

---

# Automatic Image Theft Detection in eBay by Digital Watermarking

---



**Fraunhofer** Gesellschaft

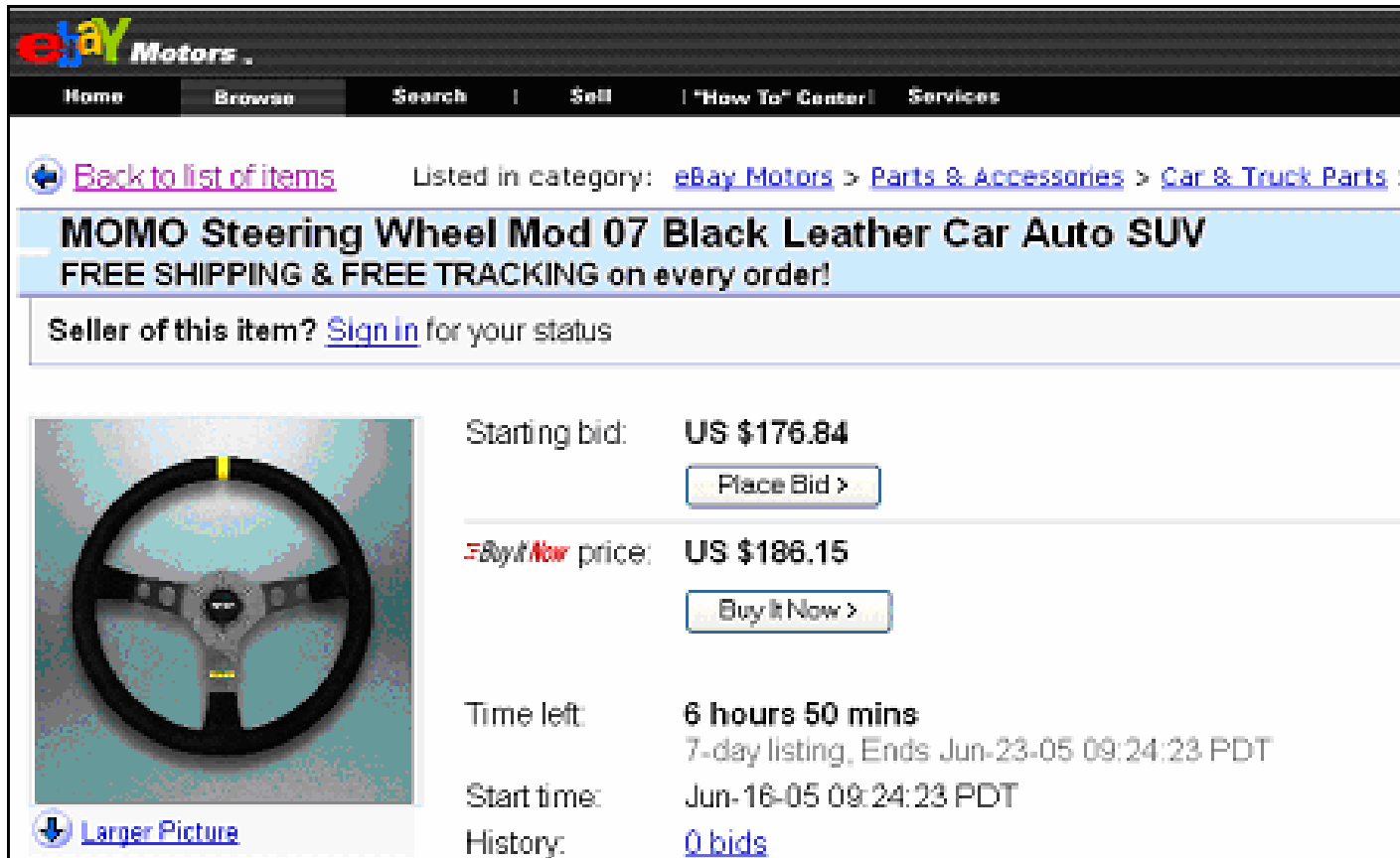
---

Martin Steinebach, Ellen Kremer, Lucilla Croce Ferri

Fraunhofer IPSI

Media Security Department

1. Motivation
2. Background
3. Concept
4. Application
5. Summary
6. Future work



**eBay Motors**


Home | Browse | Search | Sell | "How To" Center | Services

[Back to list of items](#) Listed in category: [eBay Motors](#) > [Parts & Accessories](#) > [Car & Truck Parts](#) >

## MOMO Steering Wheel Mod 07 Black Leather Car Auto SUV

FREE SHIPPING & FREE TRACKING on every order!

