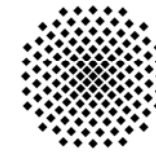




Visual Analysis of Video Streams

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Why Visual Analytics?

- Massive increase of video data
- 10h of video data uploaded to YouTube in every minute
- Millions of CCTV cameras (4.5 million CCTVs in GB)
- Heterogeneous video sources

→ **How to analyze this data?**

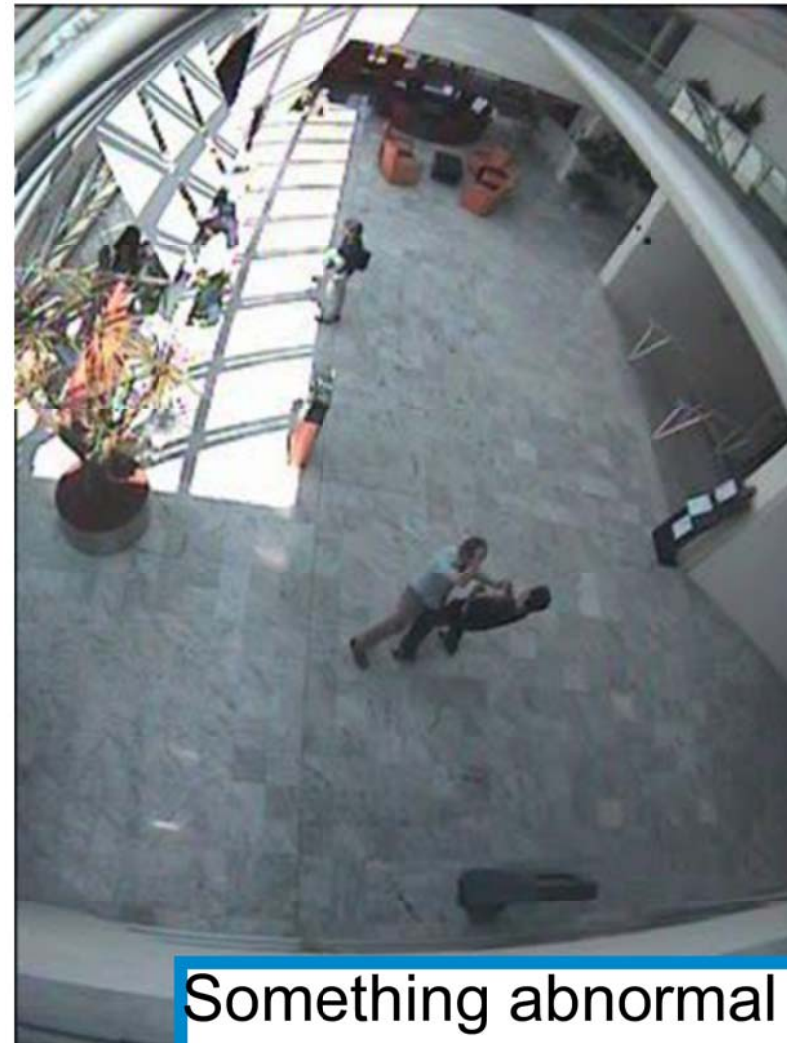


[Haering2008]

Why Visual Analytics?



