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2008 年度下期未踏 IT 人材発掘・育成事業　採択案件評価書

1．担当PM

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2．採択者氏名

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コクリエータ：なし

3．プロジェクト管理組織

学校法人国際大学（グローバル・コミュニケーション・センター）

4．委託金支払額

4,300,000 円

5．テーマ名

AJAX Platform for Image Based Rendering in Cloud Computing

6．関連Webサイト

http://www.dh.aist.go.jp/~shun/research/ajax/

7．テーマ概要

With the recent ubiquity of AJAX (Asynchronous JavaScript and XML) technologies, web applications can provide the user experience end-users have demanded for a long time. Rich client and web applications are converging with regard to functionality and usability - web applications are becoming "Rich" with respect to UI capabilities, rich client applications are offering better deployment and management functionality.

We develop a software platform that enables users to view real-world objects interactively by changing viewpoints using AJAX technology. Our rendering technique is image-based --- the virtual views of an object are synthesized by interpolating 2D images, leveraging the high-quality of recent digital photographs. This approach alleviates the difficulty of modeling 3D geometry in existing approaches to 3D computer graphics. The software can run on various kinds of devices using web browser without additional software installation, which makes it possible for users to experience photo-realistic 3D computer graphics in cloud computing environment.

Our software platform consists of two components:

(1) Content creation software: Our server software reconstructs a light field (a set of light rays in 3D space) from uncalibrated camera images. Given the images of an object acquired by a user, the system automatically estimates 3D structure of the scene from the camera motion and reconstructs the light field.

(2) Content rendering software: Our client software synthesizes the 3D virtual views of the object using light field rendering technique. We use AJAX technology, which allows users to see the object interactively from preferred view-points using standard web-browsers on a variety of hardware platforms.

The goal of this project is to make it easy for non-researchers to use the state-of-the-art techniques developed in computer vision and graphics communities. We provide the application programming interface (API) to the developed software so that other web-application developers can plug the

software easily into their own services. We believe this is the first step to developing the practical application of 3D computer graphics in web-based computing environment.

8. 採択理由

This project is complementary to several others I have managed or prose to manage. The notion of the mobile phone as a part of a distributed computing environment - a cloud - offers the opportunity to provide significant computing power to the limited mobile environment. In particular a two way path between the phone and the rest of the cloud offers an interesting set of possibilities . The research appears to be experienced and competent and thus should achieve the goals.

9. 開発目標

The goal of the project was to make it easy for everyone to use the state-of-the-art techniques in computer vision and graphics. The project consisted of two main components: Content creation software. This is server-based software that will reconstruct a light field (a set of light rays in 3D space) from uncalibrated camera images. Given the images of an object acquired by a user, the system will automatically reconstruct the light field by estimating the 3D structure of the scene from the camera motion. And secondly, content rendering software which renders the acquired light field through the Internet. The software is implemented using AJAX technology, which allows a user to see the virtual object interactively from their preferred viewpoints using standard web-browsers on a variety of hardware platforms.

10. 進捗概要

The developer completed the work professionally and to schedule.   Some of the tasks took longer than anticipated, but the developer was able to speed up when necessary and allow adequate time for reporting and completion of the project as required.

11．成果

The goals of the original proposal were achieved. Some components changed from the original specification, but these were adopted to meet and overcome problems faced during actual development. Concerns over the security of the current host server used to support the software platform have delayed the public release of the work, but this problem can be easily overcome. The developer achieved considerable success within the project time frame.

12．プロジェクト評価

The work was very professionally done the results are extremely satisfactory, they not only advance the state-of-the-art in this area but have, I believe, potential commercial viability. As the investigator has commented, already several commercial firms were interested in working with him to explore commercialization and further development.

There are a couple of loose ends. Some are functional but most important there are questions of creating a secure environment for the user and for the server environments. I believe the developer understands how to achieve this end and will, if the effort continues into commercialization, have no problem achieving this end. All the initial targets for the proposal have been met in a workmanlike fashion.

13．今後の課題

The developer has identified the need to make the software easier to use for the every-day user, and to ensure the platform is secure, there also needs to be further work to ensure compatibility with all web browsers.