Seller of this item? [Sign in](#) for your status



[Larger Picture](#)

Starting bid: **US \$176.84**  
[Place Bid >](#)

**Buy It Now** price: **US \$186.15**  
[Buy It Now >](#)

Time left: **6 hours 50 mins**  
7-day listing, Ends Jun-23-05 09:24:23 PDT

Start time: Jun-16-05 09:24:23 PDT

History: [0 bids](#)

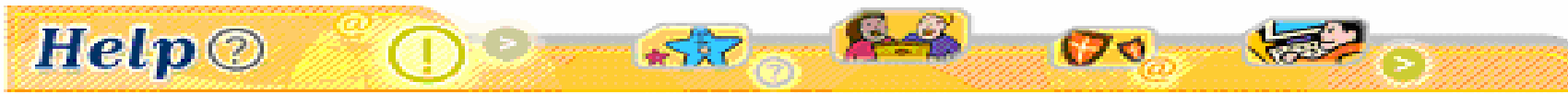
- Images are important for eBay auctions
- They increase the success rate of auctions
- High quality images are preferred

Quote:

*“someone named as [...] stole my pictures and now he is selling the same items as mine. what will i do for him to stop copying my picture?”*

<http://forums.ebay.ph/thread.jspa?threadID=300000585&tstart=0&mod=1117000770127>

[Home](#) > [Help](#) > [Contact Us](#)



**eBay Help**

- [Help Topics](#)
- [A-Z Index](#)
- [eBay Acronyms](#)
- [eBay Glossary](#)

---

**Contact Us**

**Related Links**

- [Learning Center](#)
- [Security Center](#)
- [About Customer Support](#)

## Contact Us

Start by choosing a category below. In a few simple steps, you will be able to send us your email.  
In certain cases you may be offered live help.

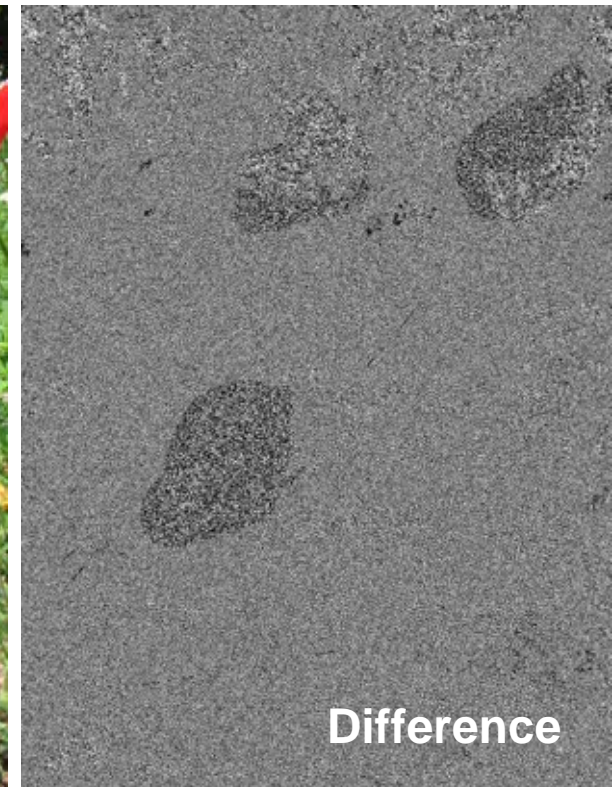
- Ask about registration, passwords, changing email / User ID  
Ask about bidding or buying  
Ask about selling or billing (for sellers only)  
**Report a listing policy violation or prohibited (banned) item**  
Report fake eBay emails (spoofs) and unauthorized account activity  
Report problems with other eBay members
- Copying of your listing**  
Items that may violate a copyright or are counterfeit  
Listing policy violations (improper keywords, outside links, etc)  
Prohibited (banned) items  
Mature Audience violations  
Fraudulent listings (illegal seller demands, you didn't receive item, etc)
- Your item description text was copied  
**Your picture was copied**  
Your listing title was copied  
Someone is linking to your pictures without permission  
Someone copied text or pictures from another Web site or eBay user

[Continue >](#)

- Image theft is common
- There are mechanisms to fight image theft
- But how to find illegal image usage in eBay?

