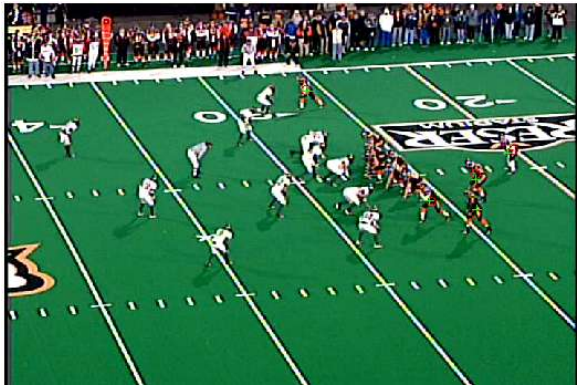
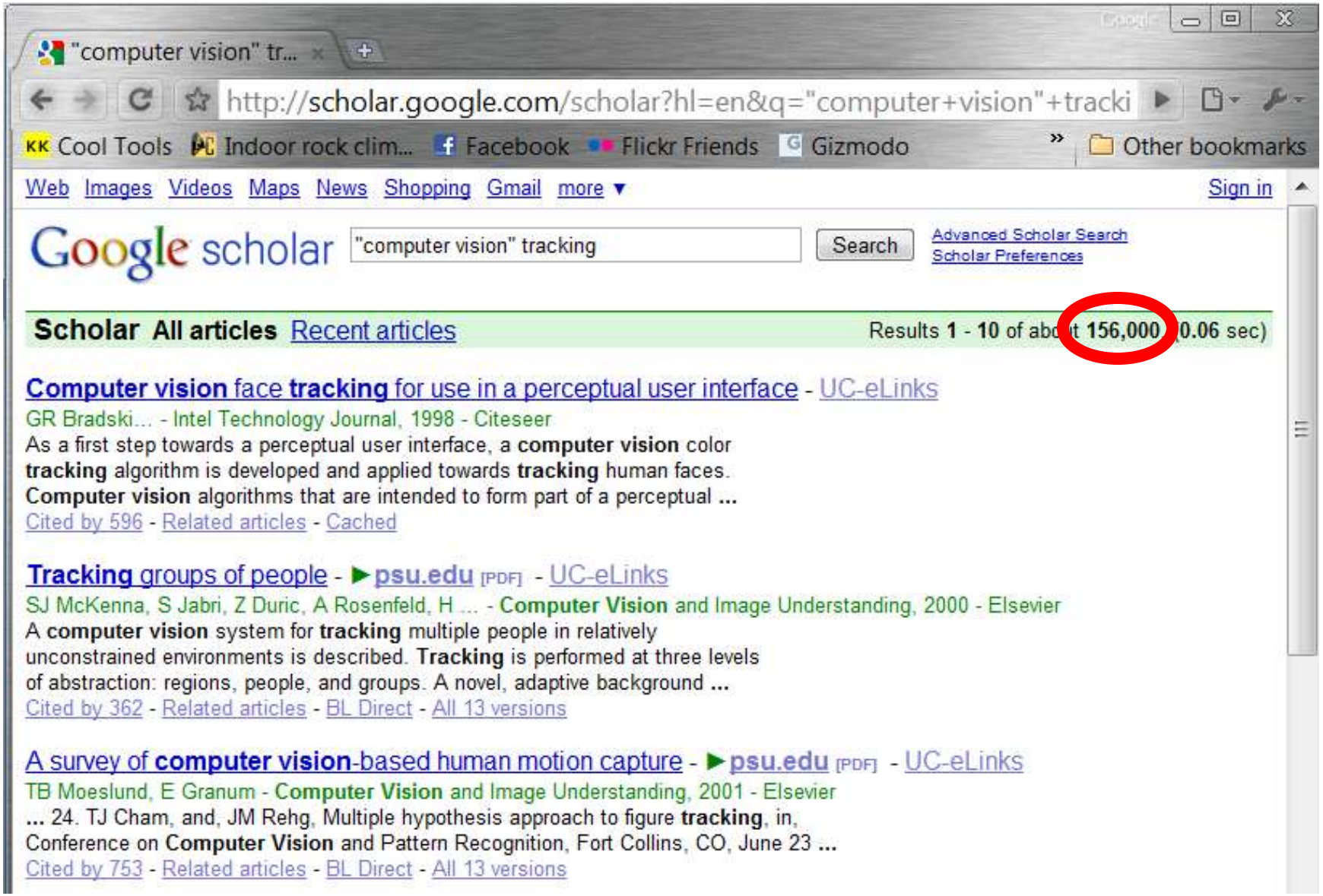
Eye Tracking for Blob Tracking

Steven Scher (ucsc phd candidate)
sscher@ucsc.edu

ISSDM program
James Davis (ucsc professor)
Sriram Swaminarayan (LANL)

