

# VK Multimedia Information Systems

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# Agenda



- Topics & goals
- Modalities & examination
- Schedule
  
- What is **information**?
- What are **information systems**?
- The information overload
- Current state in *MuMe* consumption

# C.V.



- Technische Mathematik an der TU Graz
- Doktoratsstudium Telematik
  
- 98-01 Entwicklung von Web-Applikationen
- 01-06 Know-Center in Graz (KPlus)
- 05-06 Ass. am KMI / TU Graz
- 06-14 Ass. am ITEC / Uni Klagenfurt
- 14- .. Assoc. Prof. ITEC / Uni Klagenfurt

# Course Topics



Multimedia Databases

Multimedia Management

Social Media Sharing

Video Analysis

**Metadata**

Data Mining

Digital Audio

**Information Retrieval**

Social Networks

**Image Processing**

Retrieval Evaluation

# Goals I



Basic (and a little more) understanding of

- Multimedia retrieval
- Multimedia analysis
  - images in the spatial domain
  - audio & video processing
- Multimedia databases & meta data

# Goals II



- Overview on state of the art
  - who is who in research
  - what to read if I want to know more?
  - available tools in development
  - de facto & de jure standards

# Goals III



- Providing a solid base for
  - further research,
  - consulting and
  - practical development
- in the area of
  - multimedia information retrieval
  - multimedia information systems
- and: hands on experience!

# Modalities



Multimedia Information Systems ist eine  
*„prüfungsimmanente Lehrveranstaltung“*

A positive grade is based on

- some few mandatory exercises / readings
- ongoing collaboration
- and a project (implementation & presentation)



# Modalities



## Projects are

- Practical implementations of *MMIS* / *MIR*
- Research work & studies

## Projects topics will be

- ... assigned after Easter holidays
- ... assigned to groups or individual students

# Team Work



- Preferably teams of 2 students
- TEAM = „Toll-Ein-Anderer-Machts“ ?



# Projects



- Topics:
  - LIRE
    - Applications using LIRE
    - Extensions to LIRE
  - LIRE Solr
    - Mobile apps using LIRE Solr
    - ...
  - Anything with MIR
    - Tracking the use of assets in documents
    - Finding duplicates in photo streams
    - Media monitoring
    - ...

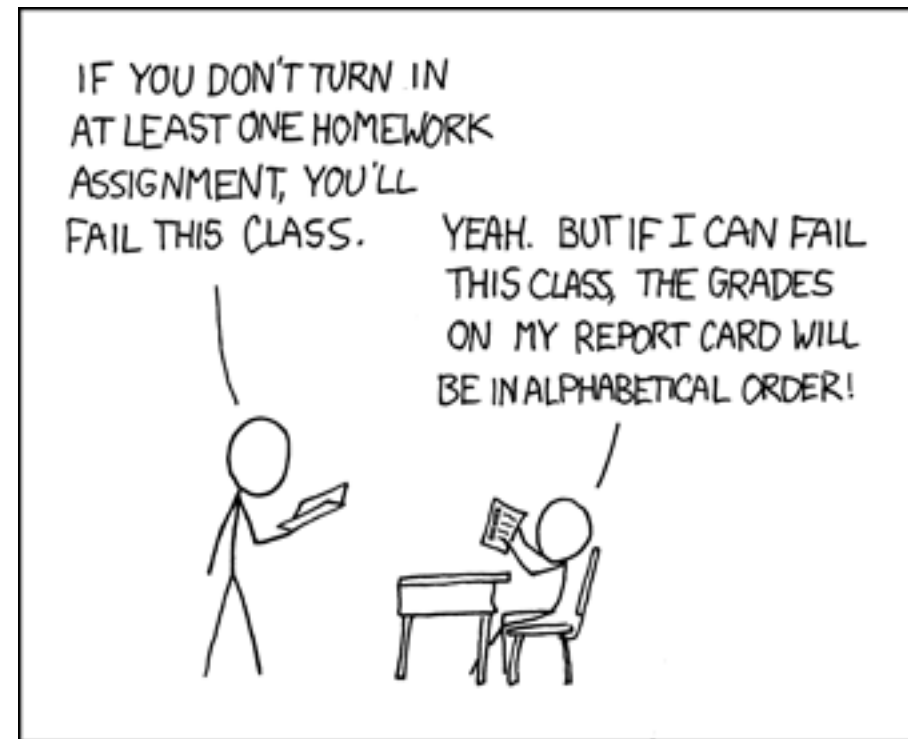
# Grades



Grade is derived from:

- 1/3 Exercises
  - Pen & paper
  - Readings
- 1/3 Project
  - Implementation
- 1/3 Presentation

<http://www.xkcd.com>



# Schedule



- See web page

# Questions?



Any questions regarding organizational issues left?