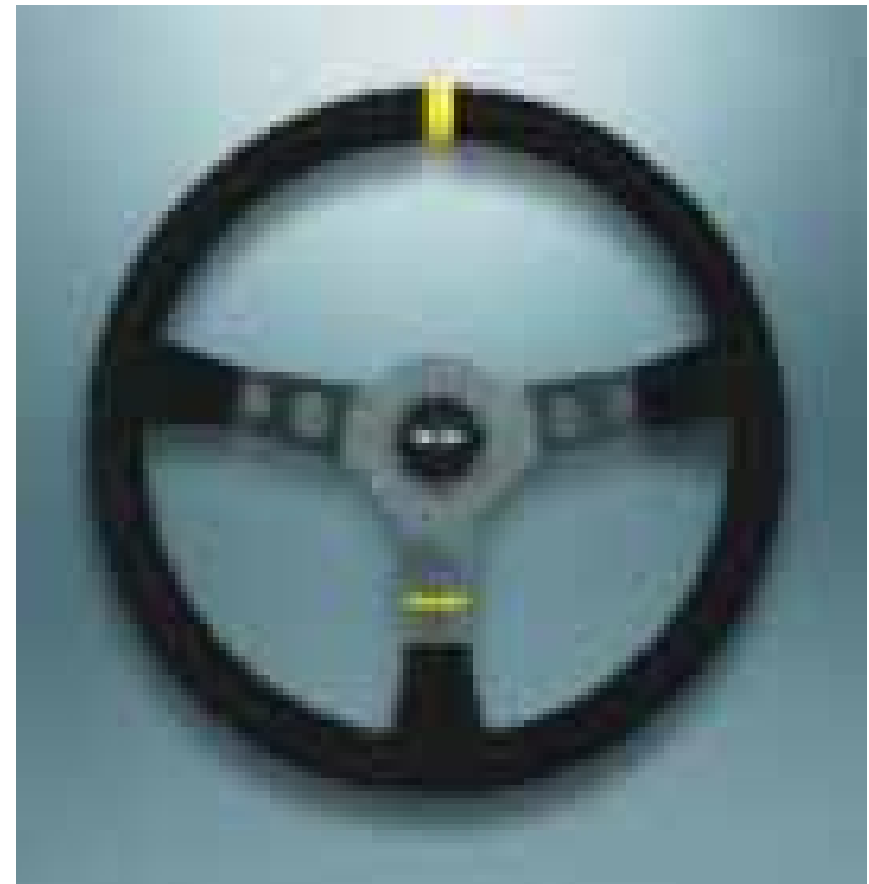
Technology to embed information into image data

- no loss of quality
- No file size increase
- Robust to common image handling
- Protected by secret key