It’s useful to track stuff

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Computer vision face tracking for use in a perceptual user interface - UC-eLinks
GR Bradski... - Intel Technology Journal, 1998 - Citeseer
As a first step towards a perceptual user interface, a computer vision color tracking algorithm is developed and applied towards tracking human faces. Computer vision algorithms that are intended to form part of a perceptual ...
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Tracking groups of people - ▶psu.edu [PDF] - UC-eLinks
SJ McKenna, S Jabri, Z Duric, A Rosenfeld, H ... - Computer Vision and Image Understanding, 2000 - Elsevier
A computer vision system for tracking multiple people in relatively unconstrained environments is described. Tracking is performed at three levels of abstraction: regions, people, and groups. A novel, adaptive background ...
Cited by 362 - Related articles - BL Direct - All 13 versions
A survey of computer vision-based human motion capture - ▶psu.edu [PDF] - UC-eLinks
TB Moeslund, E Granum - Computer Vision and Image Understanding, 2001 - Elsevier
... 24. TJ Cham, and, JM Rehg, Multiple hypothesis approach to figure tracking, in, Conference on Computer Vision and Pattern Recognition, Fort Collins, CO, June 23 ...
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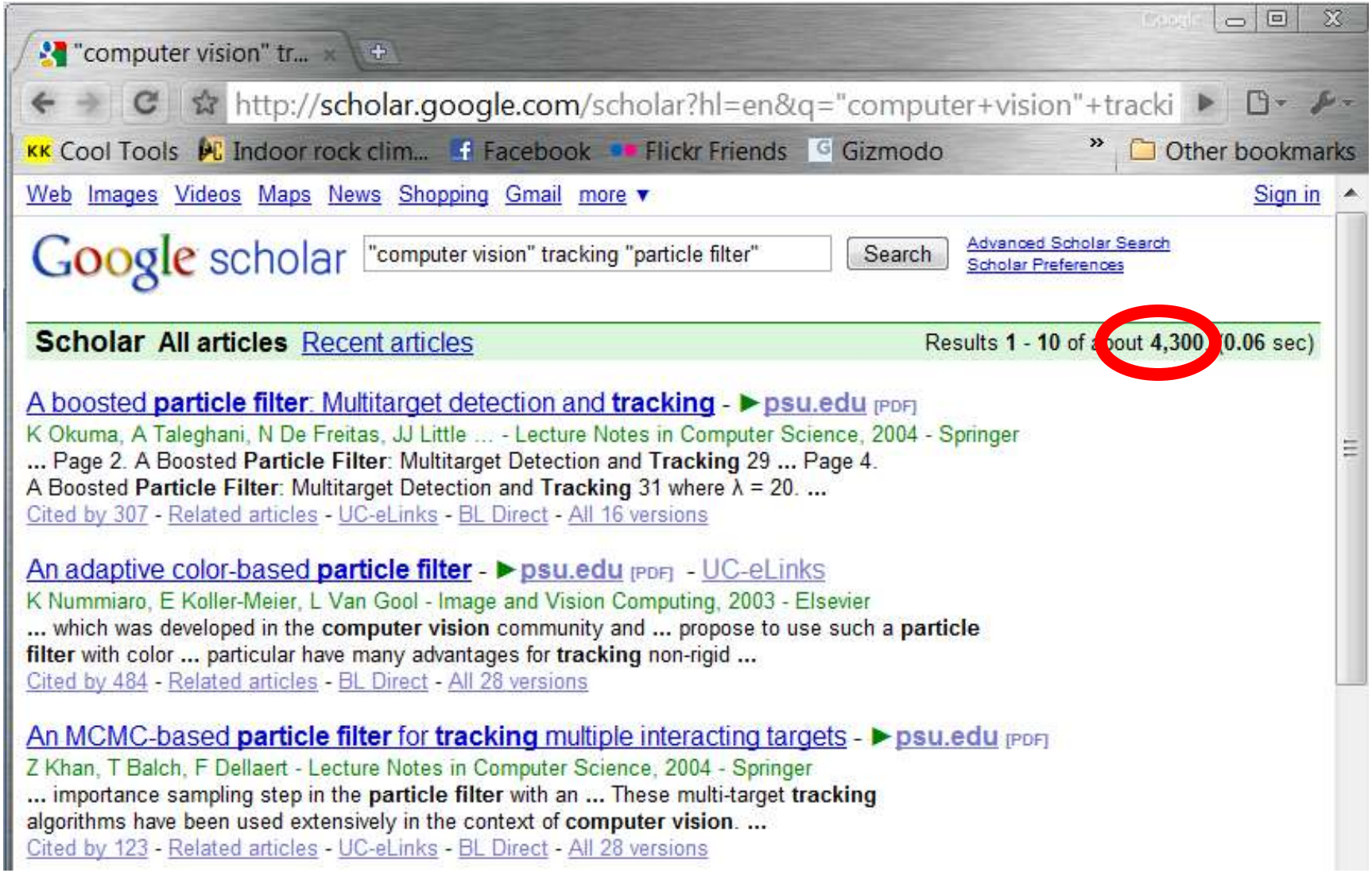
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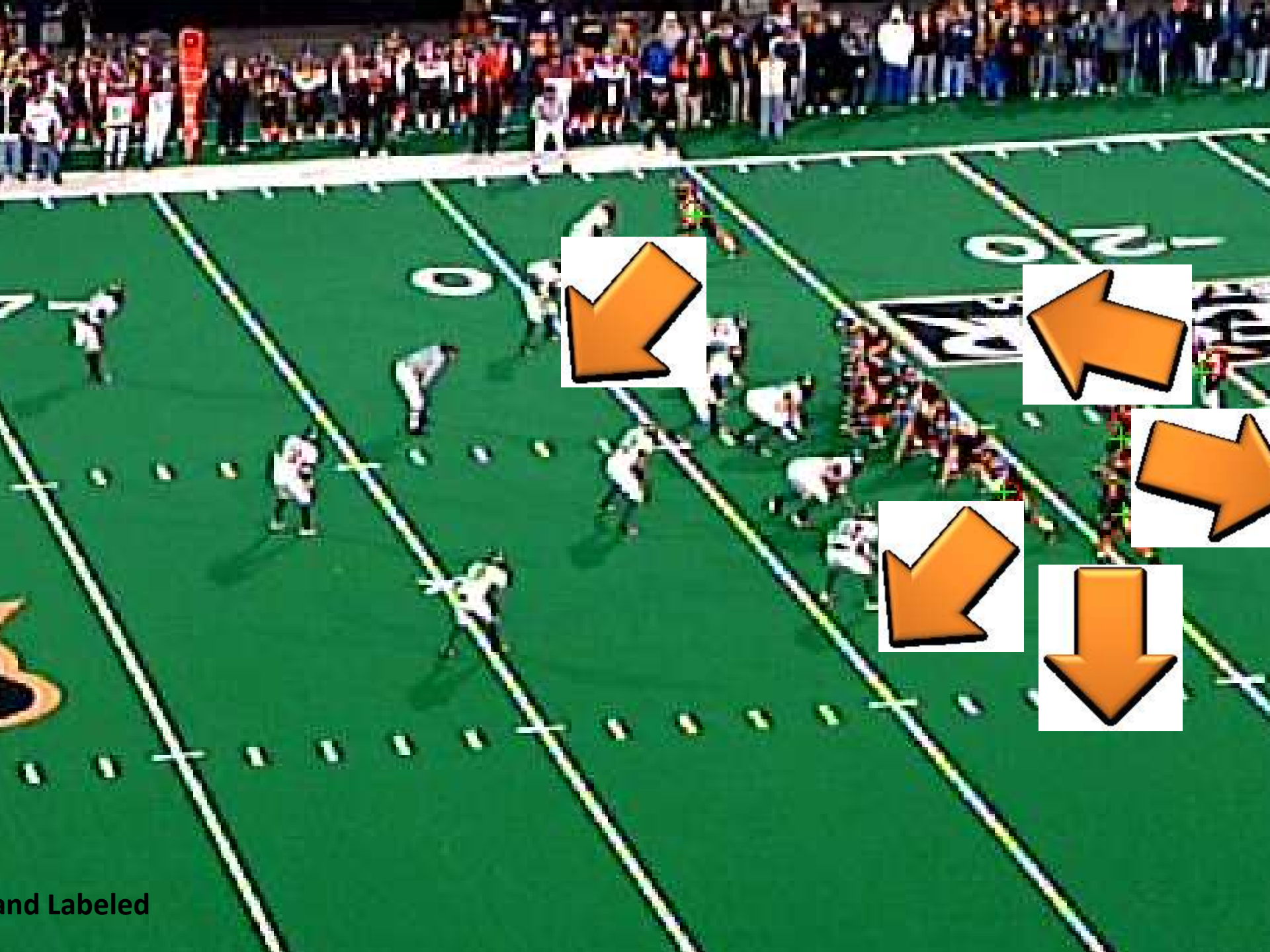
A boosted particle filter: Multitarget detection and tracking - psu.edu [PDF]
K Okuma, A Taleghani, N De Freitas, JJ Little ... - Lecture Notes in Computer Science, 2004 - Springer
... Page 2. A Boosted Particle Filter: Multitarget Detection and Tracking 29 ... Page 4.
A Boosted Particle Filter: Multitarget Detection and Tracking 31 where λ = 20. ...
Cited by 307 - Related articles - UC-eLinks - BL Direct - All 16 versions
An adaptive color-based particle filter - psu.edu [PDF] - UC-eLinks
K Nummiaro, E Koller-Meier, L Van Gool - Image and Vision Computing, 2003 - Elsevier
... which was developed in the computer vision community and ... propose to use such a particle
filter with color ... particular have many advantages for tracking non-rigid ...
Cited by 484 - Related articles - BL Direct - All 28 versions
An MCMC-based particle filter for tracking multiple interacting targets - psu.edu [PDF]
Z Khan, T Balch, F Dellaert - Lecture Notes in Computer Science, 2004 - Springer
... importance sampling step in the particle filter with an ... These multi-target tracking
algorithms have been used extensively in the context of computer vision. ...
Cited by 123 - Related articles - UC-eLinks - BL Direct - All 28 versions

