may be output. Also, the output screen is divided
into a plurality of areas so that each surface of the hexahedral Baduk board may be
output to each area, respectively.

When the player selects the surface of the hexahedral Baduk board displayed
on the screen using the input unit 120 (1402), the screen output unit 110 outputs a
screen by rotating the hexahedral Baduk board or changing the surface of the
hexahedral Baduk board to be output according to the input (1403). When the player
selects a desired intersection using the input unit 120 (1404), the screen output unit
110 outputs a screen so that the stones of the player may be placed at the
intersections (1405). Then, the storage unit 140 stores the positions of the stones
selected by each player (1406).

Also, the calculation unit 130 determines the winning and losing of the game
according to a preset rule based on the positions of the stones selected by each player
(1407). When the winning and losing of the game is determined, the game is
terminated.

As described above, the stone output by the screen output unit 110 has a
sphere shape and is output such that the center of the sphere may be located at the
intersection of the horizontal and vertical lines of the Baduk board. Also, the rule of
determining the direction of a straight line at the vertex may be directly set by a player
before a game starts and the calculation unit 130 determines the winning and losing of
a game based on the rule.

The invention can also be embodied as computer readable codes on a
computer readable recording medium. The computer readable recording medium is
any data storage device that can store data which can be thereafter read by a
computer system. Examples of the computer readable recording medium include
read-only memory (ROM), random-access memory (RAM), CD-ROMs, magnetic tapes,
floppy disks, optical data storage devices, and carrier waves (such as data
transmission through the Internet). The computer readable recording medium can
also be distributed over network coupled computer systems so that the computer
readable code is stored and executed in a distributed fashion. Also, functional programs, codes, and code segments for accomplishing the present invention can be easily construed by programmers skilled in the art to which the present invention pertains.
CLAIMS

1. A game system using a hexahedral Baduk board, the game system comprising:
   a screen output unit outputting the hexahedral Baduk board, wherein a grid pattern is formed on each of six surfaces forming the outside of hexahedral Baduk board of a hexahedral shape and a plurality of horizontal lines and vertical lines forming the grid pattern are connected to the horizontal lines and vertical lines of an adjacent surface, and displaying stones to be placed at an intersection of the horizontal lines and the vertical lines of the Baduk board and selected by a player of a game;
   an input unit receiving an input of the player about the position of an intersection where the stone is placed and a surface of the hexahedral Baduk board;
   a storage unit storing the positions of stones selected by the player; and
   a calculation unit determining winning and losing of the game according to a rule set before the game starts using the position of the stone selected by the player.

2. The game system of claim 1, wherein the game is Five in a Row.

3. The game system of claim 1, wherein the game is Baduk.

4. The game system of claim 1, wherein the number of each of the horizontal lines and the vertical lines of the grid pattern on each surface of the hexahedral Baduk board in three dimensions is 6-9.

5. The game system of claim 1, wherein the stone has a sphere shape or polyhedral shape, and the screen output unit outputs the stones and the hexahedral Baduk board such that the position of a center point of the stone is located at the intersection.

6. The game system of claim 2, wherein, when stones are placed at a vertex and on an edge line of the hexahedral Baduk board, an intersection in a linear direction subsequent to the vertex is at least one of intersections in a horizontal
direction, a vertical direction, and a diagonal direction closest to the vertex among a plurality of intersections on a surface that does not contact the edge line on which the stones are placed.

7. The game system of claim 6, wherein the position of an intersection in a linear direction subsequent to the vertex of the stones placed on the edge line connected to the vertex in the hexahedral Baduk board is set before the player starts the game.

8. A game method using a hexahedral Baduk board, the game method comprising:
   - outputting the hexahedral Baduk board, wherein a grid pattern is formed on each of six surfaces forming the outside of the hexahedral Baduk board of a parallelepipedal shape and a plurality of horizontal lines and vertical lines forming the grid pattern are connected to the horizontal lines and vertical lines of an adjacent surface;
   - receiving an input of a game player about the position of an intersection of the horizontal lines and the vertical lines where a stone is placed in the hexahedral Baduk board;
   - storing the positions of stones selected by the game player; and
   - determining winning and losing of a game according to a rule set before the game starts using the position of the stone selected by the game player.

9. The game method of claim 8, wherein the game is Five in a Row.

10. The game method of claim 8, wherein the game is Baduk.

11. The game method of claim 8, wherein the number of each of the horizontal lines and the vertical lines of the grid pattern on each surface of the Baduk board in three dimensions is 6-9.
12. The game method of claim 8, wherein the stone has a sphere shape or polyhedral shape, and the screen output unit outputs the stones and the hexahedral Baduk board such that the position of a center point of the stone is located at the intersection.

13. The game method of claim 9, wherein, when stones are placed at a vertex and on an edge line of the hexahedral Baduk board, an intersection in a linear direction subsequent to the vertex and is at least one of intersections in a horizontal direction, a vertical direction, and a diagonal direction closest to the vertex among a plurality of intersections on a surface that does not contact the edge line on which the stones are placed.

14. The game method of claim 13, further comprising setting a rule about the position of an intersection in a linear direction subsequent to the vertex of the stones placed on the edge line connected to the vertex of the hexahedral Baduk board, before the player starts the game.

15. A computer readable recording medium having recorded thereon a program for executing the method defined in any of claims 8-14.
FIG. 1
FIG. 3

SCREEN OUTPUT UNIT
110
INPUT UNIT
120
CALCULATION UNIT
130
STORAGE UNIT
140

FIG. 4
FIG. 14

START

OUTPUT HEXAHEDRAL BADUK BOARD

1401

IS A SURFACE OF THE HEXAHEDRAL BADUK BOARD SELECTED?

1402

YES

OUTPUT SELECTED SURFACE

1403

NO

IS THE POSITION WHERE A STONE IS PLACED IS INPUT?

1404

NO

DISPLAY STONE AT SELECTED POSITION

1405

STORE SELECTED POSITION

1406

NO

IS WINNING AND LOSING DETERMINED?

1407

YES

END
A. CLASSIFICATION OF SUBJECT MATTER

G06Q 50/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC G06Q 50/00, A63F9/24, A63F 3/02,

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models since 1975

Japanese utility models and application for utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS(KIPO internal) & keyword GAME, CUBIC, CUBE, BADUK, PADUK, CHESS, OTHELLO, REVERSI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
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<td>Y</td>
<td>US 06062978 A (MARTINO, P D et al ) 16 May 2000 See abstract, figures 1,2, claim 1</td>
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<td>A</td>
<td>KR 10-2006-0129903 A (KIM, S C ) 18 December 2006 See English abstract, figure 1, claim 1</td>
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Further documents are listed in the continuation of Box C

See patent family annex

Special categories of cited documents

**T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

**X** document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

**Y** document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

**&** document member of the same patent family

Date of the actual completion of the international search

24 MARCH 2009 (24 03 2009)

Date of mailing of the international search report

24 MARCH 2009 (24.03.2009)

Name and mailing address of the ISA/KR

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