

# Optical Verification of Mouse Event Data for Anti-Cheat Purposes in Competitive Gaming

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## Motivation

- Software based anti-cheat monitoring systems, can be circumvented by client side software and devolves to a cat and mouse game between hackers and developers
- eSports viewership is rising; monthly viewers predicted to increase to 149 million in 2017 [1]
- And those moments of awe -- the very ones that make your head perk up and wish someone else could have seen it -- are often met with accusations of cheating...It's the same type of ugly that has marred Major League Baseball [2]

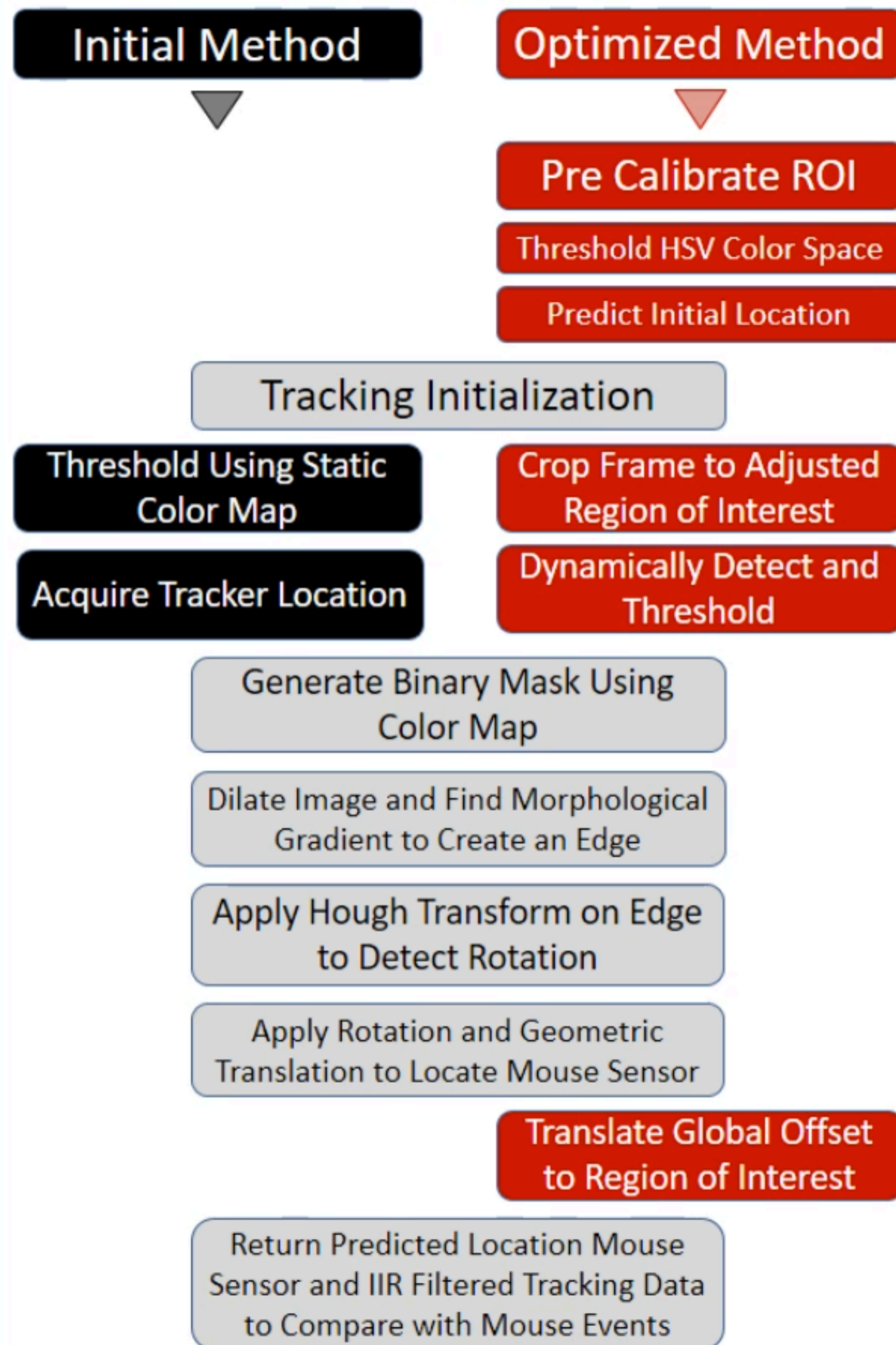
## Project Goals

- 1) Track large mouse movements by using pre-recorded video and verify using mouse events
- 2) Track fine mouse movements (very small movements amounting to  $< 15$  pixels)