and Labeled



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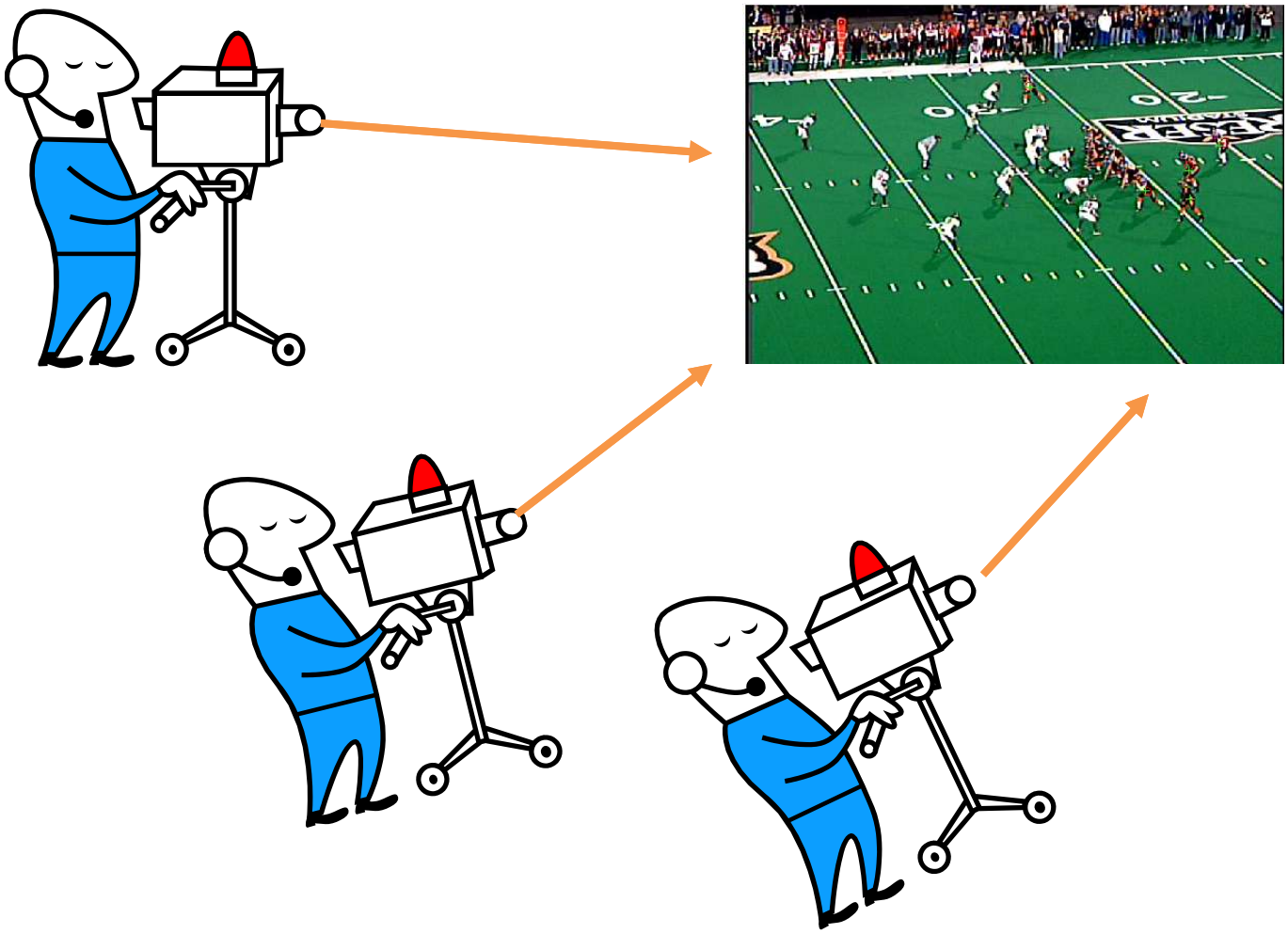