# Preliminaries



- What is research?

# Agenda



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# What is Information?



## Definition of Aamondt and Nygard (1995) :

- Data
- Information
- Knowledge

*Aamodt, A. & Nygard, M. "Different roles and mutual dependencies of data, information, and knowledge - an AI perspective on their integration" Data Knowl. Eng., Elsevier Science Publishers B. V., 1995, 16, 191-222*

# Data

Aamondt und Nygard (1995)



## *Data are syntactic entities*

- Patterns without meaning
- Input to an interpretation process

## Example:

- Bits & Bytes of a JPEG encoded image

# Information

Aamondt und Nygard (1995)



*Information is interpreted data*

- Information is data with meaning
- Output from interpretation
- Input to knowledge based process

Example:

- Decoded (and displayed) JPEG image

# Knowledge

Aamondt und Nygard (1995)



*Knowledge is learned information*

- Incorporated in an agents (software / human) reasoning resources
- Ready for active use
- Output of learning process

Example:

- There is a dog shown on the JPEG image

# What is Information?



## Definition of Zeleny (1987):

- Data
- Information
- Knowledge
- Wisdom

*Zeleny, M. "Management Support Systems: Towards Integrated Knowledge Management" Human Systems Management, 1987, 7, 59-70*

# What is Information?

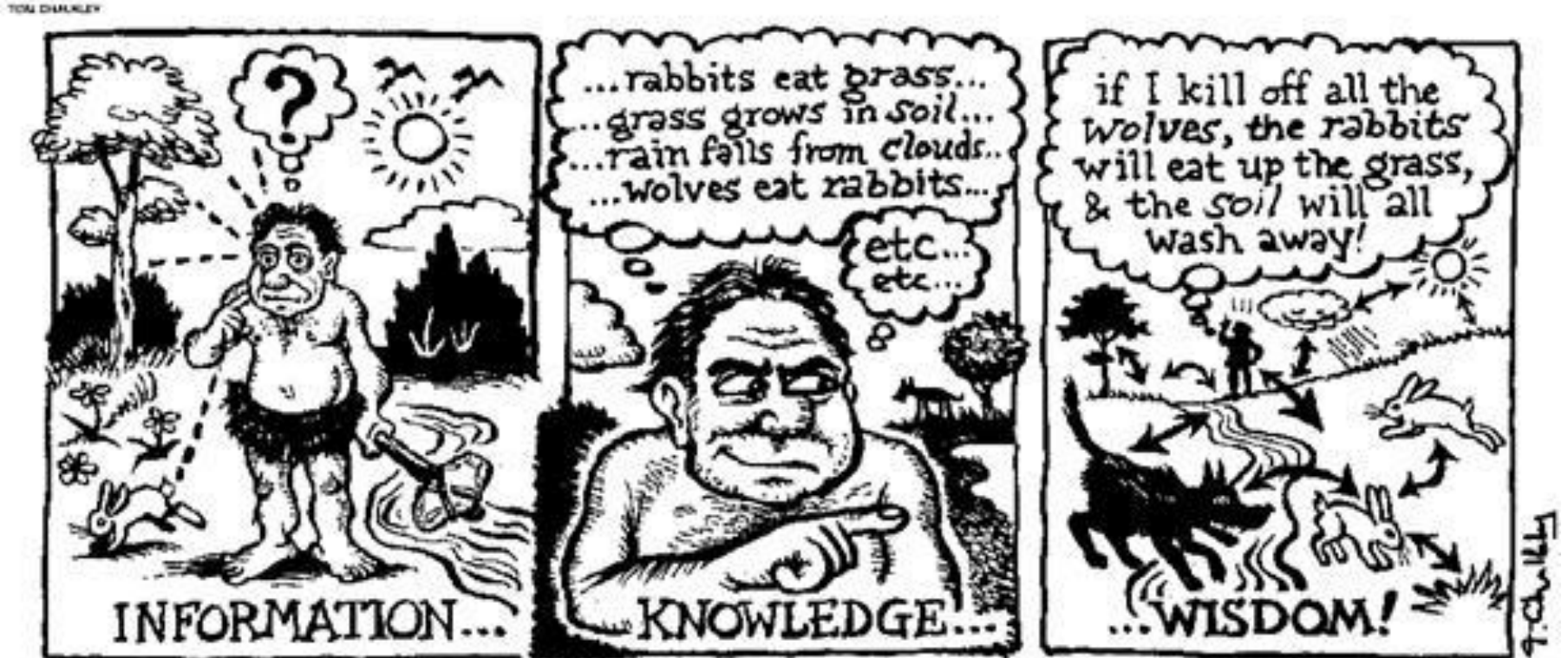


Image originally published in the December 1982 issue of THE FUTURIST, taken from [http://www-personal.si.umich.edu/~nsharma/dikw\\_origin.htm](http://www-personal.si.umich.edu/~nsharma/dikw_origin.htm)

# The DIKW Hierarchy



## Definition of the DIKW levels:

Data	Know nothing
Information	Know what
Knowledge	Know how
Wisdom	Know why

# Agenda



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# What are Information Systems?



