Optical Verification of Mouse Event Accuracy

Motivation:
The project is designed to address the issue of fair gameplay in professional competitive gaming events comparing point tracking techniques, assessing optical flow, and multi-object tracking. In doing so, we aim to analyze and determine the most robust system for accurately correlating mouse movements against their corresponding motion on the player's screen. By cross referencing these data points, we will be able to confirm the validity of a player's movement during a gaming event.

Proposal:
Optical verification of mouse events will track mouse accuracy by analyzing a marker on the mouse and comparing, in real time, mouse movement to the resulting movement on screen. We will add multiple visual markers on the mouse and then perform feature extraction techniques to find their position and calculate the displacement vector between frames. We will compare multiple algorithms to ensure consistency in the displacement vector for all features. We will try markers of various shapes such as box and circle and compare which algorithm performs best in various lighting conditions. apply a template and find a local centroid at each frame of the video. To track the change in the X Y coordinate space, we will find the dy/dx change between consecutive video frames and record the data with the values reported by a mouse event.

In order to visualize the accuracy, we will display a mouse pointer trace showing the path reported by the optical verification method and the mouse event values. To simulate alteration of mouse event values, we will provide a deterministic software solution that allows the user to introduce alteration of the mouse event at will.

Implementation:
Android device for video capture and image processing, Laptop for viewing mouse trace, accuracy, and tamper reporting.

References:
https://cecas.clemson.edu/~stb/klt/tomasi-kanade-techreport-1991.pdf
http://ieeexplore.ieee.org/abstract/document/4195154/?reload=true
http://www.cse.psu.edu/~rtc12/CSE486/lecture30.pdf
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