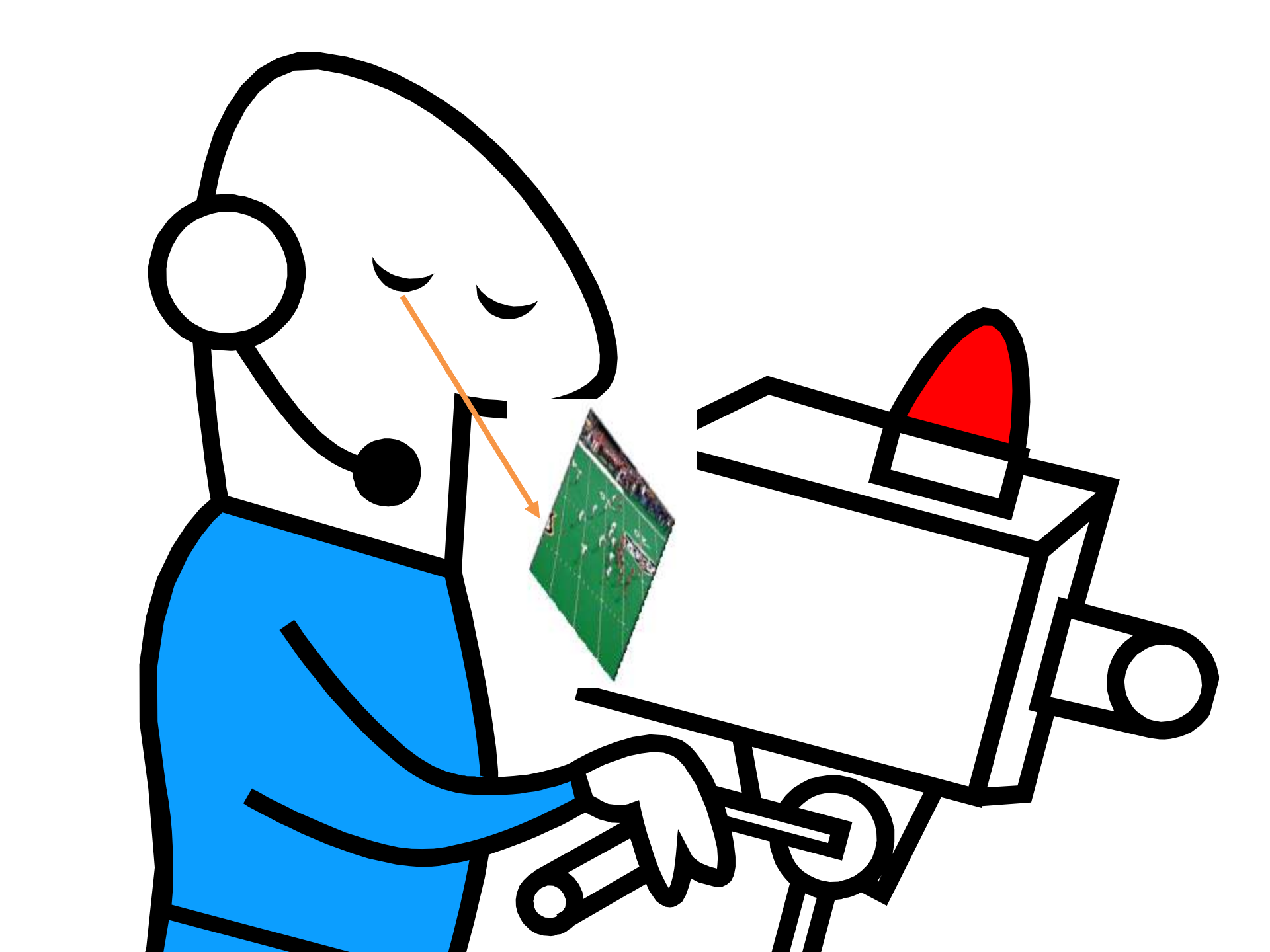
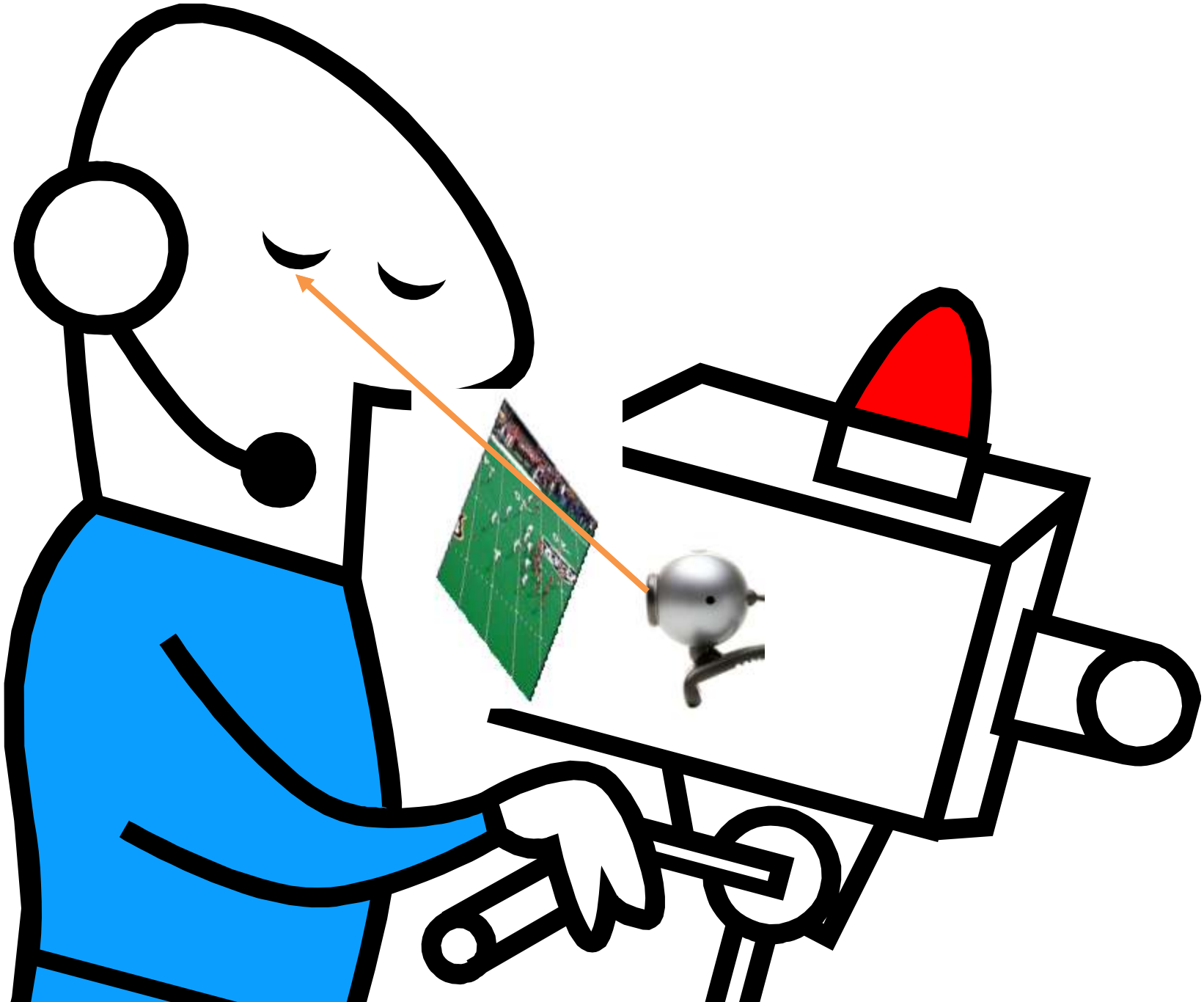
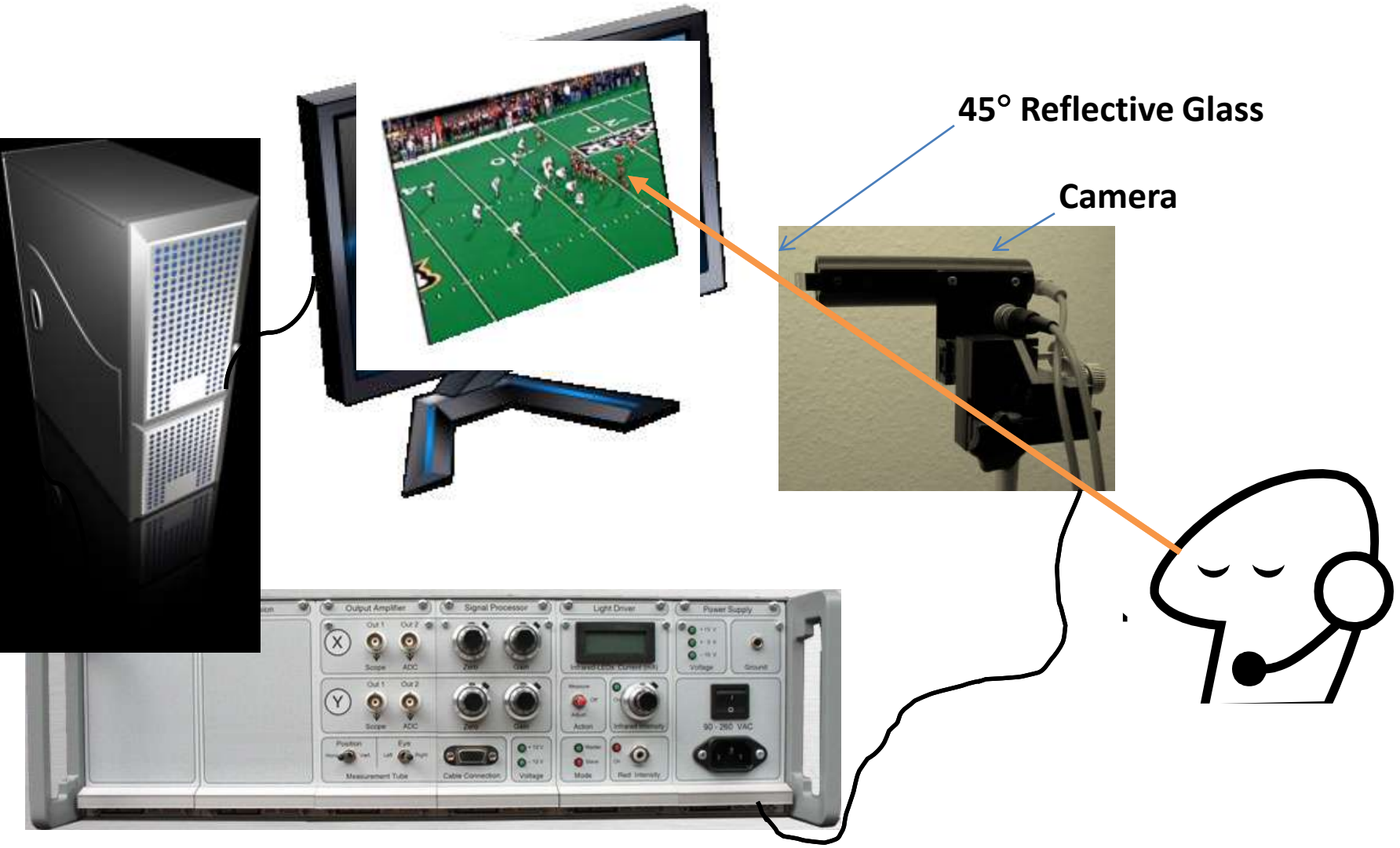