a known and well-defined target

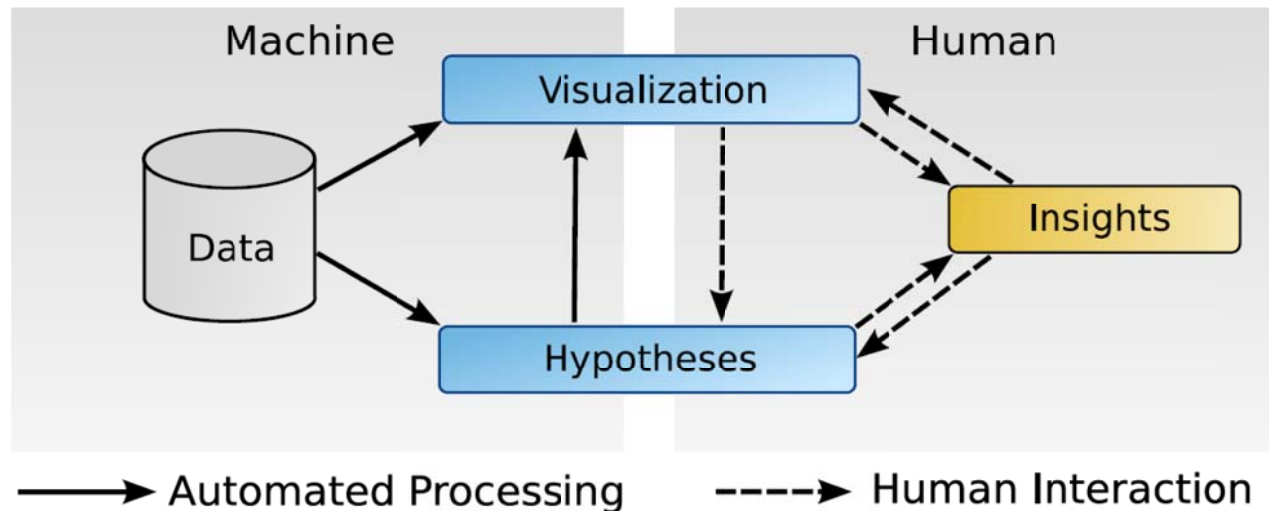


Something abnormal ?

an unknown or poorly-defined target



- Deploy the work to the expert: human or machine
- Iterative Insight Generation:
 - Automated Low-Level Processing
 - Feature Visualization
 - User Interaction