- Systems for handling information
  - collect, store & organize
  - process, disseminate & transmit
- Three main parts in these systems
  - people,
  - machines &
  - methods

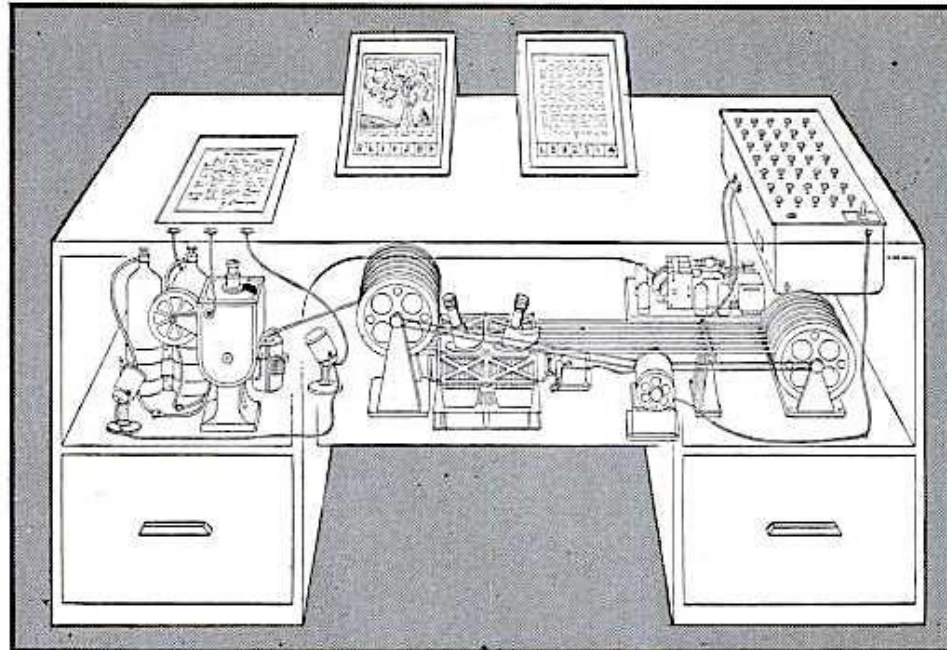
# MEMEX



## Memory Extender - Vannevar Bush

- Published in 1945 (Atlantic Monthly)
- An electromechanical device for
  - viewing books and films
  - adding information and comments
  - interlinking information
  - browsing links
- MEMEX is an early hypertext system

# MEMEX



**MEMEX** in the form of a desk would instantly bring files and material on any subject to the operator's fingertips. Slanting translucent viewing screens magnify supermicrofilm filed by code numbers. At left is a mechanism which automatically photographs longhand notes, pictures and letters, then files them in the desk for future reference.

**AS WE MAY THINK** CONTINUED

# Multimedia IS



- Focus on multimedia data & meta data
  - storage, transmission
  - search & retrieval
  - organization & dissemination
- Media types
  - textual / visual / auditive / haptic / olfactory
  - rastered or rendered / modelled
    - Midi vs. MP3
    - VRML vs. PNG
    - LASER vs. MPEG-2

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# YouTube

(Mar 2013)



- Over 800 million unique users visit YouTube each month
- Over 4 billion hours of video are watched each month on YouTube
- 72 hours of video are uploaded to YouTube every minute
- 70% of YouTube traffic comes from outside the US