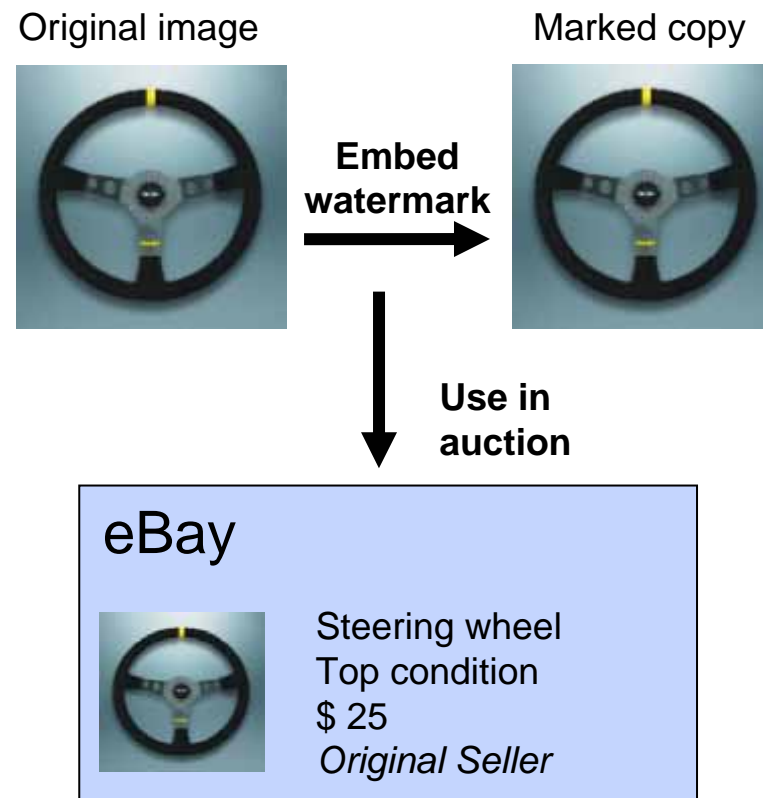
## Challenges in eBay scenario

- Small image size
  - Best algorithm requires at least 512x512 pixel
- Large number of images (complexity)
- Image characteristics differ strongly
  - Minimal textures
  - Drawings
  - Blurred photos
  - ...



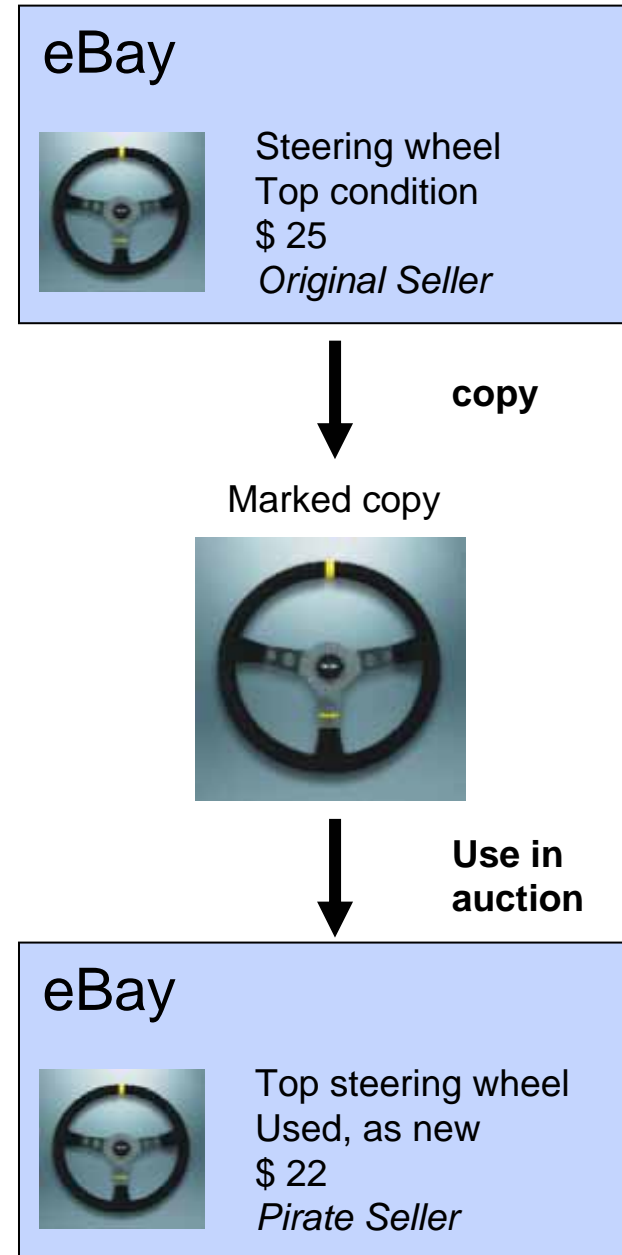
How to improve eBay image misuse detection by digital watermarking?

