Proseminar Wissenschaftliches Arbeiten

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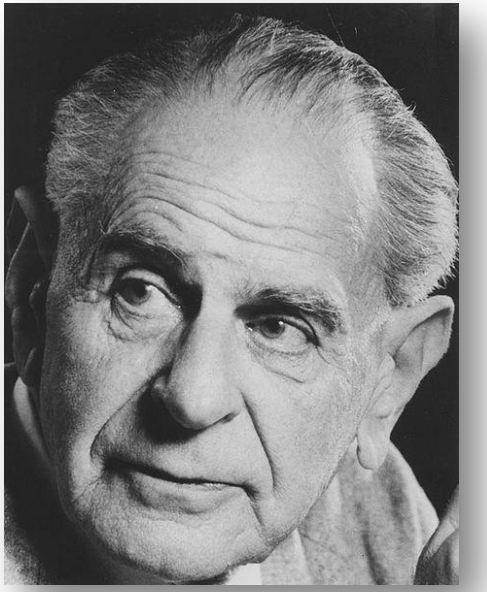
Agenda

- Wissenschaft & Theorie
- Wissenschaftliche Arbeiten
- Recherche

Kritischer Rationalismus

- Begründer: Sir Karl Raimund Popper
  - * 28. Juli 1902 in Wien
  - † 17. September 1994 in London

- Zitat Popper:
  - *Lebenseinstellung, „die zugibt, dass ich mich irren kann, dass du recht haben kannst und dass wir zusammen vielleicht der Wahrheit auf die Spur kommen werden“*



Quelle: Wikipedia (de)

Kritischer Rationalismus

- Lösen von Problemen ...
  - undogmatisch
  - methodisch (geplant)
  - rational (wohlüberlegt)

- Annahme: Die Welt existiert wirklich.
  - Die Welt ist unabhängig von unserer Betrachtung.

Quelle: Wikipedia (de)

Falsifikationismus

- Wissenschaftstheorie des kritischen Rationalismus
- Idee: Eine Aussage ist falsifizierbar, wenn sie widerlegt werden kann.
  - Eine nicht widerlegbare Aussage ist „nicht-empirisch“ (unwissenschaftlich)
  - Bsp. „Morgen regnet es oder nicht“
  - Empirischer Gehalt ist „Grad der Falsifizierbarkeit“
- Wahrscheinlichkeitshypothesen

Quelle: Wikipedia (de)

Mathematische Beweise

- Behauptung: “Das Quadrat einer ungeraden natürlichen Zahl *n* ist stets ungerade.“

$$n^2 = (2k+1)^2 = 4k^2 + 4k + 1 = 2 \cdot (2k^2 + 2k) + 1.$$

- Beweisformen
  - Direkt, Indirekt, vollständige Induktion, …

Quelle: Wikipedia (de)

Die wissenschaftliche Arbeit

- Präsentation von Ergebnissen.
  - Sind die Ergebnisse neu?
  - Sind die Ergebnisse richtig?
  - Wie hoch ist der empirische Gehalt der Ergebnisse?
- Unterschiedliche Arten von Artikeln
  - Forschung (Studien, Modelle, Algorithmen)
  - Position
  - Applikation
  - Survey
  - Technischer Bericht
  - ...

Bewertung wissenschaftlicher Arbeit

- Novelty
- Significance
- Scientific impact
- Contribution to the field
- Readability & organisation

Beispiele ...

- Ich entwerfe einen neuen Videocodec und publiziere Algorithmen für En- und Decoder

- Wie oben, nur zeige ich dass mein neuer Videocodec dieselbe Bildqualität bei halber Übertragungsrate liefert.

Die wissenschaftliche Arbeit

- Titel
- Autoren
- Abstract
- Metadaten
- Body
- [Kontext]

Video Retargeting: Automating Pan and Scan

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ABSTRACT

When a video is displayed on a smaller display than originally intended, some of the information in the video is necessarily lost. In this paper, we introduce *Video Retargeting* that adapts video to better suit the target display, minimizing the important information lost. We define a framework that measures the preservation of the source material, and methods for estimating the important information in the video. Video retargeting crops each frame and scales it to fit the target display. An optimization process minimizes information loss by balancing the loss of detail due to scaling with the loss of content and composition due to cropping. The cropping window can be moved during a shot to introduce virtual pans and cuts, subject to constraints that ensure cinematic plausibility. We demonstrate results of adapting a variety of source videos to small display sizes.