*Source: <http://www.youtube.com>*

# fotocommunity

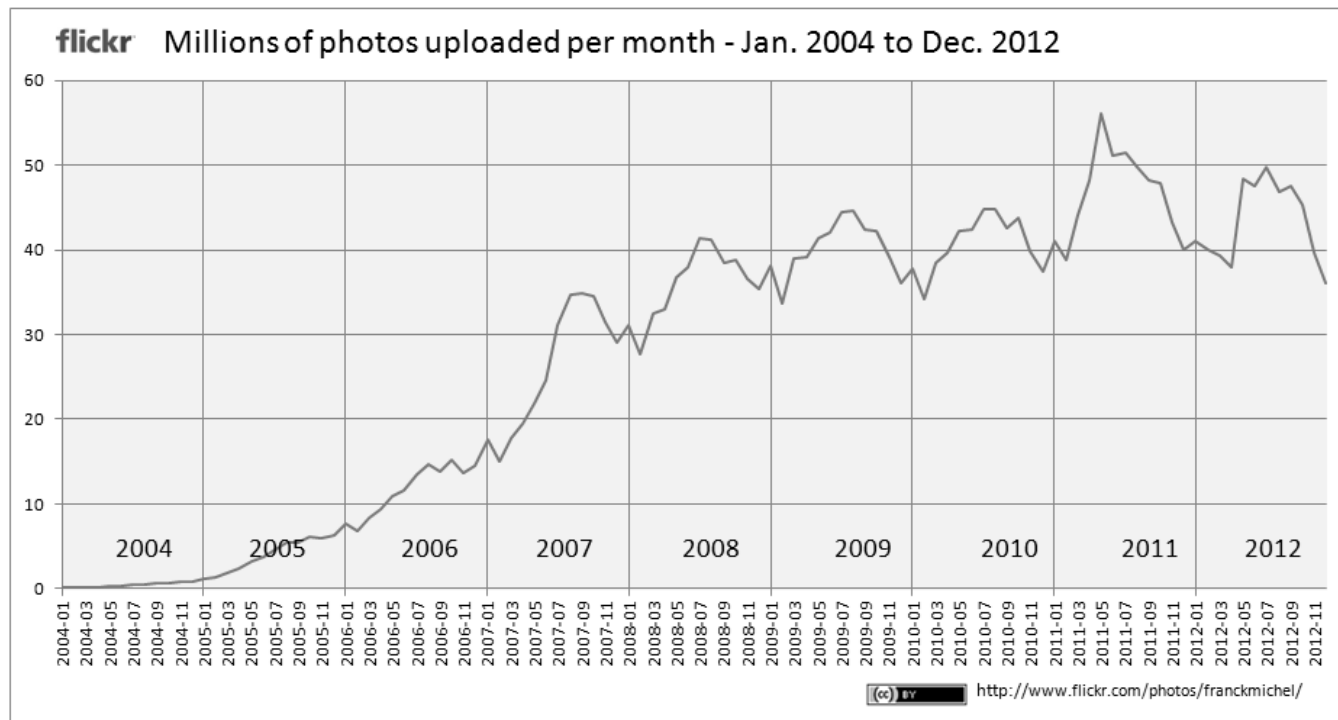


- Each day
  - 9,300 new photo uploads
  - 60,000 photo reviews (comments)
  - 450 new amateur photographers
- In the data base
  - 170 Million photo reviews (comments)
  - 20 million photos
  - 1,000,000 members

*Source: <http://www.fotocommunity.net/en/about-us/the-fotocommunities.html>, 2014*

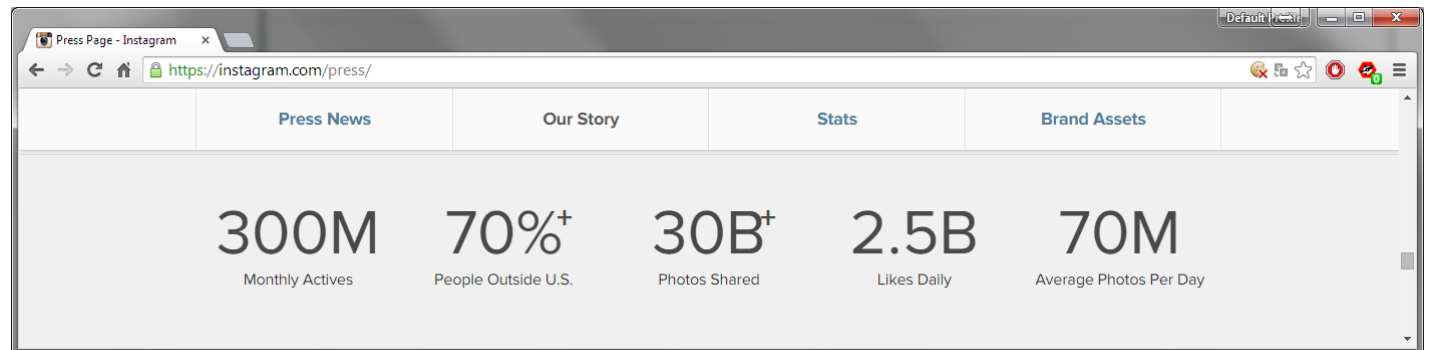
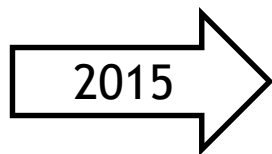
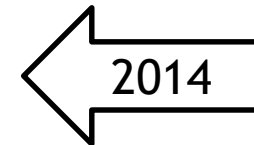
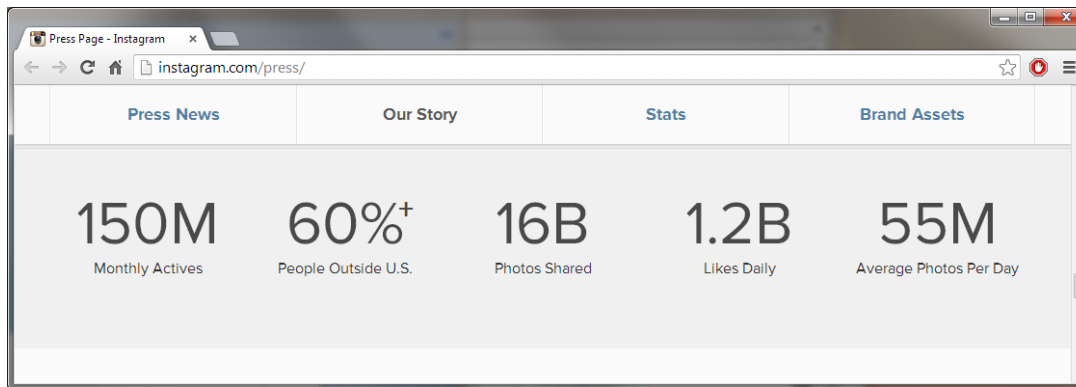