**Step 1: eBay User marks original image he intends to use in auction**

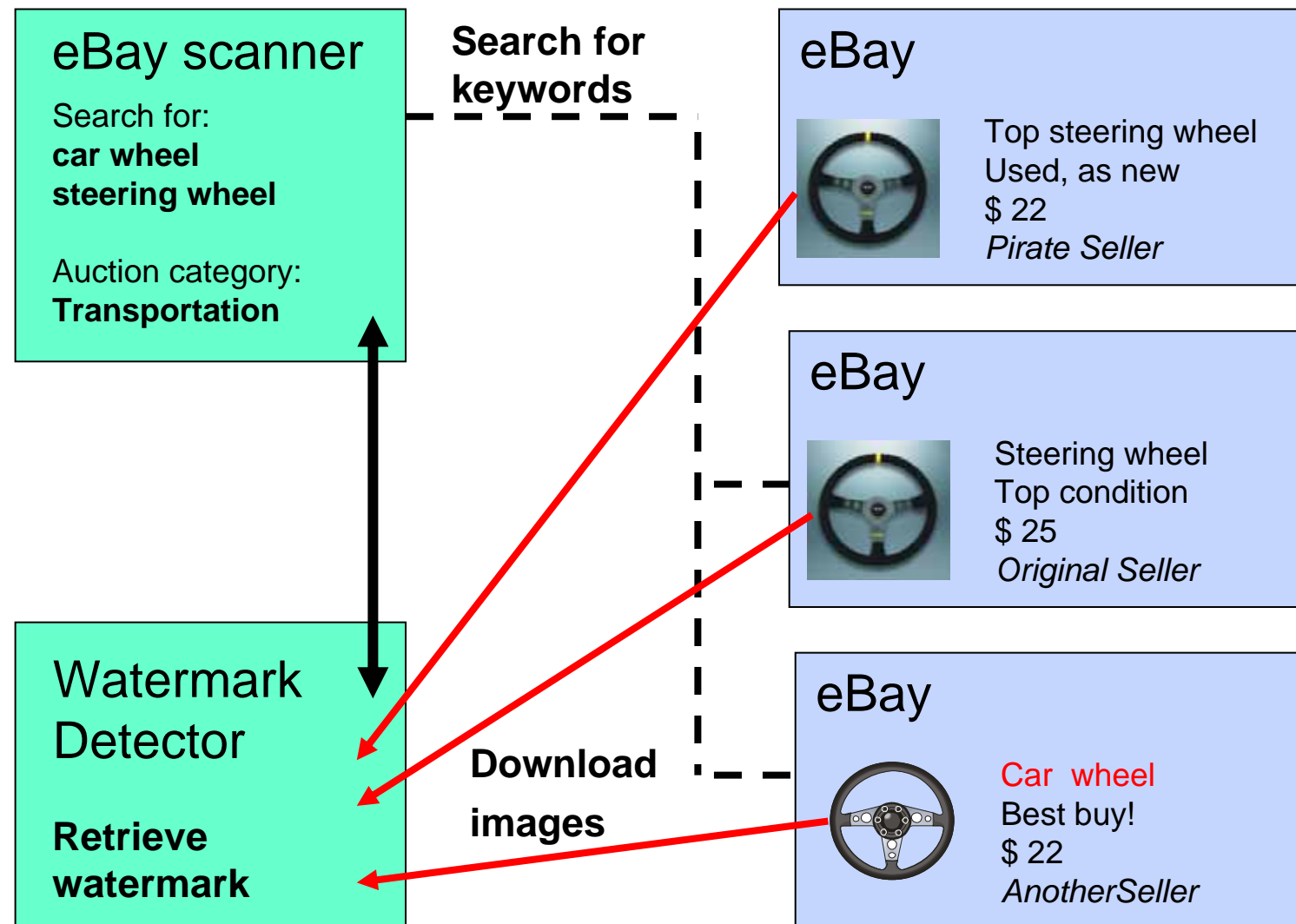


**Step 2: pirate copies