Categories and Subject Descriptors

I.4.9 [**Image Processing and Computer Vision**]: Applications

General Terms

Algorithms, Human Factors

Keywords

Video retargeting, Video editing, Mobile multimedia, Importance estimation

1. INTRODUCTION

Viewing video on small screens is becoming increasingly common as portable devices become more capable and popular. Unfortunately, most source material is originally intended for larger displays, such as televisions and theater screens. If such video is presented naïvely, by simply scaling it to fit the small screen, important parts of the image become too small to see. To make matters worse, small displays often have different aspect ratios than larger ones, requiring either an anisotropic "squish" or padding the video to fill the display. Small displays are limited to display less content than larger ones; our goal is to enable effective small display by retaining what is important.

This paper considers the problem of *video retargeting*, that is, adapting a video so that it is better suited for viewing on a display different than was originally intended. Video retargeting applies two operations to each frame of a video: cropping, which discards information outside of a window and disturbs the composition of the image; and scaling, which loses details of the image especially as objects become too small to recognize, and distorts the image if the scaling is anisotropic.

In this paper, we introduce an approach for automatically retargeting video to displays of different sizes and aspect ratios. This intelligent retargeting solution uses the video content to determine how to best combine cropping and scaling: unimportant aspects of the frame are cropped away so that more important content appears at a larger scale. We cast the retargeting as an optimization problem: what new video least damages the content of the original video. By moving the cropping window, video retargeting can create virtual pans and cuts to better portray dynamic shots. While our focus is on adapting edited films and videos for small displays, the methods are also applicable for automatically adapting wide format videos (such as feature films) to other aspect ratios (such as standard television).

Cropping discards considerable information. Not only is the content of the cropped portion lost, but we also lose the intended composition of the original frame. Composition is important in video as filmmakers use it in subtle ways to convey emotion and story. However, for small devices the alternative, downsampling the image to a tiny size that where objects are potentially too small to be recognized, is often worse. In essence, we choose to selectively lose some information from cropping in the hope of avoiding losing all information from scaling. Examples are shown in Figure 1.

In video, the motion on screen has significance beyond individual frames. Not only do objects move, but also filmmakers move the camera to achieve their desired goals. These latter effects are often subtle, yet significant: a zoom-in to create a feeling of connection or the timing of cuts to establish pacing. Therefore, video retargeting must not only consider how each frame is cropped, but also how this cropping affects motion. Rather than computing the cropping for each frame, we must be careful not to introduce new motions that will be obvious artifacts or significantly destroy

MM'06, October 23–27, 2006, Santa Barbara, California, USA.

Titel

- Informativ & Beschreibend
  - Was können Leser erwarten wenn sie den Artikel lesen?
- Attraktiv
  - Motiviert der Titel zum Lesen?
- Klassifizierend
  - In welches Fachgebiet gehört der Artikel
- Beispiele
  - „Video Retargeting: Automating Pan & Zoom“
  - “An object-based classification approach for surface water detection”

Autoren

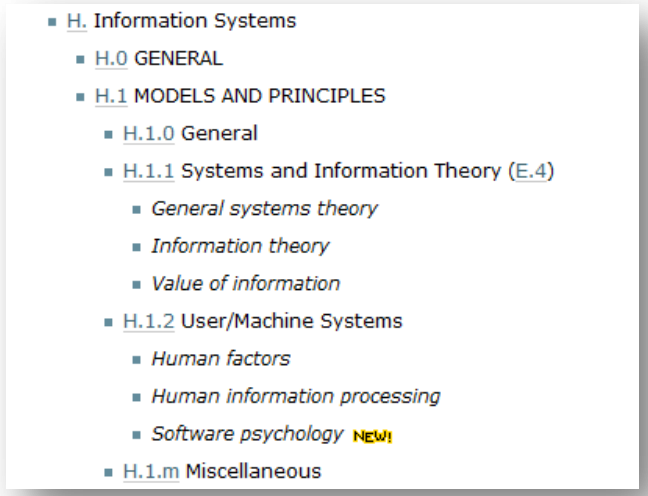
- Wer hat an dem Artikel gearbeitet
  - Rückschlüsse auf die Forschungsgruppe
- Reihung abhängig von Gebiet & Gruppe

Abstract

- Zusammenfassung des Artikels
- Teaser für den Leser
  - Als Hilfestellung zum Lesen
  - Zum Abwägen ob von Interesse

Metadaten

- Vorgabe durch Template
- Stichworte & Klassifikation
  - http://www.acm.org/about/class/
- Auf Richtigkeit achten!