Our Eye Tracker



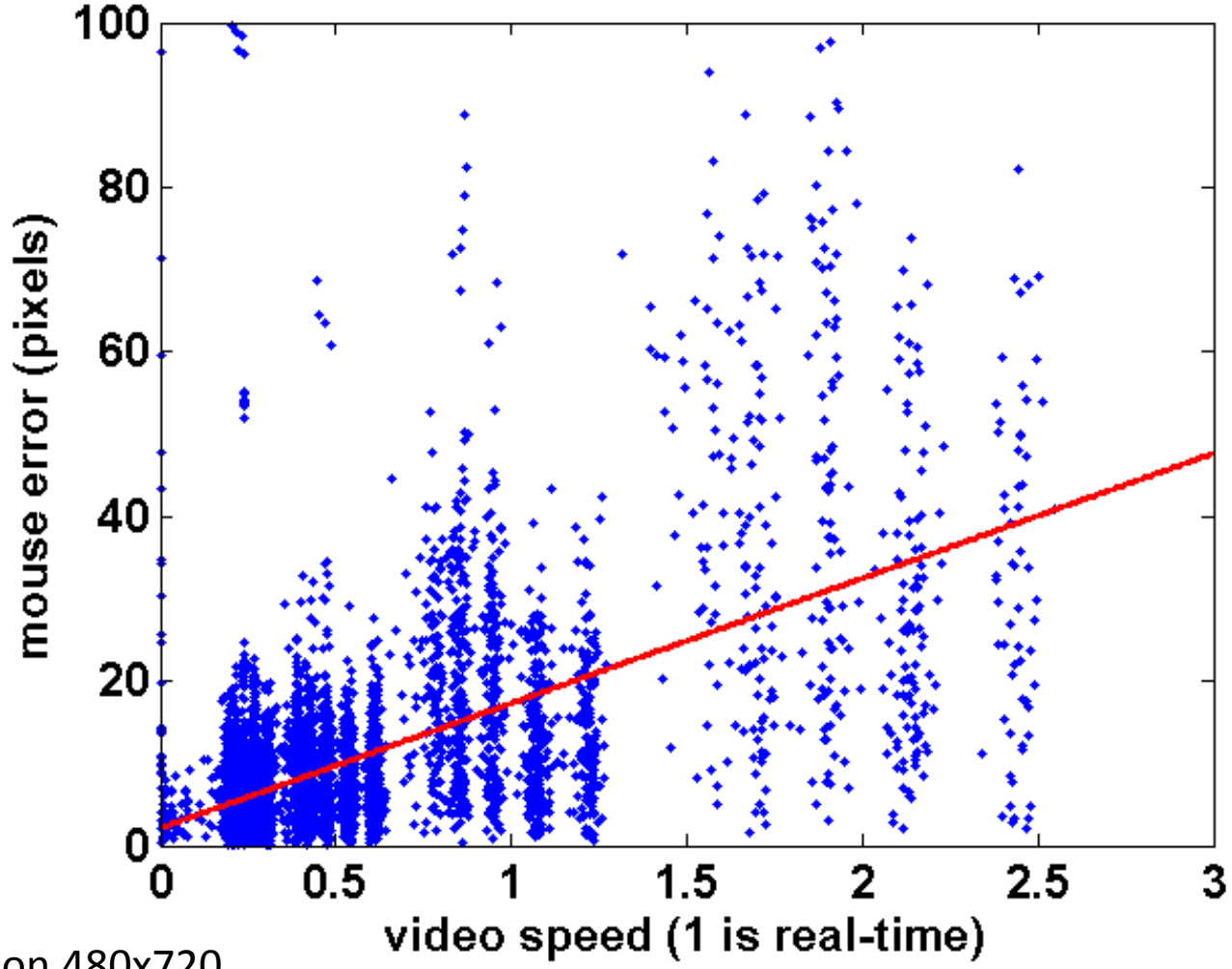
Other Fancier Eye Trackers

45° Reflective Glass
Camera
Output Amplifier
Signal Processor
Light Driver
Power Supply

Why not use a mouse?