marked original image**

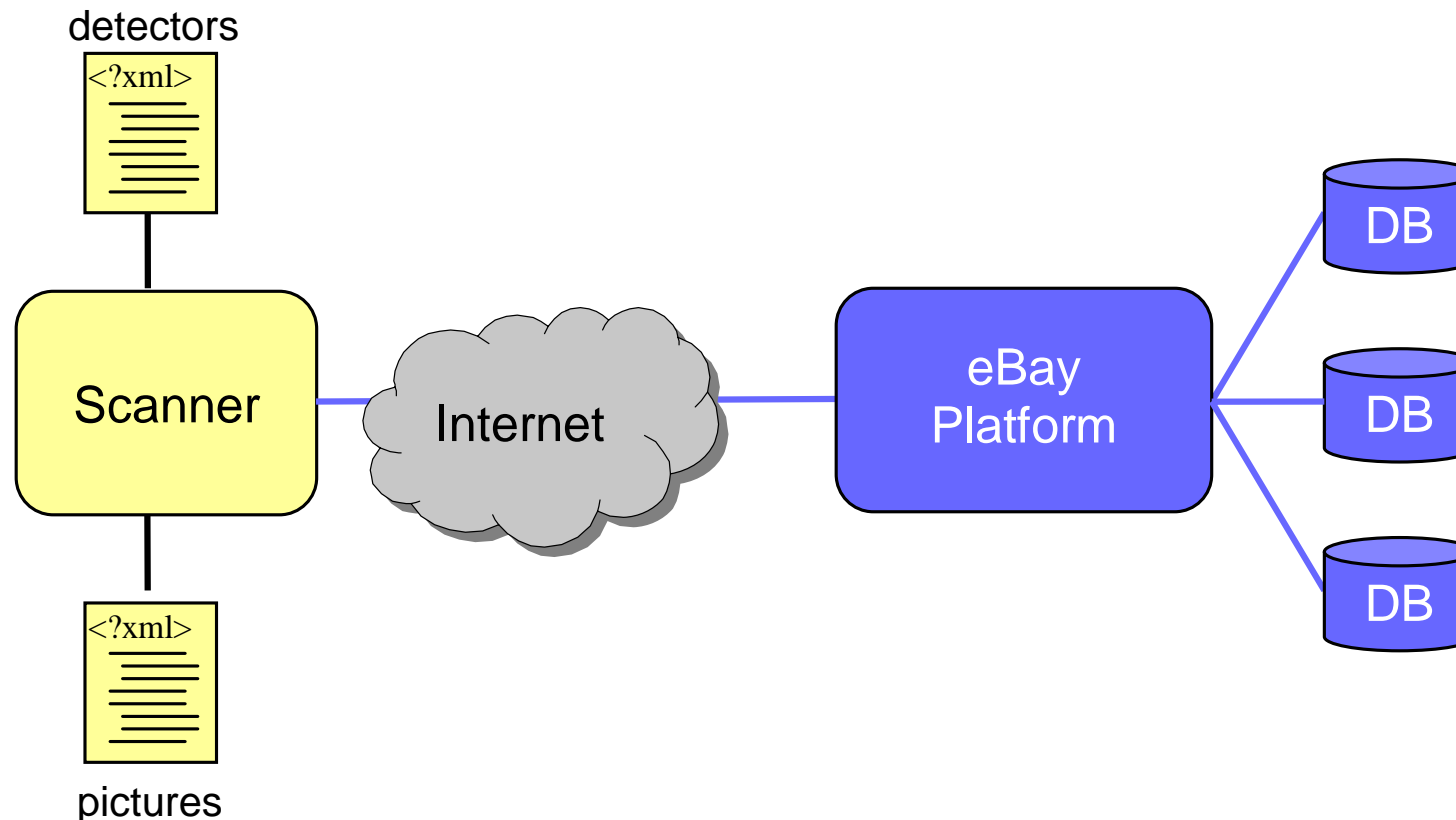
**Step 3: pirate uses marked original image in another auction**