## Future Work

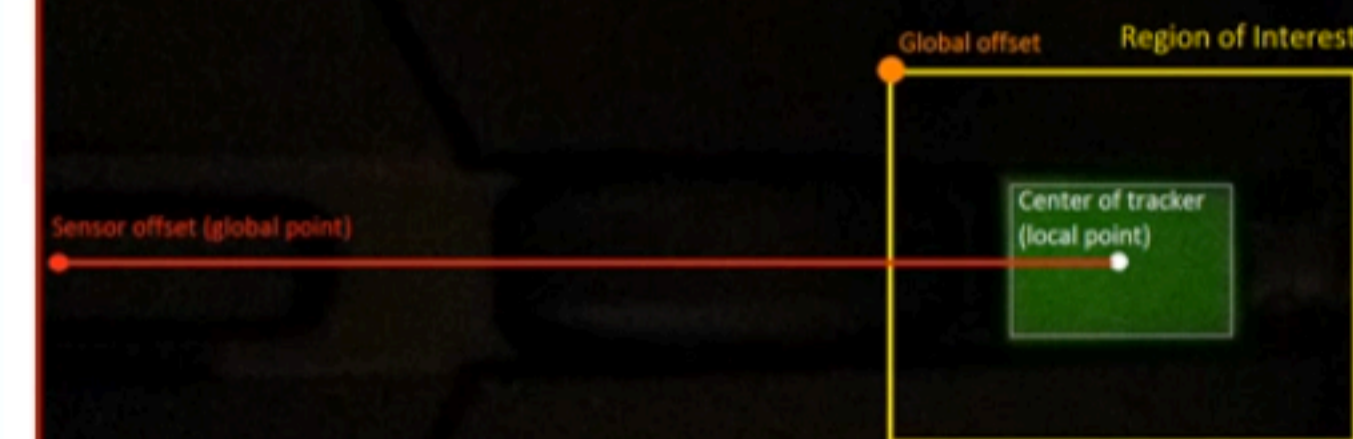
- Increase fidelity and real-time tracking using faster capture methods and higher resolution of tracking
- Autocorrect periodically using mouse events data to inject "key frames"
- Track mouse lift (physical movement of mouse without changing pointer location)

## Method Flow



## Experimental Results

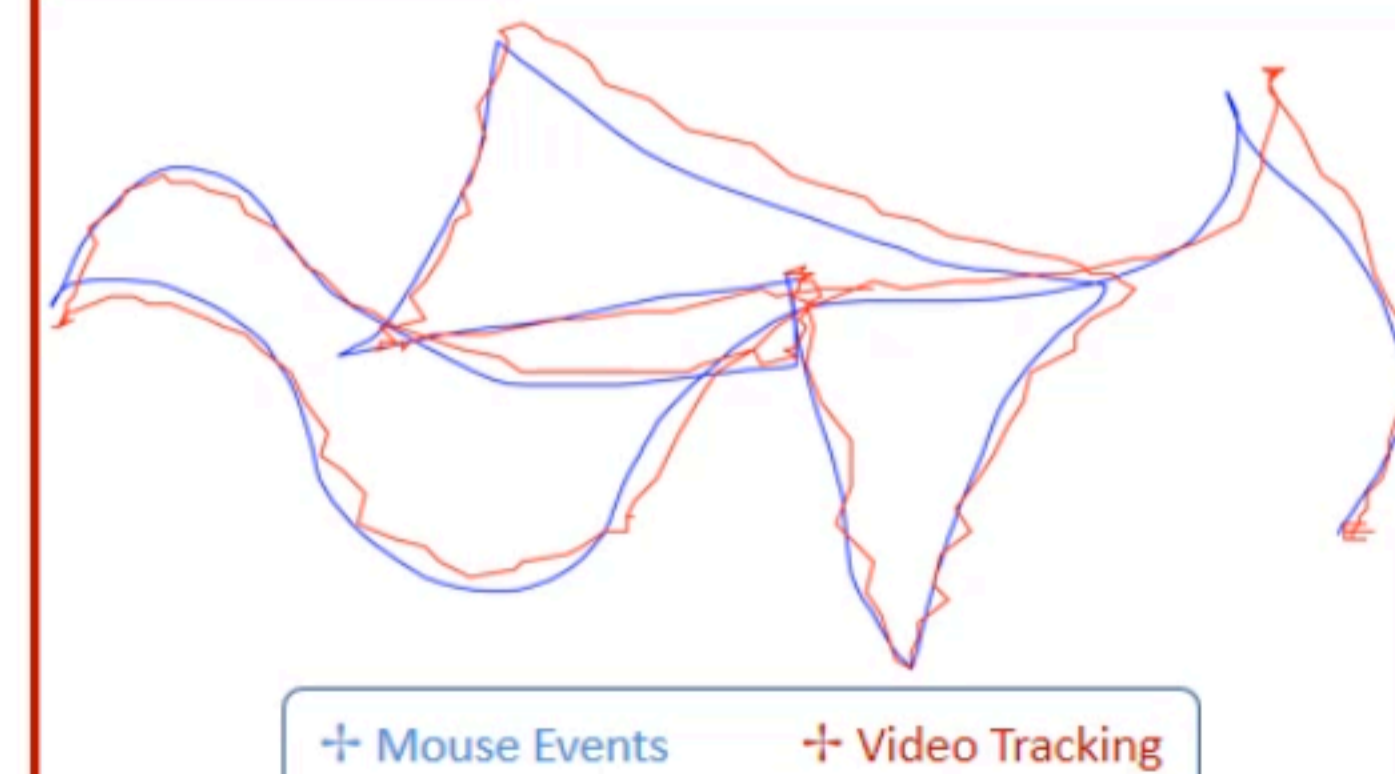
### Region of Interest Map



### Initial vs Optimized Method

- Tracking Speed on Quad Core Processor:
- Initial  $> 500$  ms per frame (at 60 FPS)
  - Optimized  $> 10$  ms per frame (at 10 FPS)

### Method Comparison



## References

1. <https://newzoo.com/insights/articles/esports-enthusiasts-total-145-million-2017/>
2. [http://www.espn.com/esports/story/\\_/id/14942404/global-offensive-curtain-cheats-their-inevitable-fall-counter-strike-esports](http://www.espn.com/esports/story/_/id/14942404/global-offensive-curtain-cheats-their-inevitable-fall-counter-strike-esports)