- Show 2 hand-labeled videos
  - Original Speed
  - Too Fast

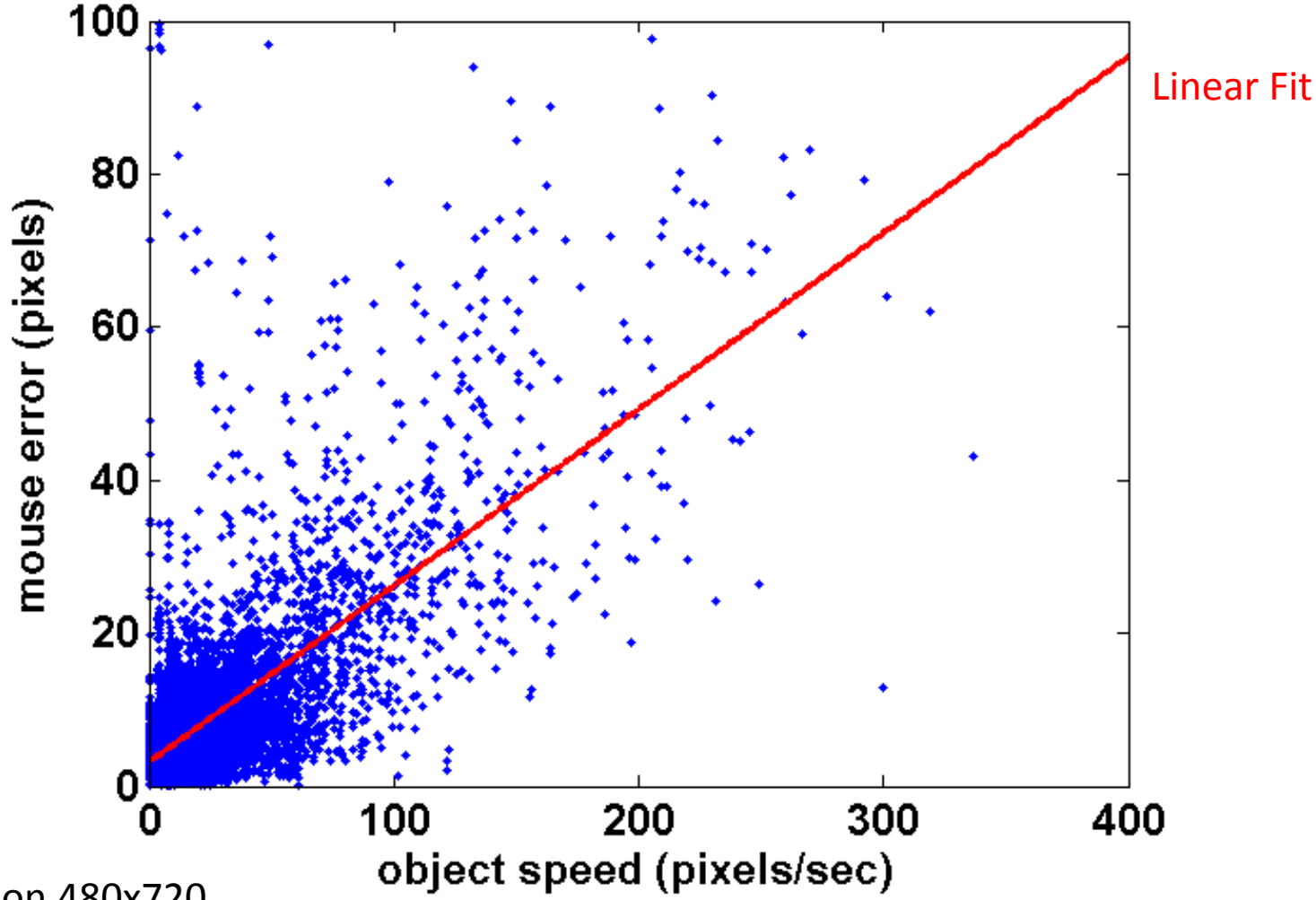
Hand-Labeling Error Increases with Video Playback Speed