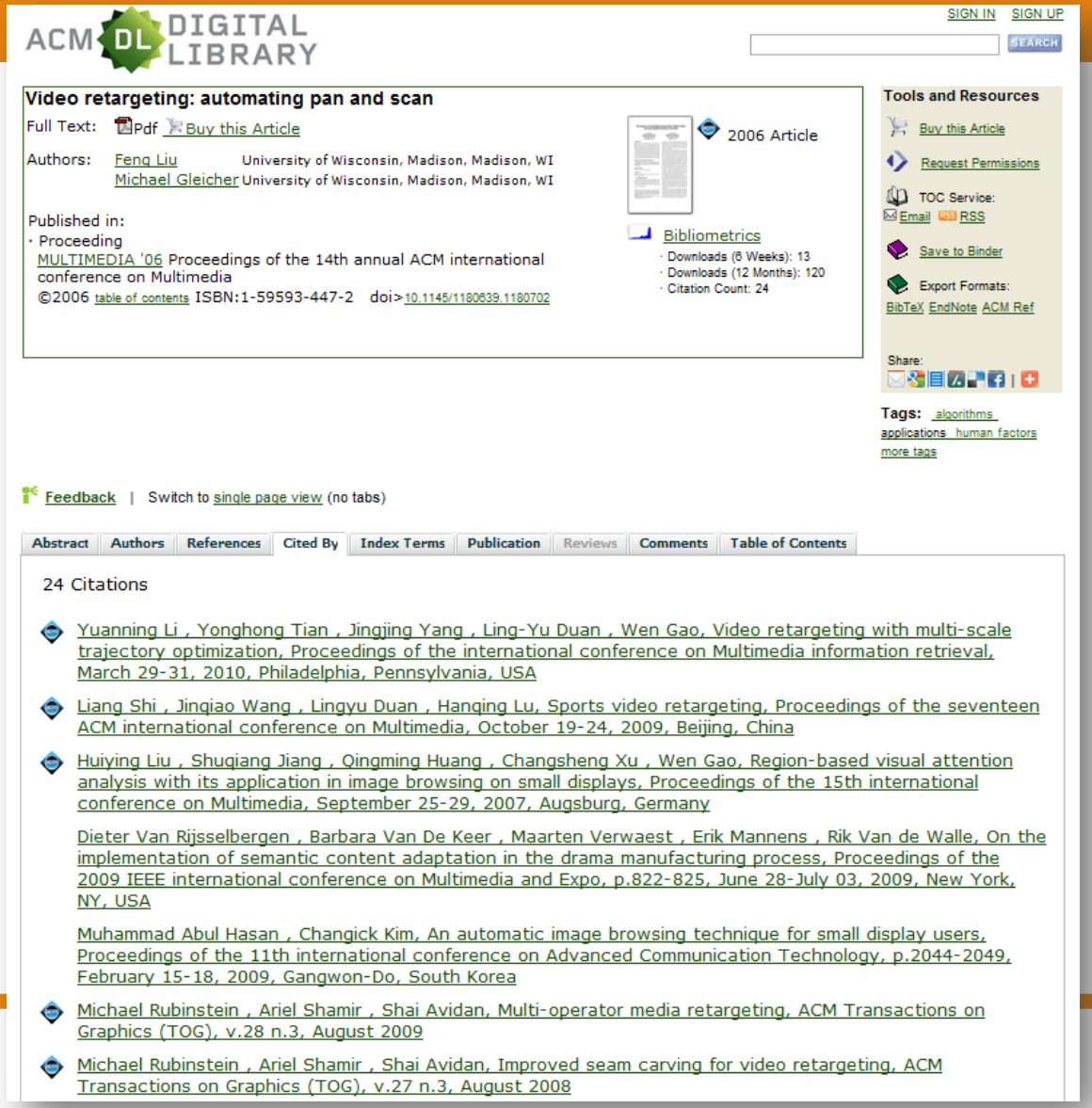


Body

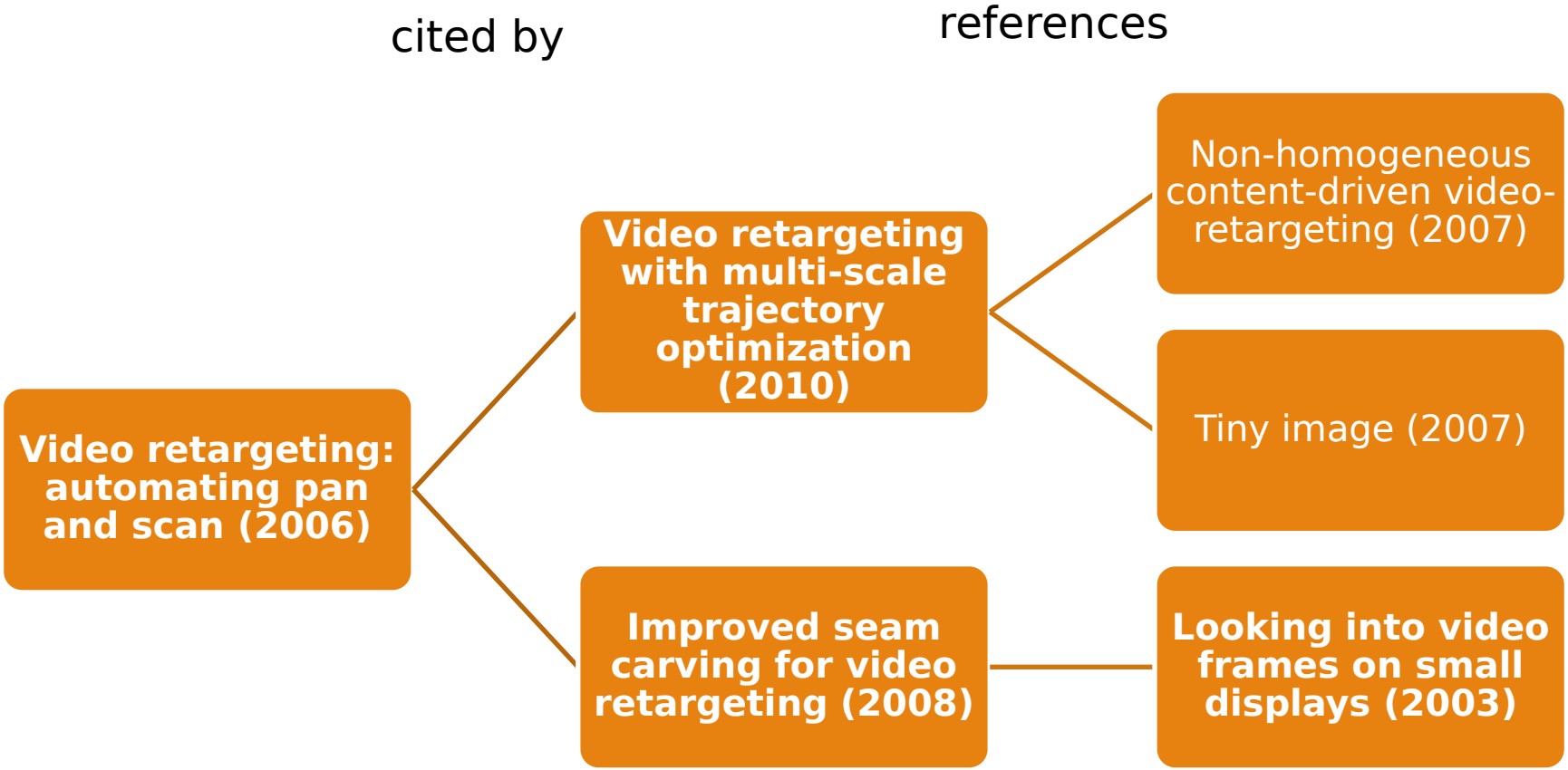
- Introduction
  - Gibt Kontext und Problemstellung an, Struktur
  - Hätt-i-war-i ….
- Related Work
  - Was gibt‘s noch? Warum reicht das nicht?
- Evaluation
  - Geht das auch? Ist das besser?
- Conclusion
  - Keine „Summary“!
- Future Work & Acknowledgements

