Synergy between Printing Media and Mobile Phone AR

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Abstract— We aim to create synergy and new value by constructing a new information acquisition method as a result of combining printed media and mobile phone AR. We focus on high affinity between the optical tracking AR and printing to enable an accurate and customized information experience in short range.

In this paper, we propose our latest ideas of the business models for mobile AR. These models are designed for navigation in public spaces or provision of information as an alternative search method.

Our models are targeted at Japanese market at this time, and these are still in early stages, however, we hope our ideas will help leading the discussions among mobile AR business models.

I. INTRODUCTION

Dai Nippon Printing group (hereafter, DNP) is a printing company. We have diversified products such as "printing", "packaging", and "electronic components", and so on. DNP has been focusing on AR technology since 2006.

AR with computer vision is highly compatible with printing materials. Combining them together, we aim to innovate functions of printing to create new values for "printing products" as information publishing and acquisition methods. In this paper, we introduce our ideas of business model that are discovered through our sales activities.

We aim to construct a new information platform by combining information acquisition using camera and two dimensional (hereafter, 2D) media like printing. The 2D media, used as a marker, is a basic starting point of this information platform. Moreover, we need to popularize this action of information acquisition by pointing a camera to the target. Also, we need to urge a lot of content providers to join in this scheme in order for this business model to be successful.

These ideas are still in early stage, and evolving as our experience increases. We hope to notice new values and develop our planning by introducing and discussing these models in this paper.

II. BACKGROUND

Mobile AR is an excellent opportunity in Japan.

1: The low penetration of PC camera in Japanese market.

In Japan, home use of PC camera is less widely adopted than in other parts of the world. In the market forecast by JMA Research Institute, Inc. in 2005, the domestic shipment volume of PC camera is predicted to increase to 220,000 [1]. In our sales activities, many Japanese companies are pointing out that low penetration of PC camera is the barrier against adopting AR for sales promotion (marketing to consumers). Therefore, they have been more interested in mobile AR where most devices ship with camera. We share the confidence that mobile AR is going to be adopted more widely than PC-based AR in Japan.

2: Visibility of AR is rising for business and general public.

After the release of iPhone 3GS in June 2009, the shipment volume of iPhone has been increasing in Japan. Apple does not disclose shipment volume of iPhone in Japan, however, some analysts assumes that about three million has been sold in Japanese market by December 2009.

Associated with the widespread adoption of iPhone is the release of "Sekai camera" by Tonchidot on App Store in October 2009. Sekai camera has contributed to increased awareness of AR by both businesses and general public in Japan. The "Sekai camera" is introduced as a typical and an innovative application of AR by mass media [2]. Afterwards, the case studies with AR (our results are also included) were frequently featured on television, and people pay more attention to AR.

3: Expected expansion of smart phone market.

Beginning in April 2010, major Japanese mobile operators NTT DoCoMo, Softbank and KDDI will offer Android phones. Especially, NTT DoCoMo said that they will start the service of "DoCoMo market" to guide users to transfer from Japanese mobile phone to Android phone smoothly [3]. All operators will compete heavily to acquire the maximum smart phone market share. We assume that these activities will contribute to the expansion of smart phone market in Japan.

III. THE IDEA OF BUSINESS MODELS

1: Providing the information for facilitation in public spaces.

Public spaces like stations, airports and commercial establishments, have are large and complex in structure. These places are also frequently underground or multi-story. Therefore, the location-based information like GPS may not be accurate. Another simple and useful method of location-based navigation is necessary. We aim to adapt optical tracking AR as an alternative method for use in places where the accuracy of location-based information, such as GPS, is inaccessible.

We will publish signs that can be easily understood by both computer eyes (camera) as an AR marker, but also by human eyes. Peripheral information in public spaces can be offered more smoothly by making this sign a starting point. We believe that by using existing signage in public spaces for marker-less tracking we will reduce barriers to widespread adoption of mobile phone AR.

Moreover, by offering the environment to use mobile phone AR in public space, the users will become accustomed to using mobile phone camera for the information acquisition. We are beginning to look into the feasibility of such a model by using iPhone.