## How many photos are uploaded to Flickr every day, month, year?





# Instagram



Src. <http://instagram.com/press/>, 2014-03-04 & 2015-03-03

# Facebook

(Aug. 2012)



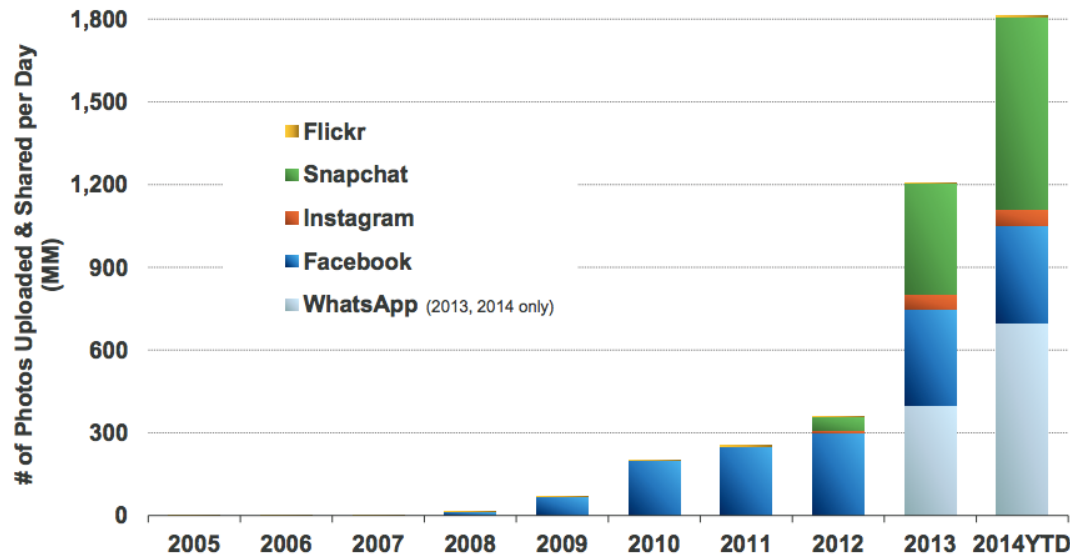
- Facebook processes more than 500 TB of data daily
- 2.7 billion likes made daily on and off of the Facebook site
- 300 million photos uploaded / day
- 1.1 billion photos uploaded on New Years Day & Eve 2012
- 70,000 queries executed by people and automated systems

# up to 2014 ...



## Photos Alone = 1.8B+ Uploaded & Shared Per Day... Growth Remains Robust as New Real-Time Platforms Emerge

Daily Number of Photos Uploaded & Shared on Select Platforms,  
2005 – 2014YTD



@KPCB

Source: KPCB estimates based on publicly disclosed company data, 2014 YTD data per latest as of 5/14.