Recherche

- Wie finde ich mehr zum Thema?
- „Cited By“
- „References“

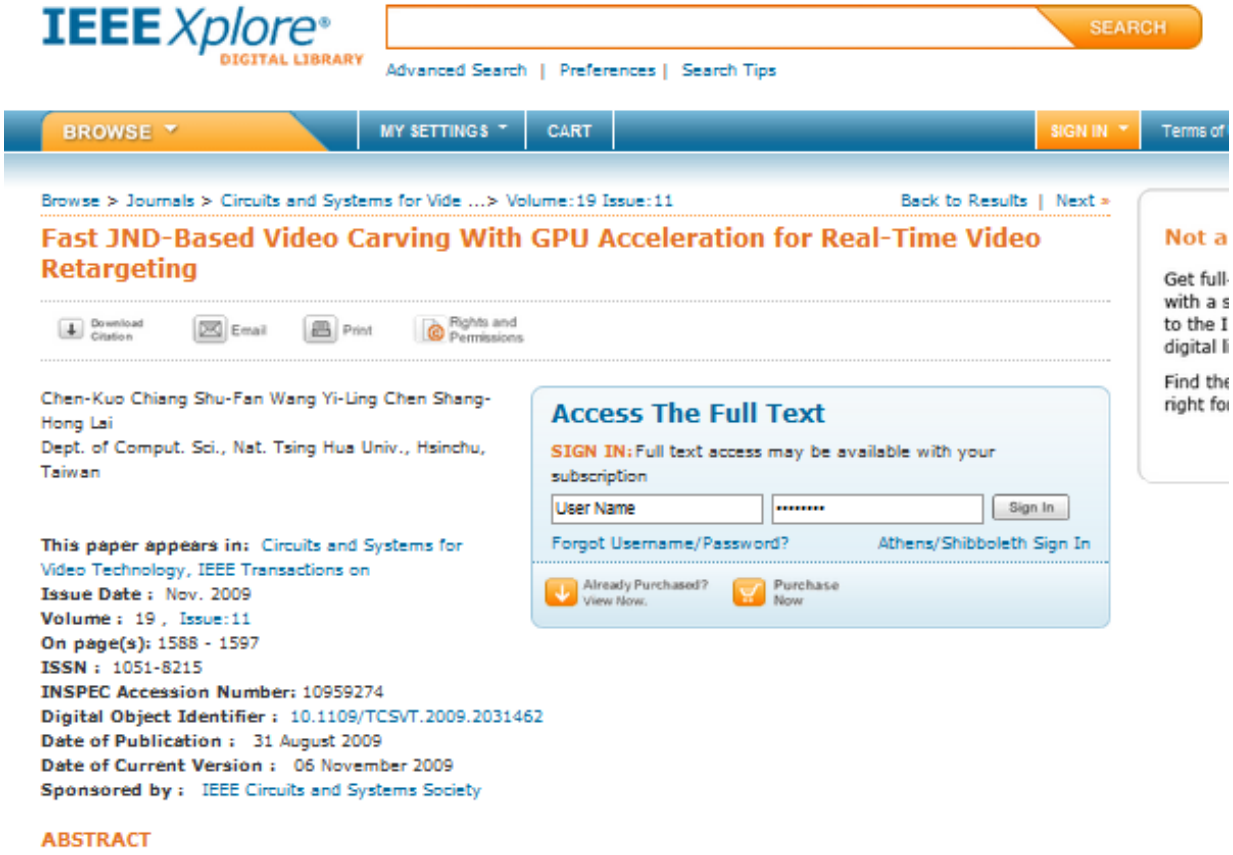


Recherche ...


cited by
references
Video retargeting: automating pan and scan (2006)
Video retargeting with multi-scale trajectory optimization (2010)
Improved seam carving for video retargeting (2008)
Non-homogeneous content-driven video-retargeting (2007)
Tiny image (2007)
Looking into video frames on small displays (2003)