Video Visualizations - Horseshoe



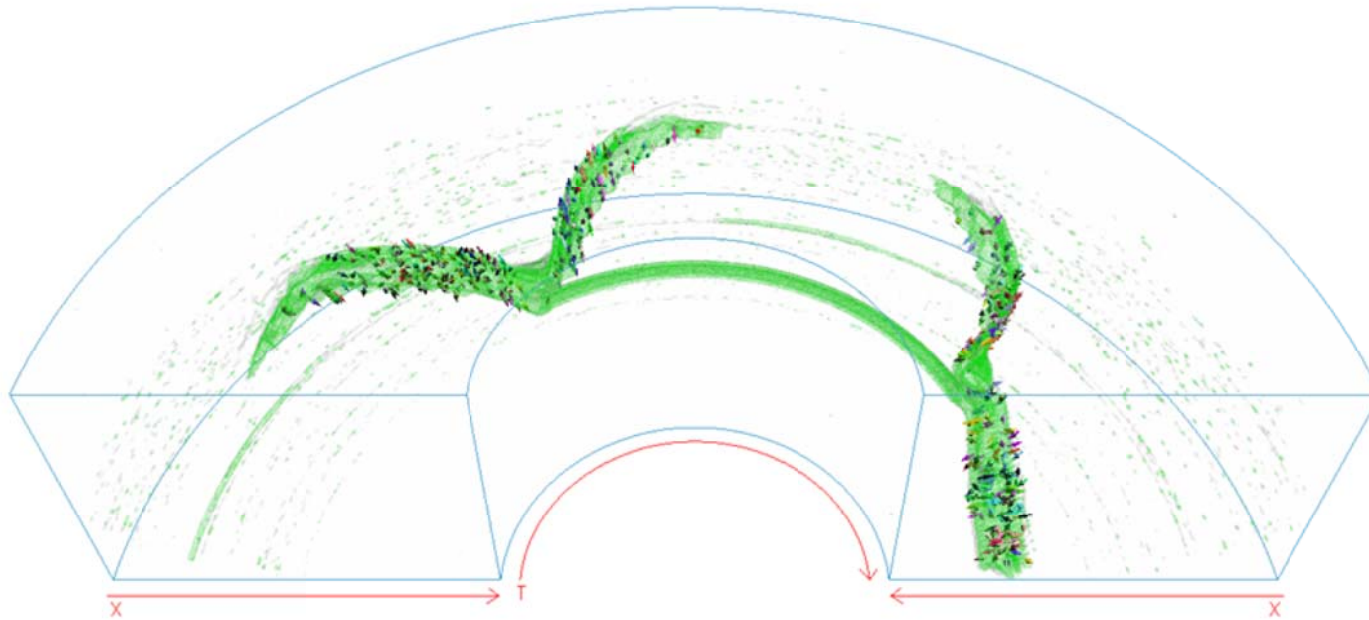
enter & deposit



leave the scene

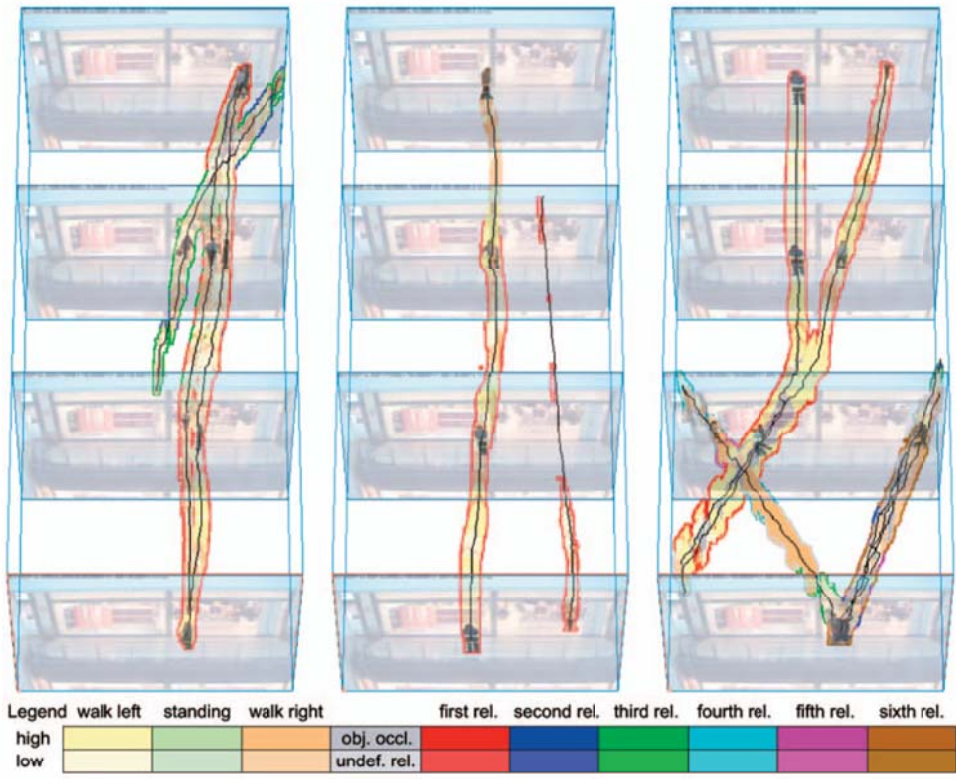


return & pick up

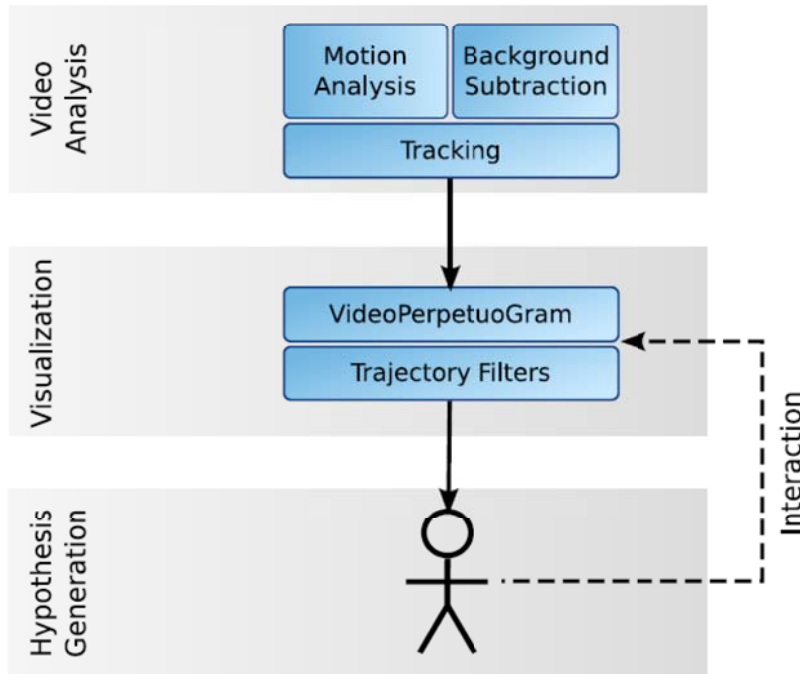


Video Visualizations - VideoPerpetuoGram

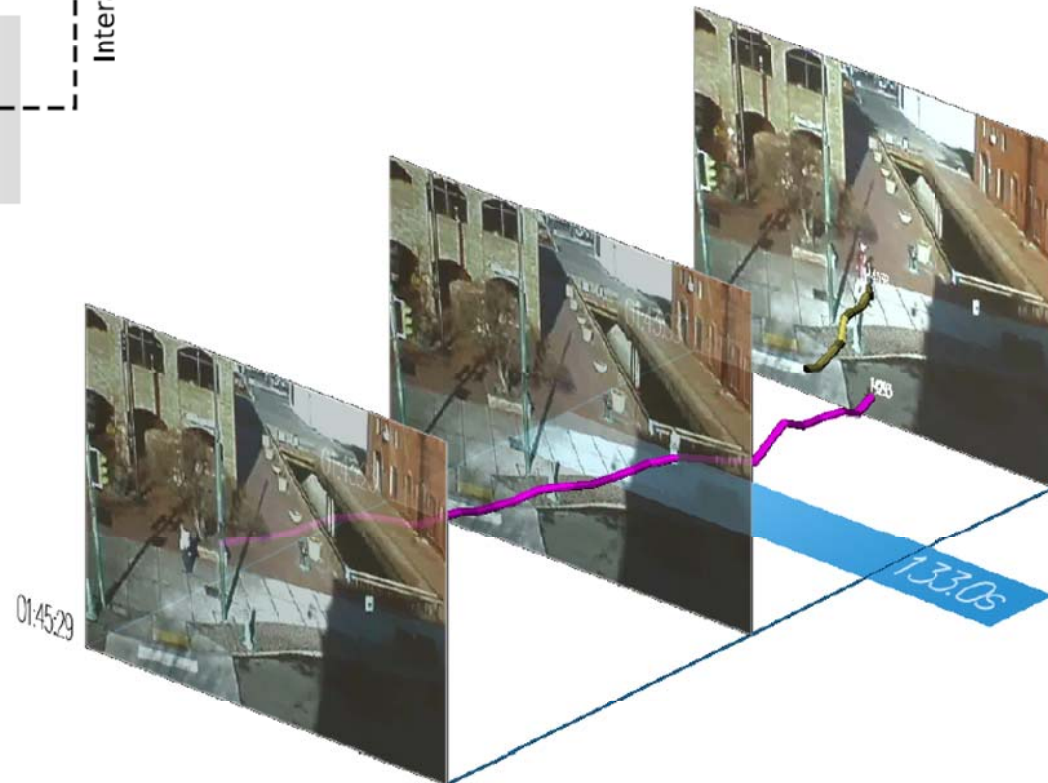
- Visualization similar to Seismographs
- Preserves temporal relationship
- Patent application pending

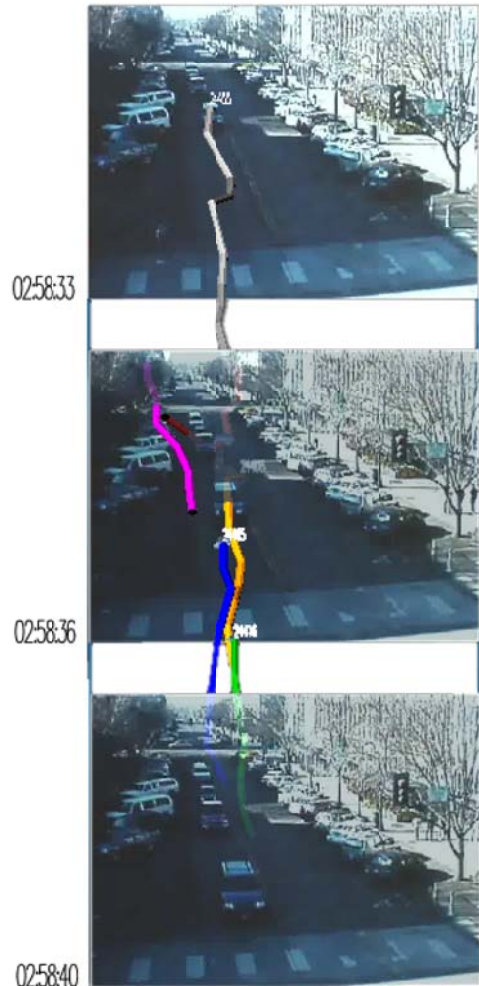


Visual Analytics for Video Streams



- Add the user interaction
- Allows for scalable video analysis
- Enables hypotheses verification





- Find suspicious encounter of people
- Video Mini Challenge Award:
Outstanding video analysis tool



- Huge amount of complex video data
- Enable the user to handle this data
- Award-winning video analysis tool combining
 - Automatic preprocessing
 - Video visualization
 - User Interaction

*“Analyze First -
Show the Important -
Zoom, Filter and Analyze Further -
Details on Demand”*

visual analytics mantra

[Keim2008]



Thank you for listening!

