Applying semiconductor films on highly liquid-repellent surfaces

High performance organic polymer transistor realized

We have developed a manufacturing technology for highly uniform thin films of organic polymer semiconductors without material loss by applying the semiconductor solution on a highly hydrophobic surface that strongly repels the solution. It is known that conventional solution processes for thin-film production are not compatible with highly hydrophobic surfaces, although the employment of such surfaces as the gate dielectric surfaces is quite effective in improving the stability of thin-film transistor (TFT) characteristics. In this study, a new "push coating" technique was developed, where a solution of organic polymer semiconductor is compressed with an original silicone-rubber-based trilayer stamp to wet the hydrophobic surfaces uniformly by way of the capillarity. It causes almost no material loss, in striking contrast to any other solution processes. The technology allows remarkably simple production of high performance TFTs that are indispensable building blocks for information terminal devices such as electronic papers.

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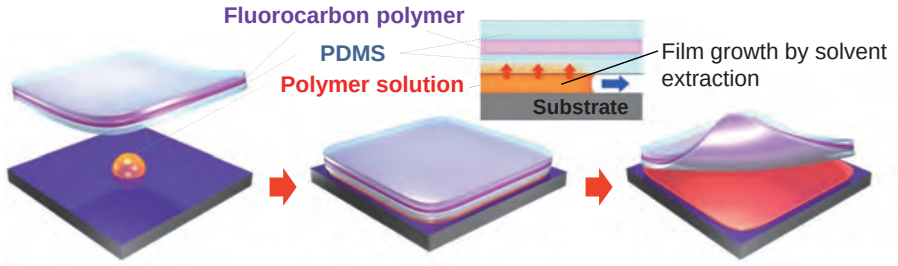

Schematic of the film production process by the push coating technique

Wide-area indoor camera tracking of a mobile device

Toward realizing maintenance support systems using augmented reality

One of the essential requirements of augmented reality (AR) is the technique of localization. To achieve robust and global localization in wide areas, we have developed a method for estimating photo-shoot location and orientation based on virtualized reality environment models. Previously, model-based localization methods with photos were not efficient for covering wide areas in terms of modeling costs. Therefore, by applying our previous modeling method, we have developed a new efficient modeling method with involvement of data for image-based matching.

Figure 1 shows a framework for the localization. In the framework, at first, an image shot by a tablet is sent to the server. Next, in the server, the input image is compared to model data to estimate photo-shoot location and orientation. Finally, an estimated result is sent to the tablet. Figure 2 shows examples of experimental results. In the experiments, users can see labels on posters, and also can get additional contents by touching the labels.

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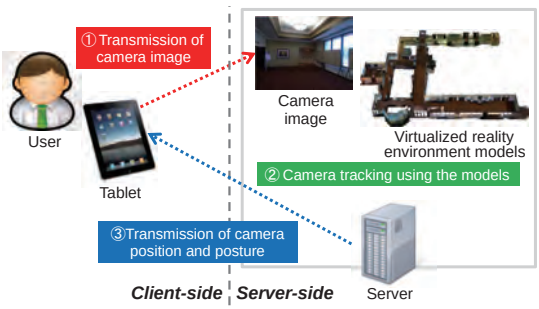

Fig.1 Outline of the camera tracking system

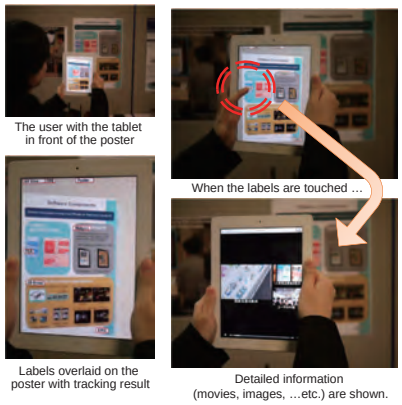

Fig.2 Experiments using a poster