Video resolution 480x720

Errors > 100 pixels not shown

Hand-Labeling Error Increases with Object Speed

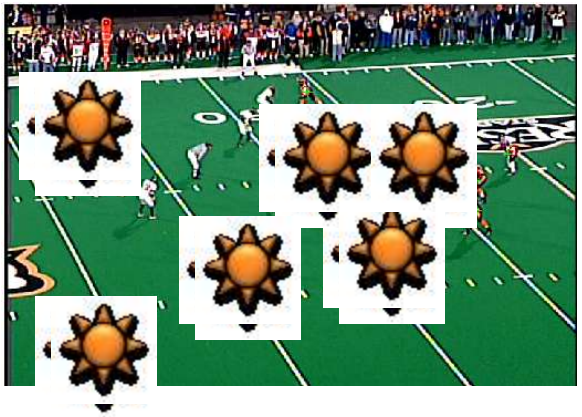


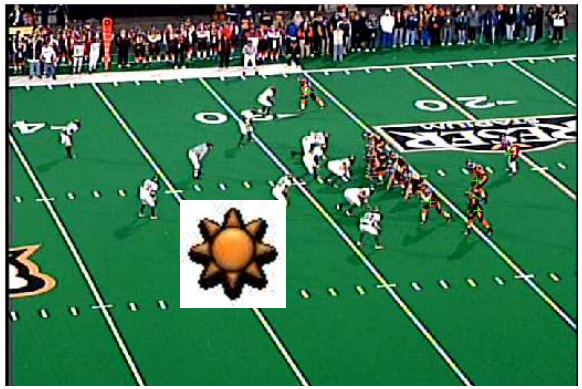
Video resolution 480x720

Errors > 100 pixels not shown

A little about our eyes

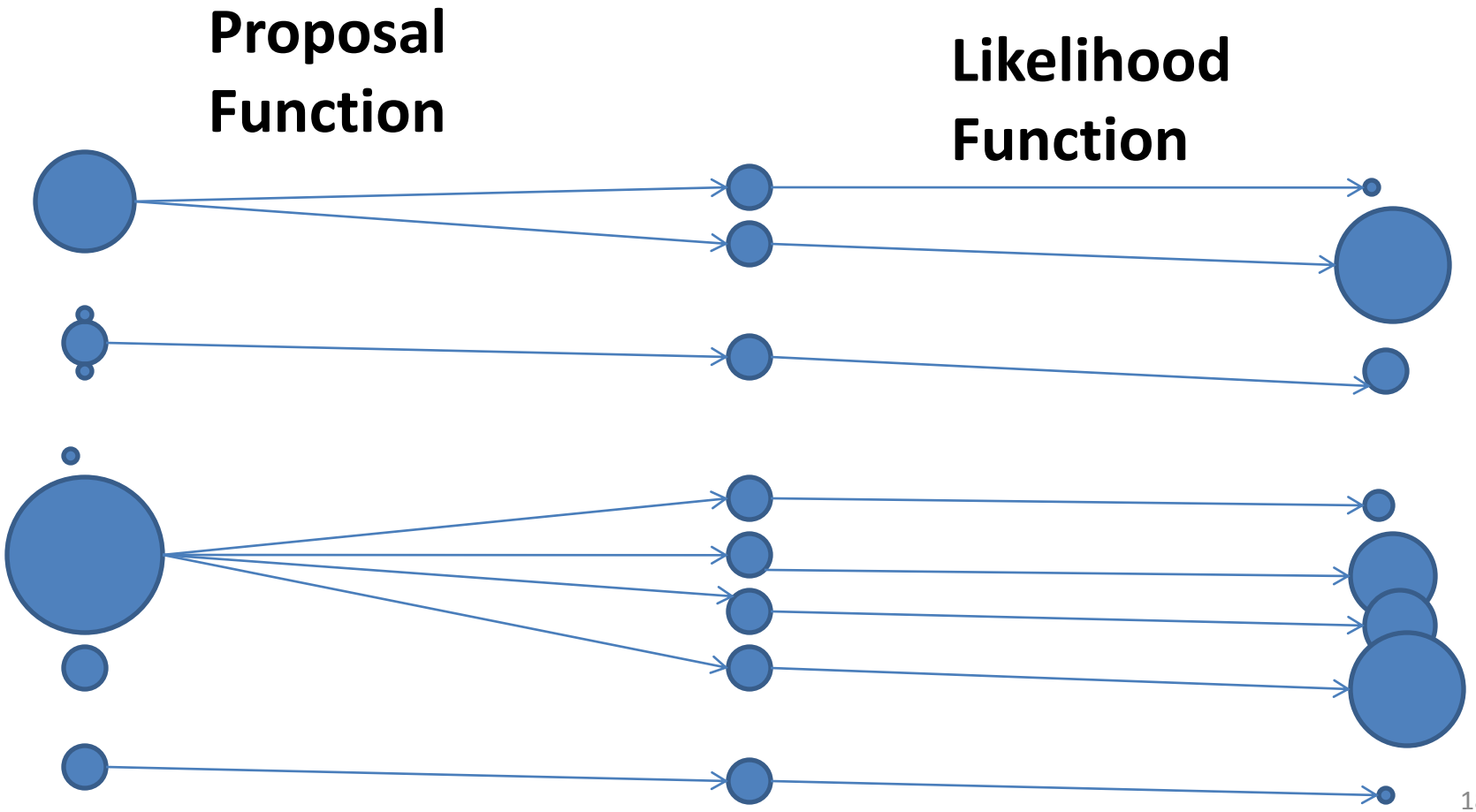
- Fixation & Saccades vs Smooth Pursuit



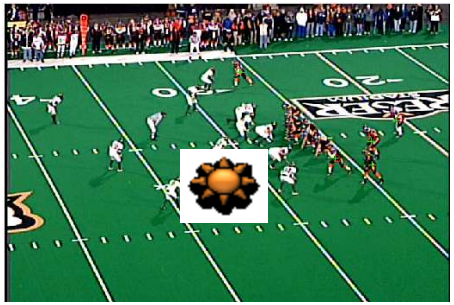


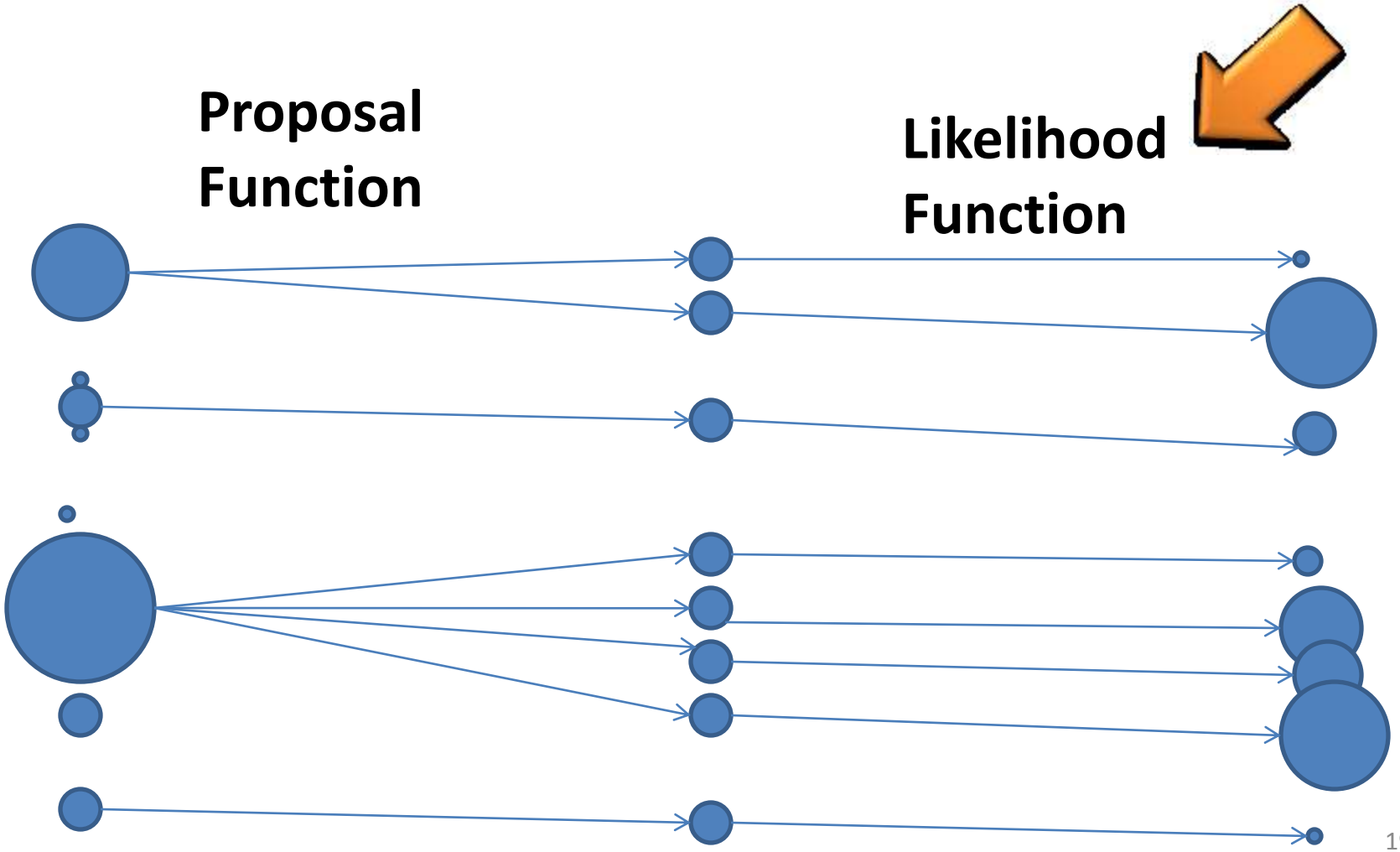
- Attending to Multiple Objects (~4)