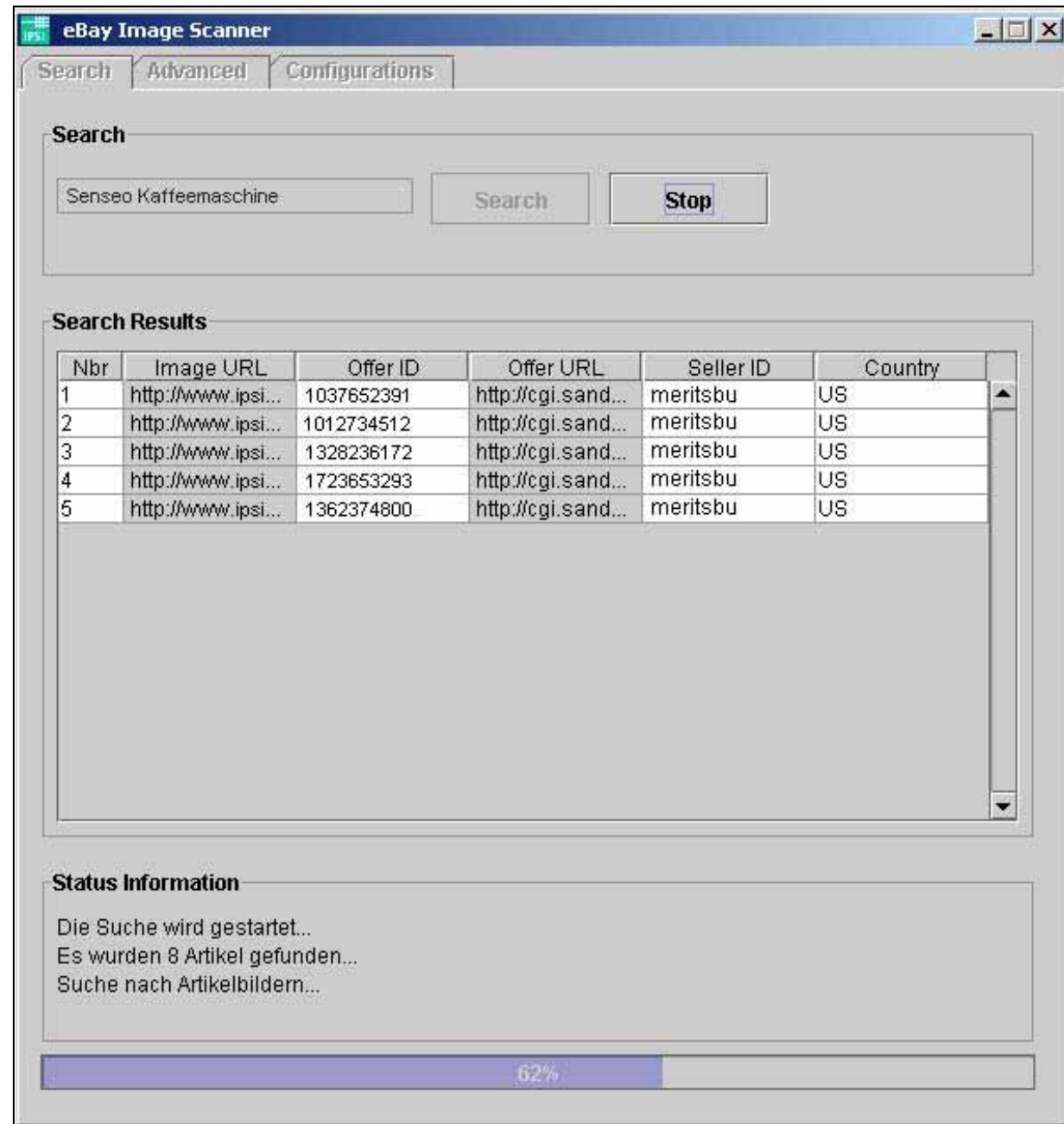
## Step 4: Scanner detects image copy



- Scanner uses eBay SDK as an communication interface
- Various watermarking detectors for different algorithms
- User-based key handling for retrieval
- Searching based on keywords, categories and dates



- GUI example
- Search process



## Practical issues:

- Retrieval optimization by hash-based image library:
  - Image with hash and result already stored for current scan is not processed again
  - Results of stored retrieval are used
- Performance:
  - Watermark retrieval: ~1 second per image
  - Bottleneck: eBay SDK, up to 5 seconds per image handling
- Handling of retrieval noise
  - Checksums
  - Stored copyright messages

- eBay image protection is important challenge
- Watermarking can help to identify image theft
- Automated solution is required
- eBay SDK and watermark detector can be combine to provide solution
- Our system uses eBay filters and watermark retrieval
- Optimization for high performance

- Improve image watermarking robustness
- Design solutions for small images
- Optimize speed
- More generic framework
  - User key handling
  - Algorithm handling

# Thank you.

---

Any questions 