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# Agenda

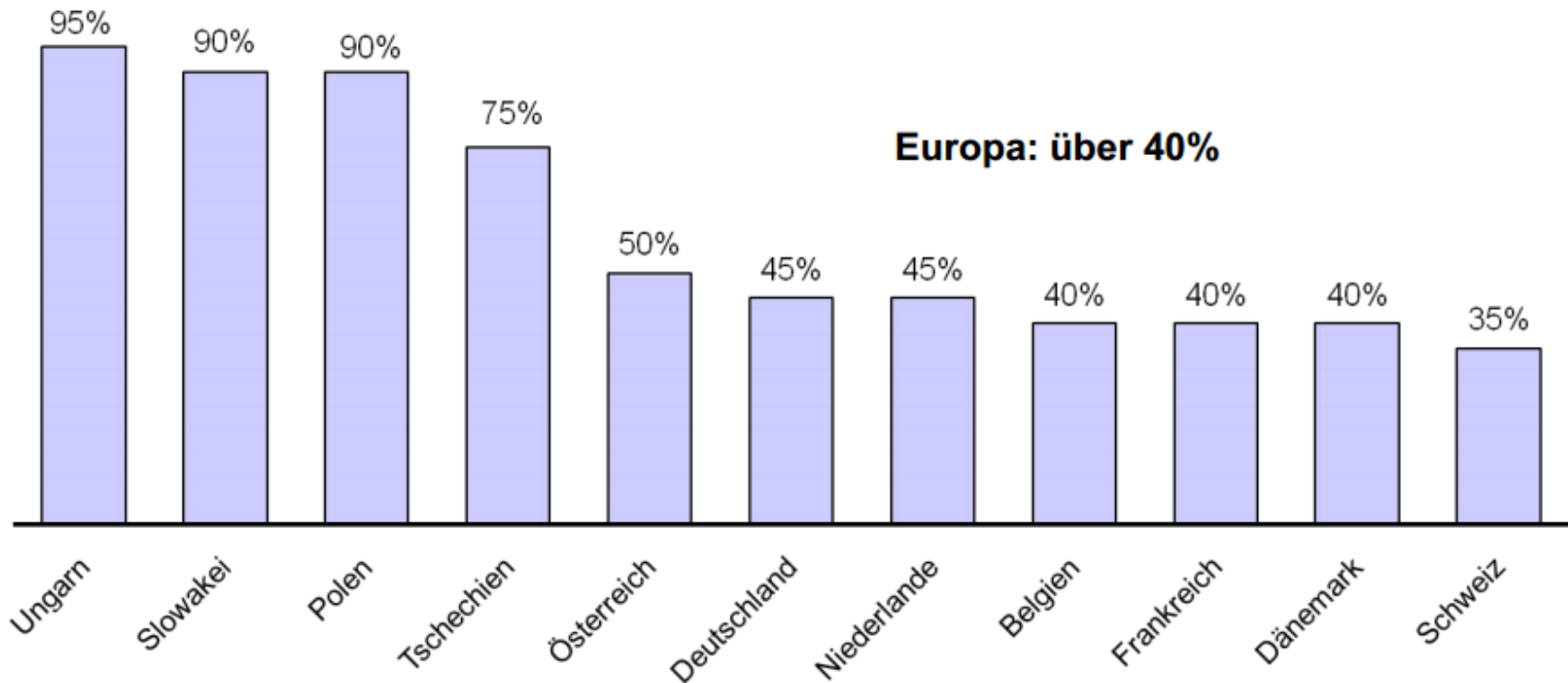


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# CEWE Color



## Marktanteile CEWE COLOR am