How to Track Stuff: Particle Filter

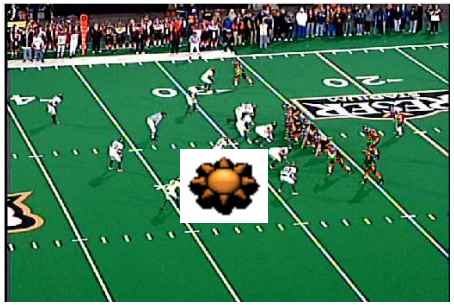


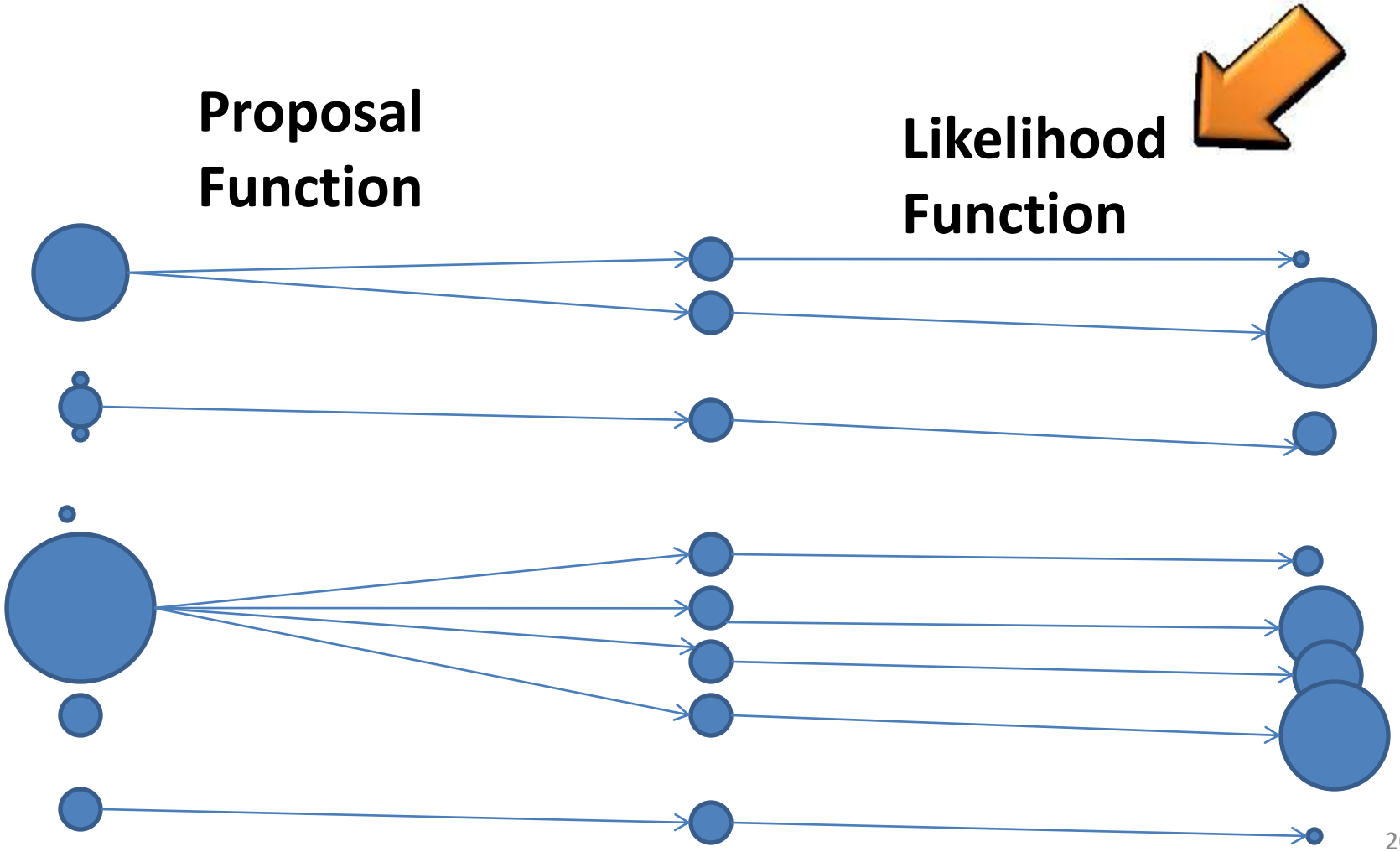
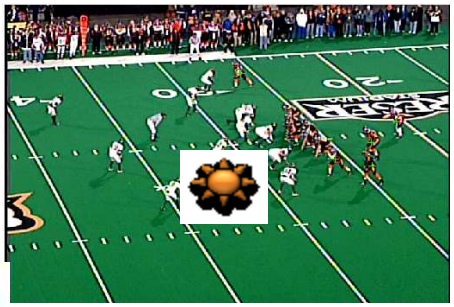
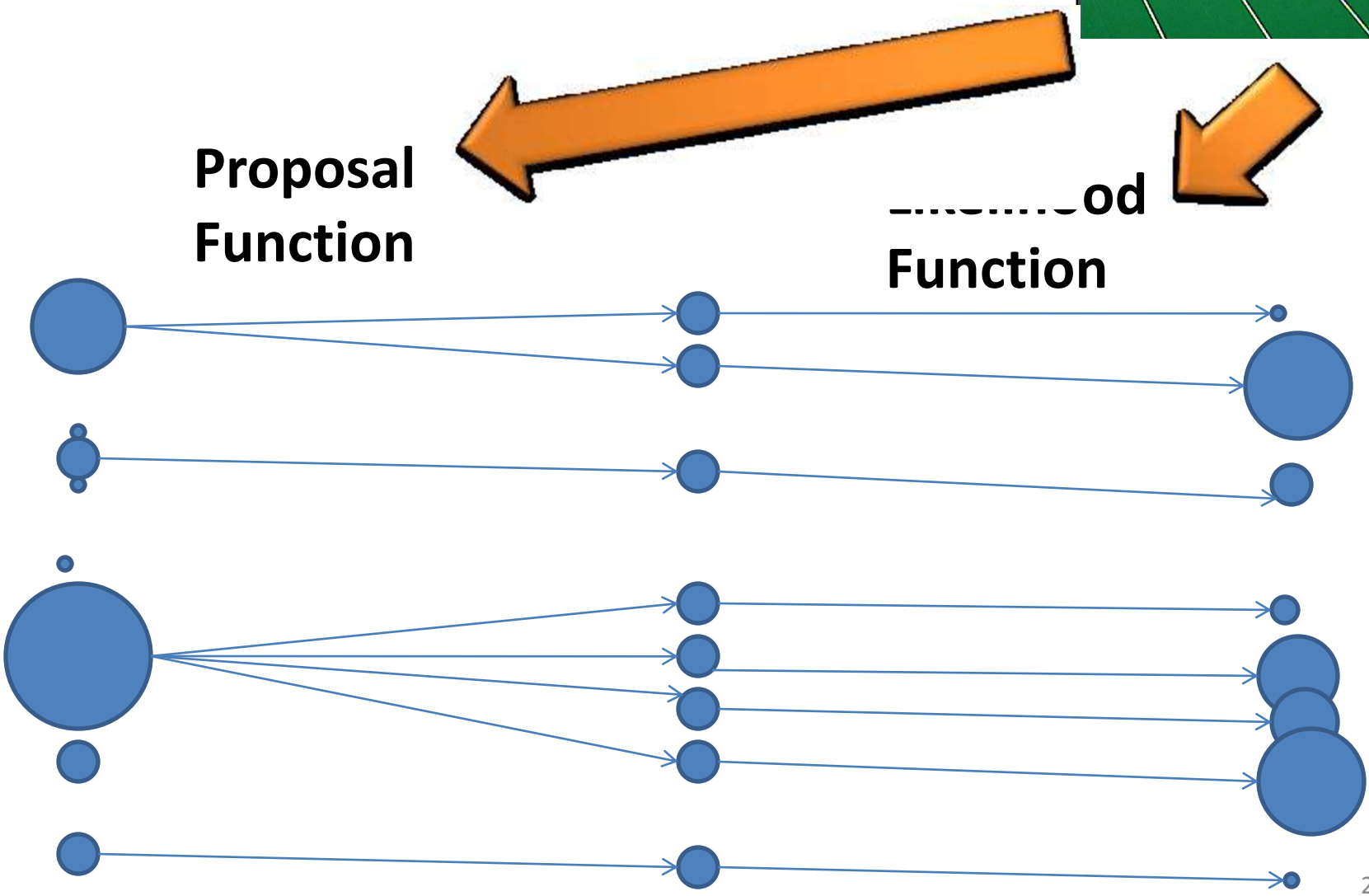
How to Track Stuff: Particle Filter





How to Track Stuff: Particle Filter





How to Track Stuff: Particle Filter