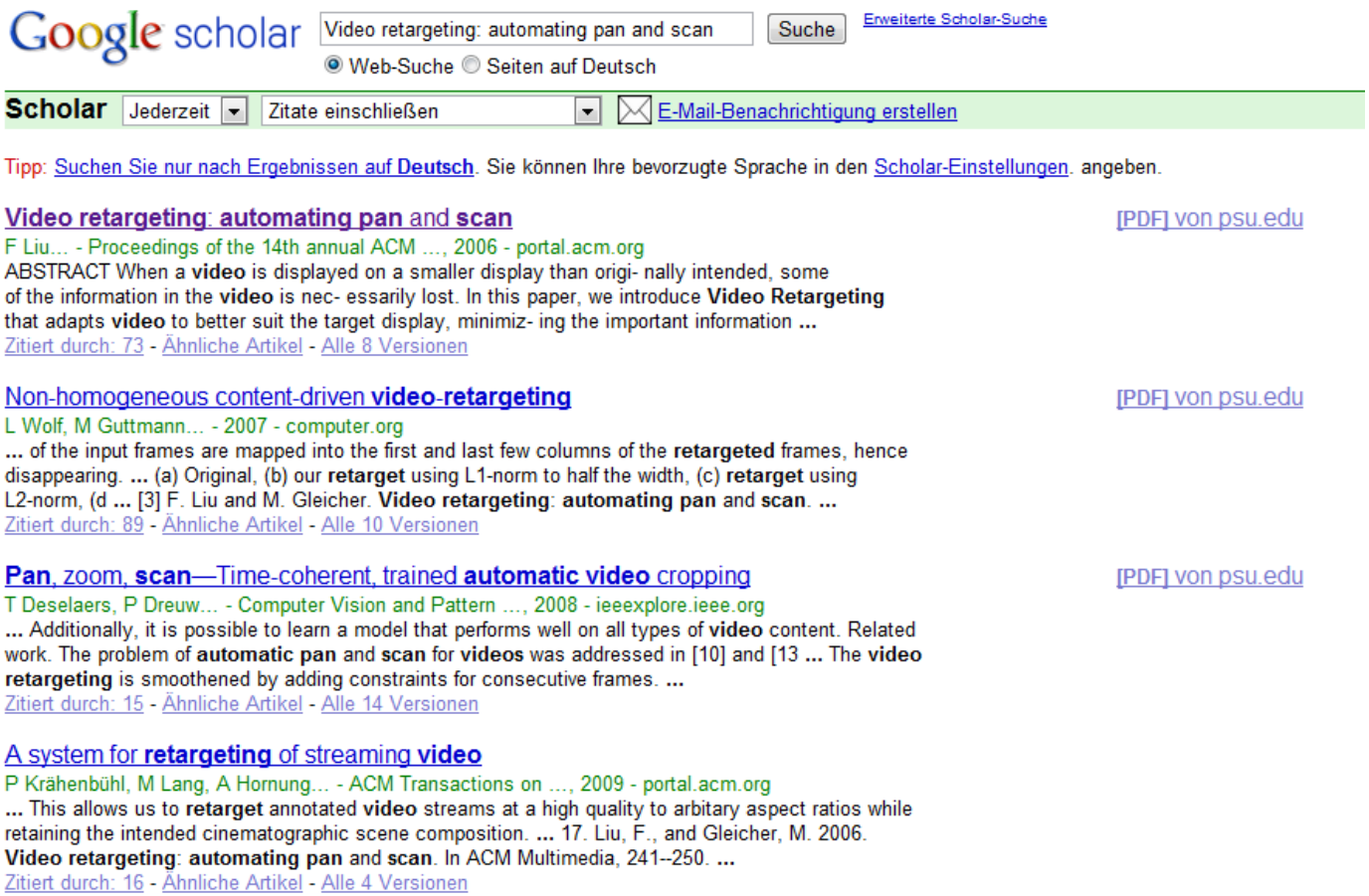
Wo recherchieren? ACM Portal

Wo recherchieren? IEEE (Xplore, computer.org)



Wo recherchieren? Citeseer

Wo recherchieren? Google Scholar



Wo recherchieren? Homepage der Autoren / Gruppe

Mike Gleicher's Web

Home

My Research
Project Descriptions
Select Publications
(by project)
Papers (date order)
Videos (date order)
Talks (date order)

Teaching
CS559 Graphics Fall '10
CS679 Game Tech '10
CS838 Visualization '10
CS559 Graphics Fall '09
Advanced Graphics S'09
Other Courses

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Main / HomePage

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I am a professor working in Computer Graphics and related areas (visualization, multimedia, animation, vision, ...). A brief biography will tell you how I got here. You can see a reasonably current CV, but you probably are looking for select publications (papers, videos, talks by project), or a more complete list of papers, talks, or videos in date order. I'l try to keep a list of project descriptions.

On this page: things I'm working on, teaching, recent papers.

Here is my most recent attempt at summarizing my research interests:
How can we use our understanding of human perception and artistic traditions to improve our tools for communicating and data understanding.

Wo recherchieren?

- Im Uni-Netz
  - IEEE Xplore / computer.org
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  - Citeseer
  - Google Scholar (nur index)
- Nicht zugänglich
  - Springer Link (nur ausgewählte)