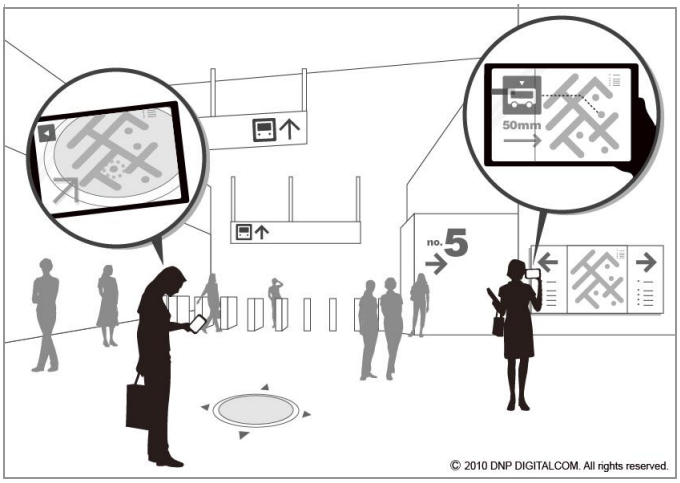

Figure 1: Navigation system by mobile phone AR in a pubic space.

2: On-site self acquisition of information.

In shopping center, stores and showrooms, the users will be able to get information like product explanation, supply of size or color variation, coupons and special offer by simply pointing the camera to an object.

We assume the keyword search maybe inconvenient, when the user is in front of the actual object. In our hypothesis, the verbalization for quick and accurate search is difficult and users may fail to obtain information they seek when they are in front of actual object. We hope to use actual product, but with present technology, price tag, brand tag, and point of purchase can be used as tracking material in stores. We think the simple and readily self acquisition of information of the actual item will bring value to the users. Since users can search and obtain information on-site, the users may go out to a brick and mortar shops and in the commercial environments more often.

Figure 2: Acquisition of information by actual objects.

3: Instructional tool in the real world

As one of the methods to attract the attention of children to the physical world around them, we are focusing on using the mobile AR to arouse awareness for objects and the environment.

For example, insects, birds, flowers and plants in nature, the paintings and the sculptures in public spaces, there are a lot of things to arouse the child's interest in the real world. We also aim to activate communications between parents and children. We assume the knowledge of children will be enhanced by the providing real time information on-site, the moment their interest sprang. By combining GPS of a smart phone and the cloud-bsaead services, the users can share the experience in the real world as social media.

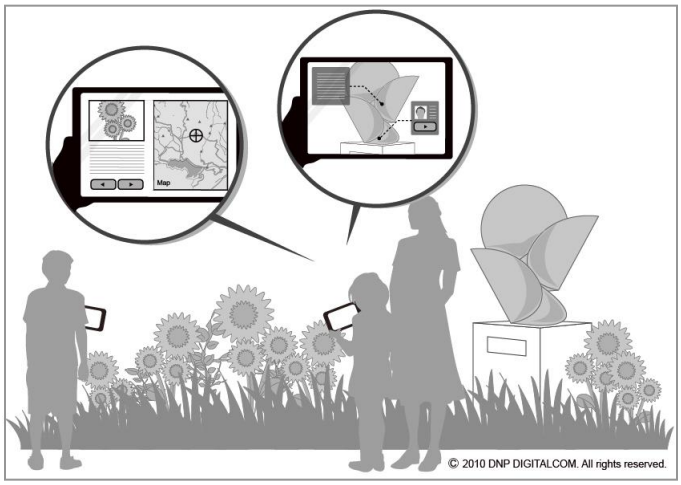

Figure 3: experience type education by mobile phone AR.

IV. CONCLUSION

A lot of companies are interested in optical tracking AR for supplying information with accuracy. Practically, the ideas

introduced here are likely to advance innovation for railway companies or toy manufacturers.

We feel that the mobile AR use cases proposed in this paper will increase this year, along with the expansion of smart phones, especially the spread of iPhone. However, the mobile AR is novel service for general public, therefore, we should carefully plan its introduction, and evaluate user behavior for further innovation of our idea.

References

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[2] Tonchidot Corporation, http://support.sekaicamera.com/en/archives/1480 , 2009

[3] NTT Cocomo, INC. http://www.nttdocomo.com/pr/2010/001467.html , 2010