We look for Research Cooperation!

Benjamin Höferlin

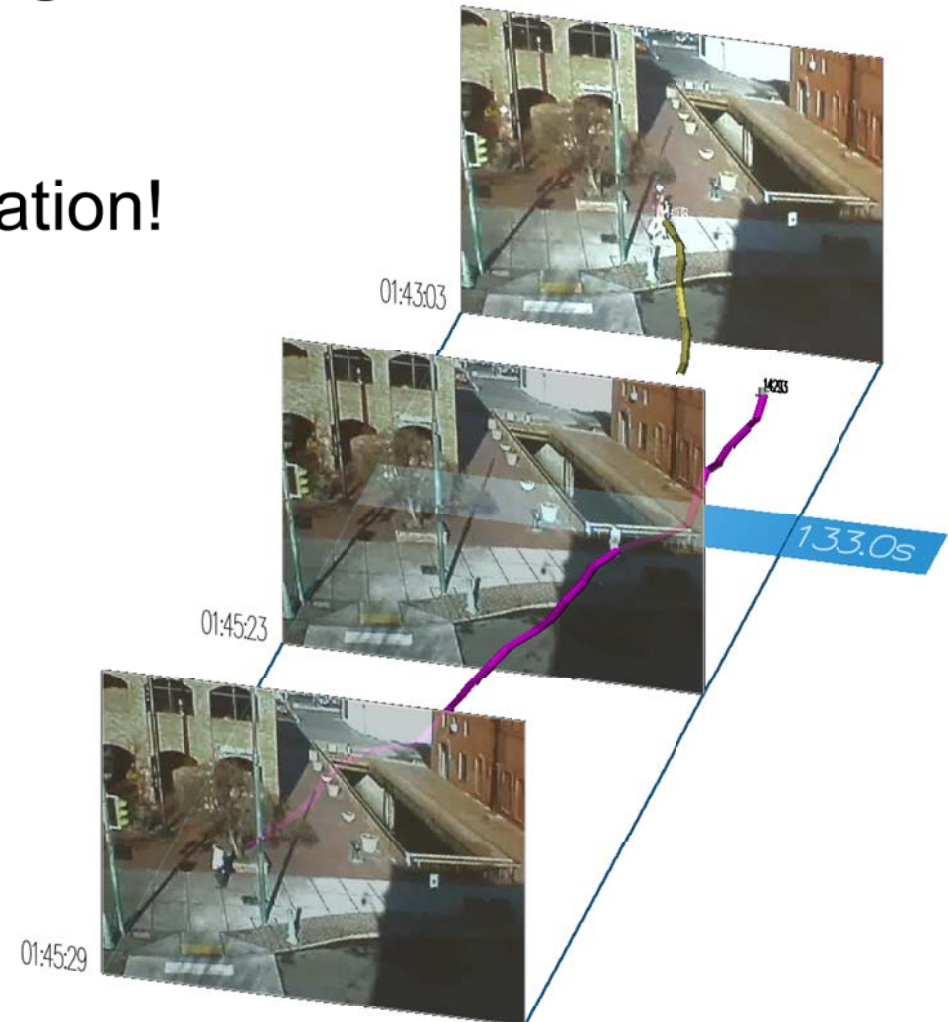
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- [Haering2008] Haering, N. and Venetianer, P.L. and Lipton, A., “The evolution of video surveillance: an overview”, *Machine Vision and Applications* 19/5, pp. 279–290, 2008.
- [Keim2008] Daniel A. Keim, Florian Mansmann, Jörn Schneidewind, Jim Thomas, and Hartmut Ziegler, “Visual Analytics: Scope and Challenges”, *Visual Data Mining, LNCS 4404*, pp. 76–90, 2008, Springer Verlag, Berlin, 2008.

