Natural Feature Tracking in JavaScript

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INTRODUCTION
We present an efficient natural feature tracking pipeline solely implemented in JavaScript. It is embedded in a web technology-based Augmented Reality system running plugin-free in web browsers. An evaluation shows that real-time frame rates on a desktop computer and interactive frame rates on a smartphones are achieved.

MOTIVATION
Portability
Reliance on web technologies enables platform independence.

As we employ standardized web technologies our system can run on most platforms that provide an HTML5 enabled browser.

IMPLEMENTATION

Augmented Reality Pipeline in HTML5

We employ the MediaStream API along with the <video> and <canvas> elements to access the video stream of a camera.

A two-stage pipeline written entirely in JavaScript efficiently computes the pose of the camera (similar to [3]). When the initial pose is detected it is incrementally updated during the tracking stage.

Finally, the pose is used to overlay 3D graphics with WebGL over the video.

EVALUATION

Detection Phase PC vs. Mobile

In the detection phase the fastest web browser (Firefox 8) is 1.6 times faster than the slowest one (Opera 12). An implementation in Google Native Client is 3.7 times faster and in Adobe Alchemy still 2 times faster. Compared to the PC the system runs 6 times slower in a web browser on a smartphone.

Tracking Phase PC vs. Mobile

In the tracking phase the fastest web browser (Chrome Canary) is 2.5 times faster than the slowest one (Firefox 8). Compared to the PC the system runs 5.5 times slower in a web browser on a smartphone.

REFERENCES


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