



Proseminar

Wissenschaftliches Arbeiten

Mathias Lux

Universität Klagenfurt, Austria

Agenda



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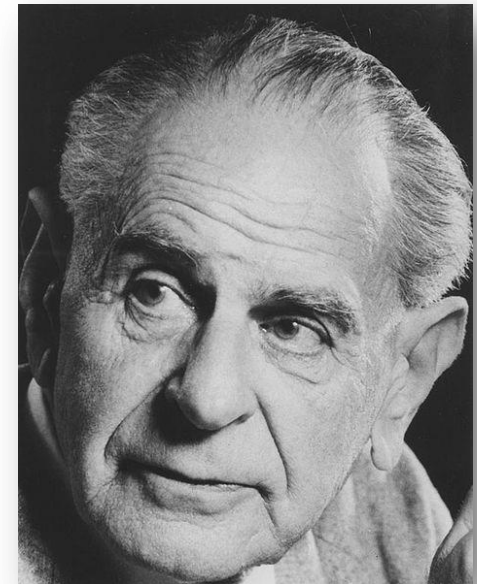
- Wissenschaft & Theorie
- Wissenschaftliche Arbeiten
- Recherche

Kritischer Rationalismus



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- 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



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- Lösen von Problemen ...
 - undogmatisch
 - methodisch (geplant)
 - rational (wohlüberlegt)
- Annahme: Die Welt existiert wirklich.
 - Die Welt ist unabhängig von unserer Betrachtung.

Quelle: Wikipedia (de)

Falsifikationismus



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- 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



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- 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



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- 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



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

Beispiele ...



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- 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 naively, 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

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 - Rückschlüsse auf die Forschungsgruppe
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Abstract



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- 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

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Authors: [Feng Liu](#) University of Wisconsin, Madison, Madison, WI
[Michael Gleicher](#) University of Wisconsin, Madison, Madison, WI

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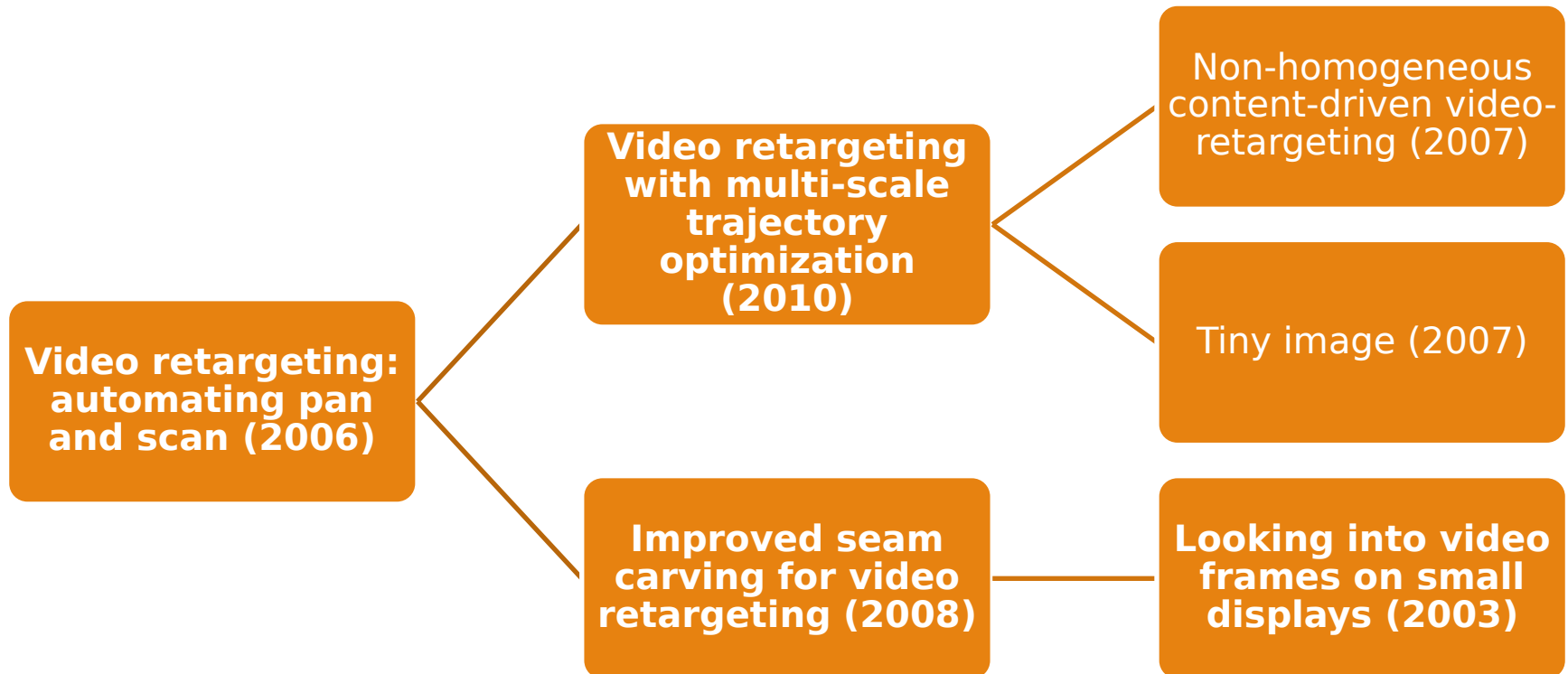
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Video retargeting: automating pan and scan

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Authors: [Feng Liu](#) University of Wisconsin, Madison, Madison, WI
[Michael Gleicher](#) University of Wisconsin, Madison, Madison, WI

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Fast JND-Based Video Carving With GPU Acceleration for Real-Time Video Retargeting

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Chen-Kuo Chiang Shu-Fan Wang Yi-Ling Chen Shang-Hong Lai
Dept. of Comput. Sci., Nat. Tsing Hua Univ., Hsinchu, Taiwan

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ABSTRACT

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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.

Citations

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[Non-homogeneous content-driven video-retargeting](#)

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L Wolf, M Guttman... - 2007 - [computer.org](#)

... of the input frames are mapped into the first and last few columns of the **retargeted** frames, hence disappearing. ... (a) Original, (b) our **retarget** using L1-norm to half the width, (c) **retarget** using L2-norm, (d ... [3] F. Liu and M. Gleicher. **Video retargeting: automating pan and scan**. ...

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[Pan, zoom, scan—Time-coherent, trained automatic video cropping](#)

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T Deselaers, P Dreuw... - [Computer Vision and Pattern ...](#), 2008 - [ieeexplore.ieee.org](#)

... Additionally, it is possible to learn a model that performs well on all types of **video** content. Related work. The problem of **automatic pan and scan** for **videos** was addressed in [10] and [13 ... The **video retargeting** is smoothed by adding constraints for consecutive frames. ...

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[A system for retargeting of streaming video](#)

P Krähenbühl, M Lang, A Hornung... - [ACM Transactions on ...](#), 2009 - [portal.acm.org](#)

... This allows us to **retarget** annotated **video** streams at a high quality to arbitrary aspect ratios while retaining the intended cinematographic scene composition. ... 17. Liu, F., and Gleicher, M. 2006.


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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'll 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.

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