

HAB: Human-centric Augmented Browser

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Abstract— In order to have displayed information on the small display of mobile apparatus conventionally, the menu had to be moved by button operation, or the picture had to be made to reduce according to the size of a display, and the limit was in the amount of information which can be displayed on a small display. On the other hand, the paper proposes the system called HAB (Human-centric Augmented Browser) which displays by moving a display, with the screen fixed which spreads beyond a display. Thereby, even a 2 inches display can display a big picture 40 inches or more. We show the basic working principle based on the patent (P****_****) and explain the expected market with business model.

Keywords — Human-centric, Augmented Reality, Browser
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I. Introduction

In order to have displayed information on the small display of mobile apparatus conventionally, the menu had to be moved by button operation, or the picture had to be made to reduce according to the size of a display, and the limit was in the amount of information which can be displayed on a small display.

On the other hand, we propose the system called HAB (Human-centric Augmented Browser) which displays by moving a display, with the screen fixed which spreads beyond a display.

Generally, since digital contents define specific screen size and are created, they are difficult for displaying the thing for big screens, without dropping resolution on a small screen.

Then, in order to solve this problem, the new display technology which can display a big screen 40 inches or more on an about 2 inches small screen was developed.

Specifically, the angular velocity sensor for XY axes is added to the about 2 inches main part of a screen display, the analog output from this angular velocity sensor is changed into digitized data, and the position and posture in the inside of the space of XY axis of a display are detected.

This paper explains the key idea of the HAB (Human-centric Augmented Browser) based on the patent (P****_****) and shows the expected market with business model.

II. Working Principle

Fig.1 shows the basic principle of HAB (Human-centric Augmented Browser), and the HAB basic architecture is the following .

▪ HAB basic architecture :

The basic composition of HAB is roughly divided and consists of two components, hardware and software. The hardware consists of the Gyro Sensor Circuit, the Button Input Equipment and the Display (Fig.1).

The Gyro Sensor Circuit is for detecting the position and posture of the Display. The Button Input Equipment is for performing selection, decision, and release of the Display's picture.

The Display is for displaying the picture according to the position and posture by computing the position and posture of the Display using the Gyro Sensor Circuit.

Moreover, as HAB Software Engine, it consists of the Gyro Sensor Processing, the Button Input Processing, and the HAB Display Processing.

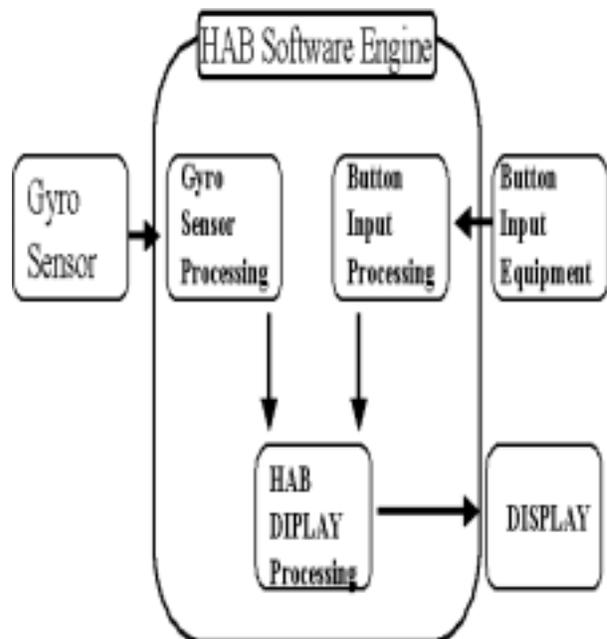


Fig.1 The basic principle of HAB

• **The method of detecting the position and the posture of the Display:**

First, the conditions of the following (1) - (4) are defined as a premise. Furthermore, the procedure of (5) - (8) performs detection of the position and the posture of the Display.

- (1) A motion of man's arm is link structure.
- (2) In case the thing held by hand is moved vertically and horizontally all over space, it becomes a motion on a sphere curved surface in approximation according to the restrictions conditions of (1).
- (3) That is, what is necessary will be just to be able to measure the move speed as angular velocity of the arm which met the sphere curved surface substantially as detecting the speed of a motion of an arm.
- (4) Generally the relation between acceleration and speed is expressed with the following equation.

When α :Acceleration, V :Speed

$$\alpha = V / dt, \quad V = \sum_{i=0}^t \alpha i \quad (1)$$

- (5) Here, speed can be found if it integrates with the data obtained by the equation (1) by the fixed time width t when there was an acceleration sensor.
- (6) If the speed of the move object of a certain fixed time is known, since by finding the integral shows move distance, the amount of scrolling of a display screen will be determined.
- (7) However, since double integration by time must be performed in order to ask acceleration for the move distance of a move object, there is a problem that is easy to produce that a response is overdue and an accumulation error.
- (8) Since it turns out that angular velocity and speed may be approximated by (3) there, the amount of scrolling Length of a display screen is as the following equation (2). Because the algorithm is applied in HAB Display Processing (Fig.1), the Display displays an oversized picture by processing of scrolling a picture.

When L : Scrolling Length, ω : Angular Velocity

$$L = \sum_{i=0}^t \omega i \quad (2)$$

III. Market Survey

Fig.2 shows the expected market in the future. From this figure, we can see that there is a big market, even with in each year. This survey is based on the number of HAB adaptation in each year, by supposing that 10% of mobile phone and PDA implement in this market. Also, we consider the fact that mobile phone and PDA implement market is more and more requesting in near future.

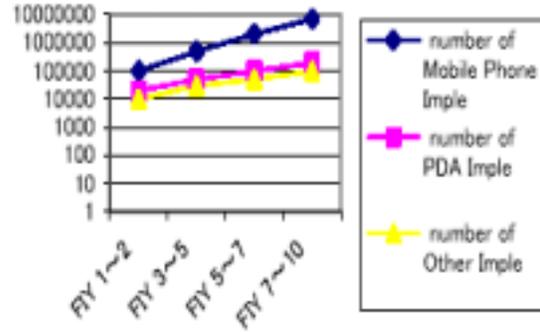


Fig.2 Expected Market Growth of HAB Implement

IV. Business Model

We have already completed a gyroscope sensor circuit and HAB engine, and the cost at the time of mounting HAB in a mobile phone or PDA mainly becomes a gyroscope sensor. Since the price of XY angular velocity sensor for gyroscope sensors is just over or below ***** yen per 100000 sets, mounting of HAB can be performed for ***** or less yen per set. For this reason, the market competitive power to HAB introduction is high.

V. Conclusions

we propose the system called HAB (Human-centric Augmented Browser) which displays by moving a display, with the screen fixed which spreads beyond a display. Thereby, even a 2 inches display can display a big picture 40 inches or more. We also showed the expected market within the next 10 years and the business model.

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