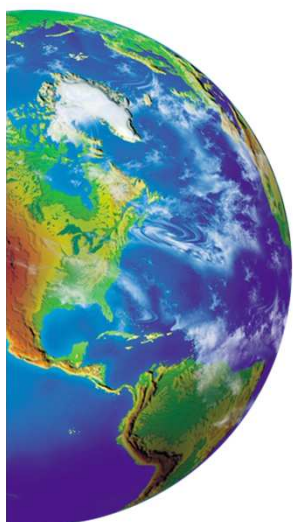


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# Tracking Gaze Direction from Far-Field Surveillance Cameras



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# Overview

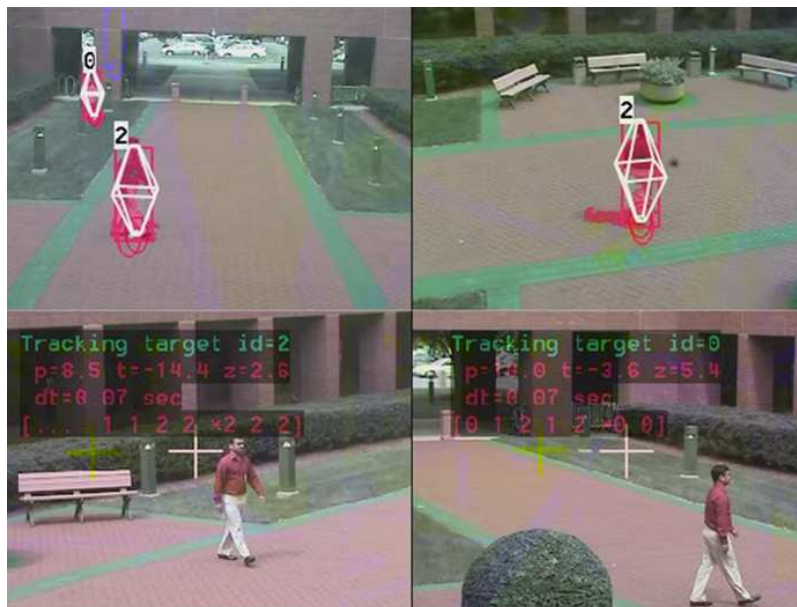


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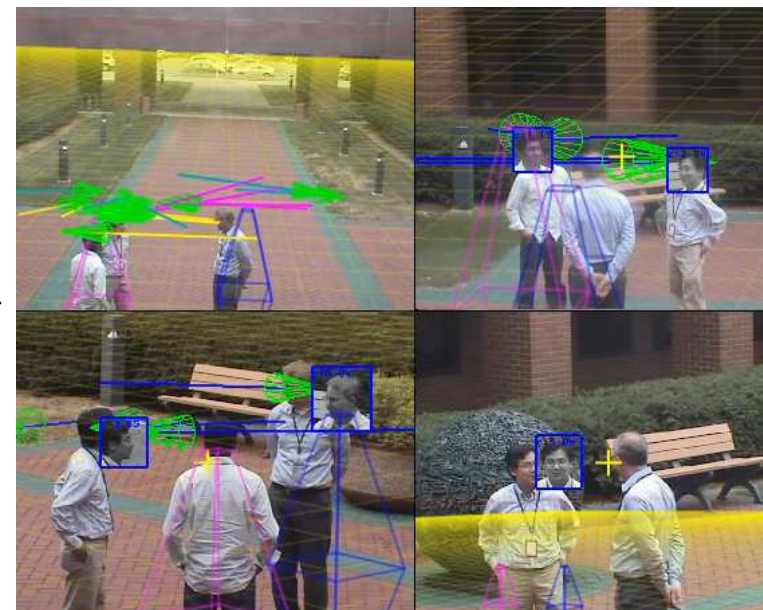


- Main idea: Real-time tracking of the gaze of multiple individuals using a network of far-field surveillance cameras.

Person Tracking



Person Gaze Tracking



# System & Applications

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Cooperative **person** and **head pose** tracking system:

- Fixed cameras performing site-wide tracking.
  - Person detection & tracking
- PTZ cameras zooming to faces.
  - Face detection, head pose estimation, **asynchronous** gaze tracking.

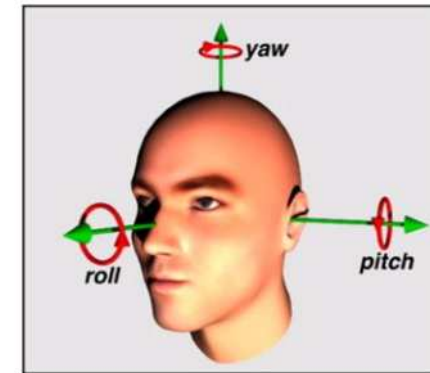
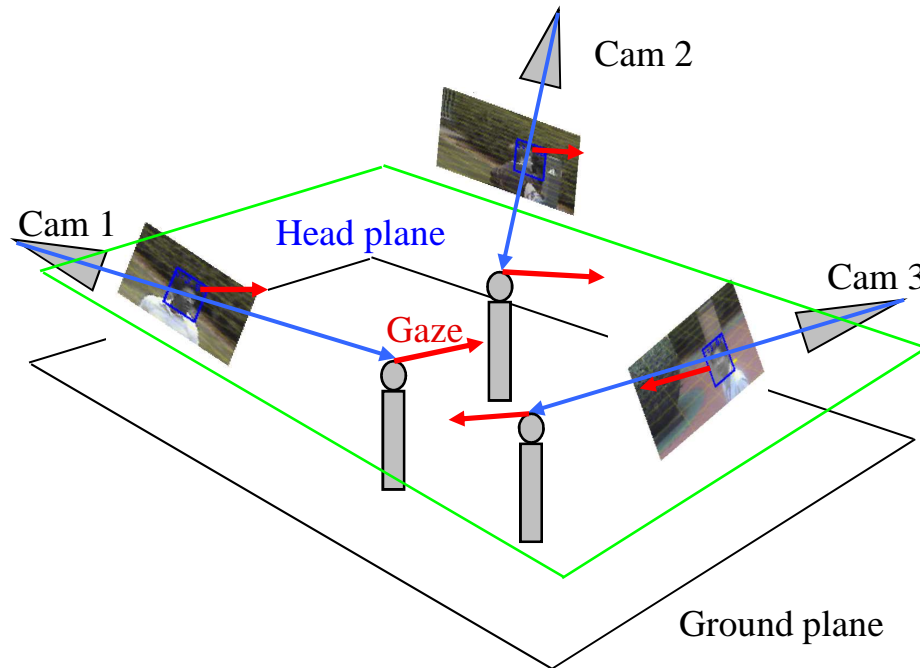
## Applications:

- Improve person localization in crowded scenes.
- Real-time understanding of pose, gesture & social interaction.
- Find out what people are looking at (e.g., security, retail apps).

# Method



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- Person tracking, PTZ camera control.
- Head localization & head pose detection.
- Track the gaze of each person using a Kalman filter on  $\text{yaw } (\alpha)$  and  $\text{pitch } (\beta)$  angles.

# Gaze Analysis



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- 3D head position from face detection & projection.
- Gaze angle conversion:



- Kalman filter gaze tracking.
- Data association for gaze and person tracking.



# Results: Gaze Tracking



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# Results: Gaze Tracking of Two People



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