industriellen Fotofinishing

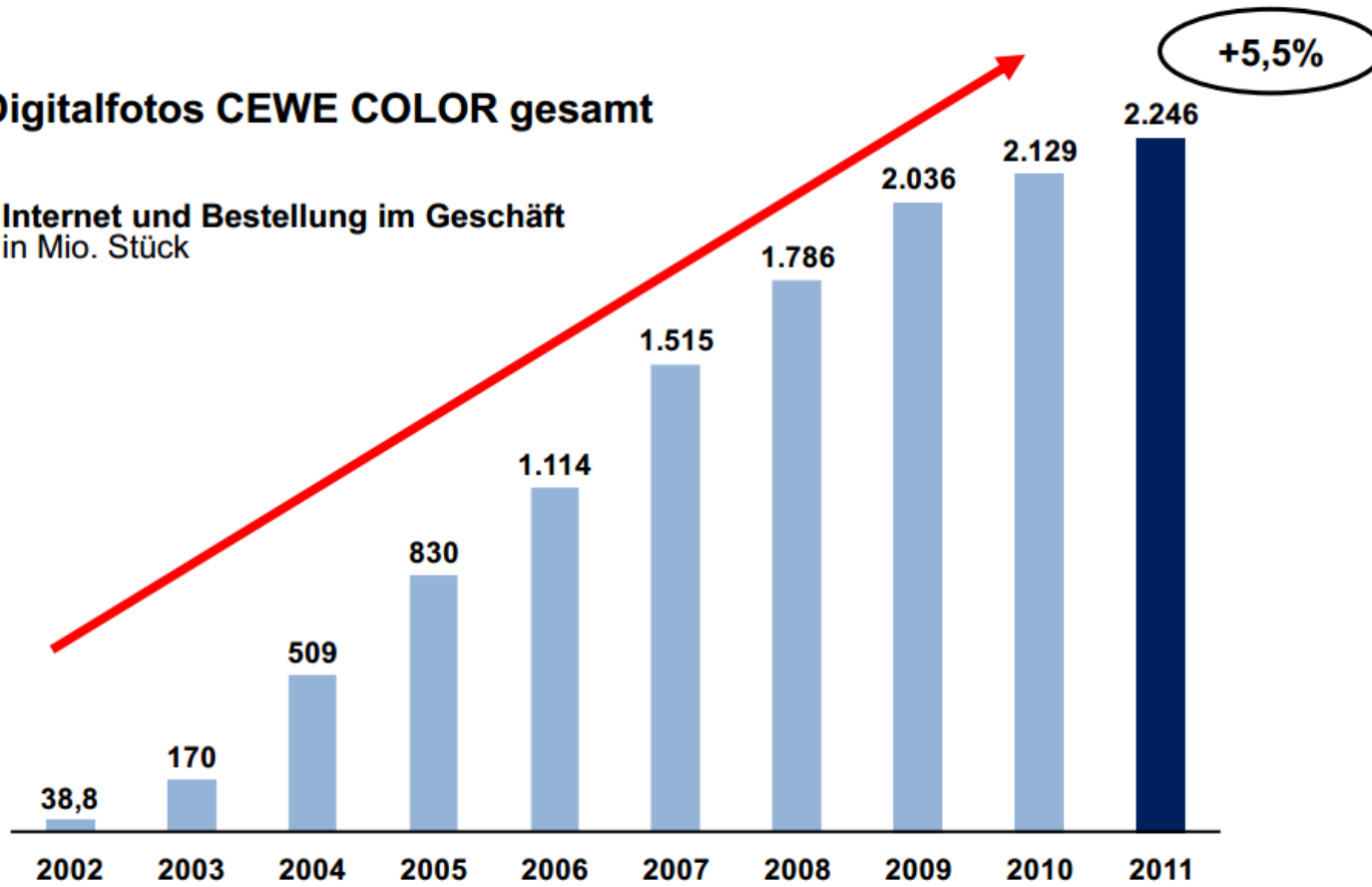


# CEWE COLOR



## Digitalfotos CEWE COLOR gesamt

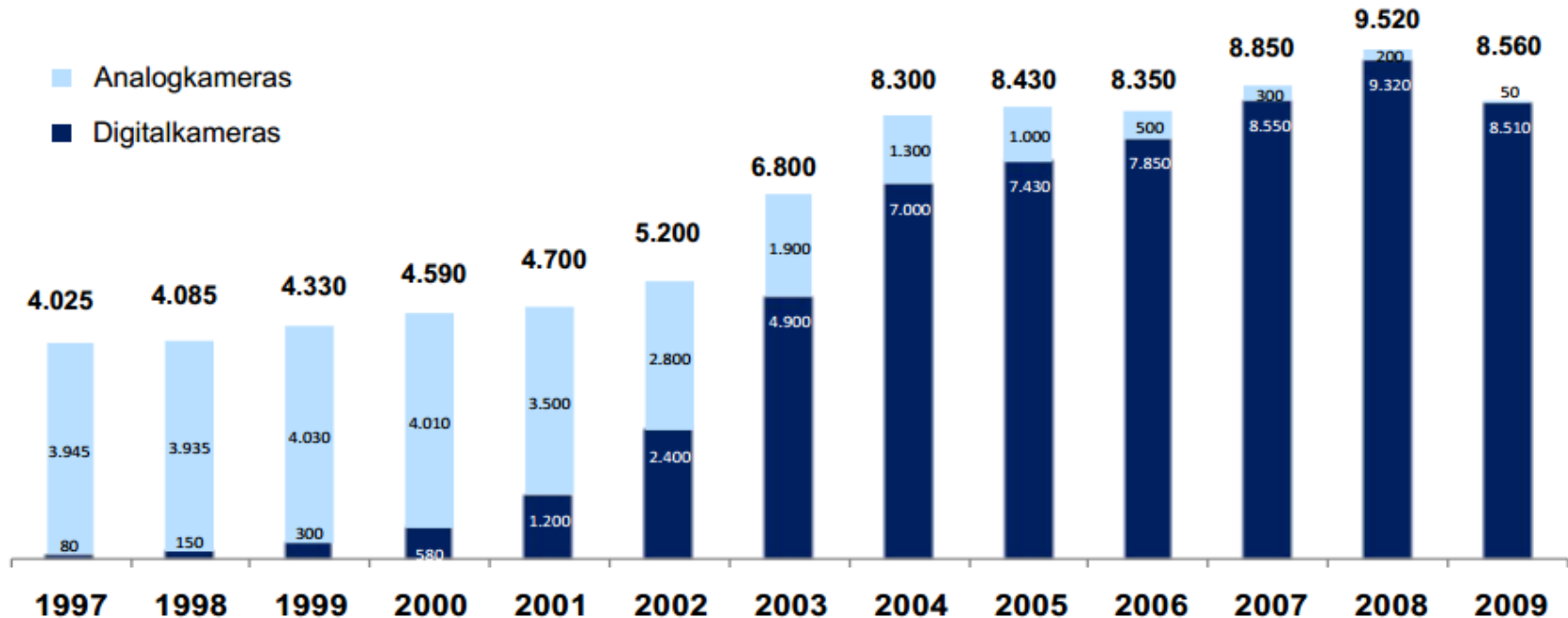
Internet und Bestellung im Geschäft  
in Mio. Stück



# CEWE COLOR

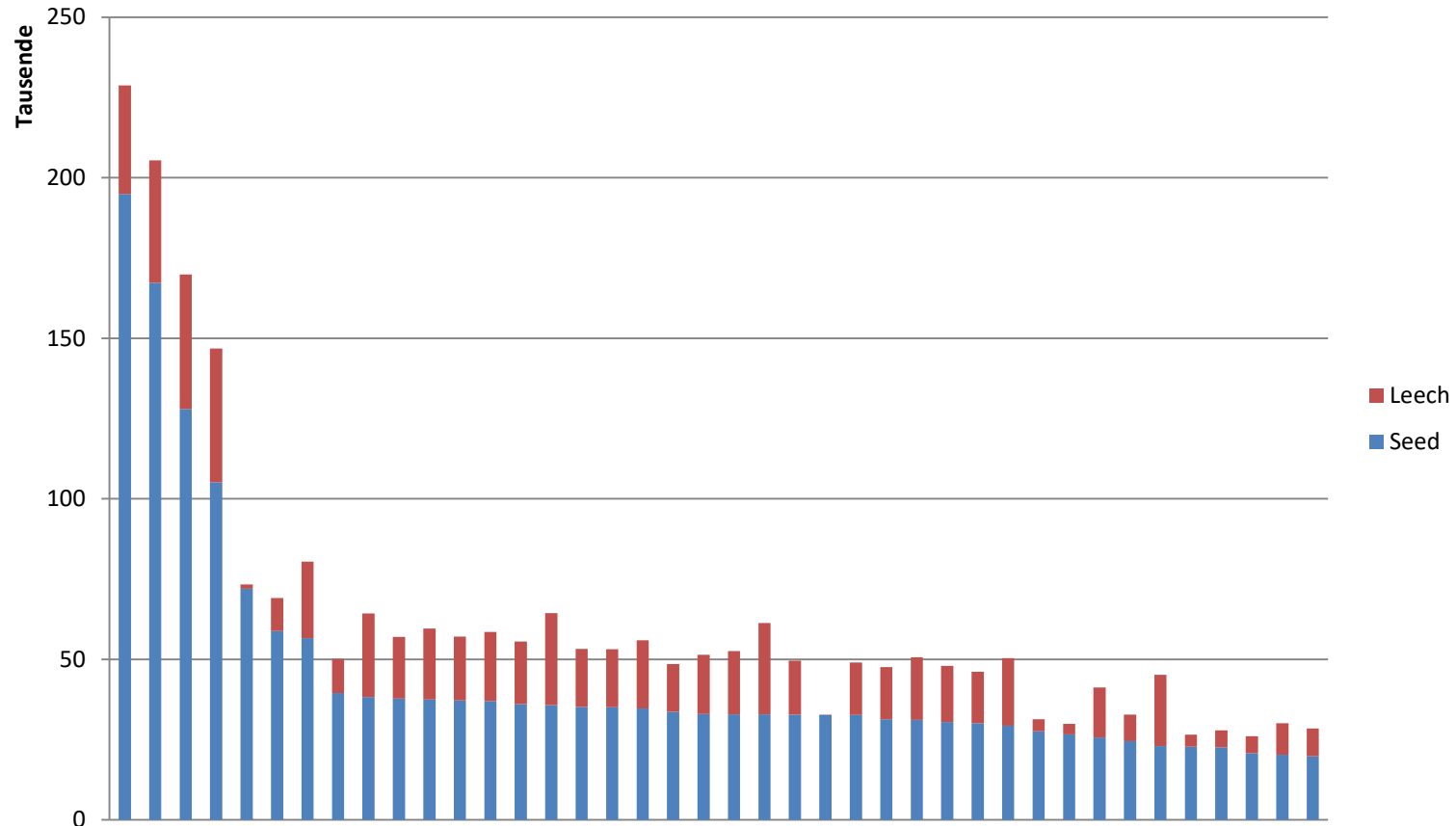


## Kameraverkäufe in Deutschland in Tsd. Stück



# Top Movie Torrents

(isohunt.com / Mar, 2013)





# Your Tasks ...



- Reading 01: Introduction to Rijsbergen's book
  - Data vs. Information
  - <http://www.dcs.gla.ac.uk/Keith/Chapter.1/Ch.1.html>

# Thanks ...



## ... for your attention!