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António Videira and Nuno Gonçalves
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nunogon@isr.uc.pt

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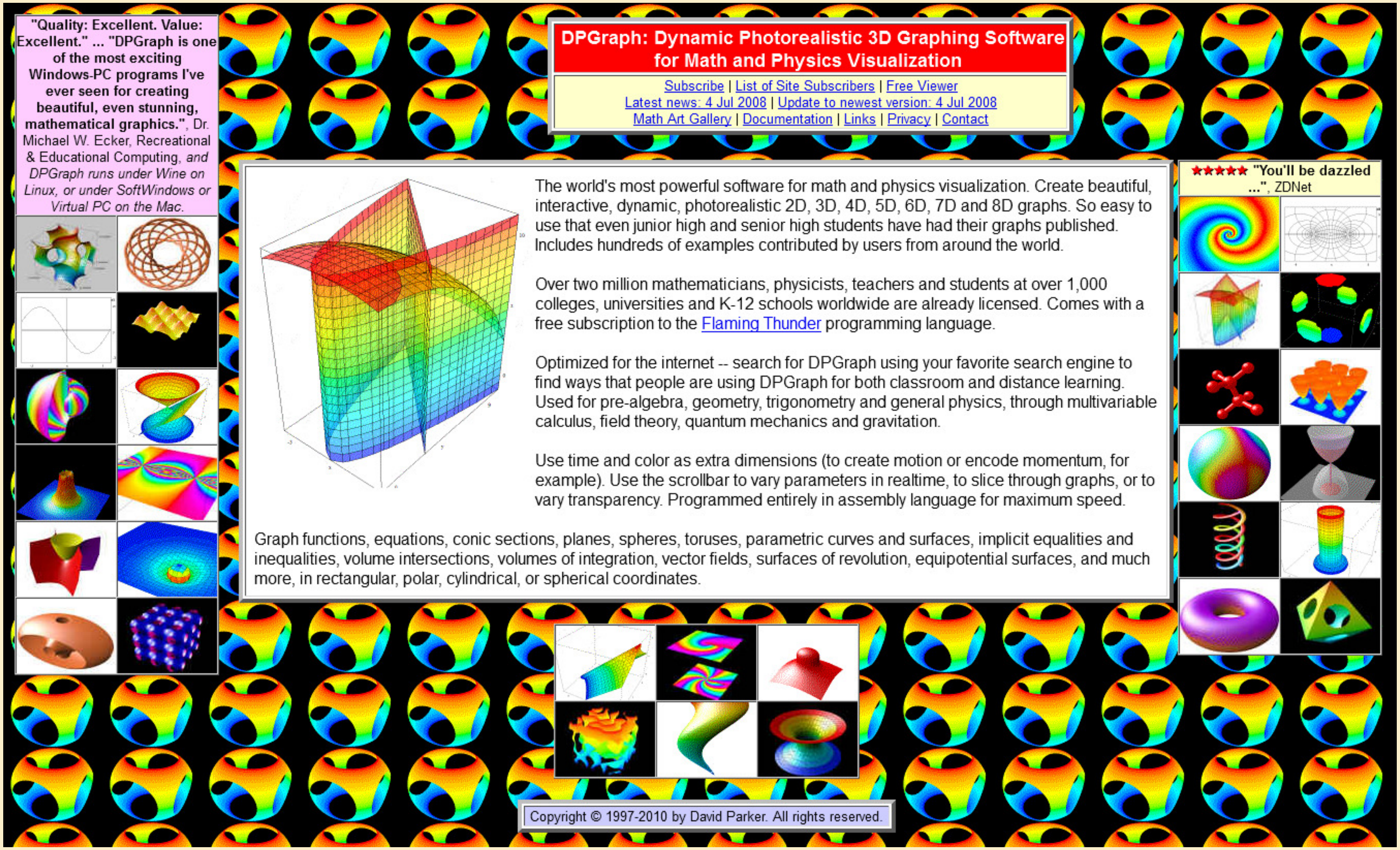

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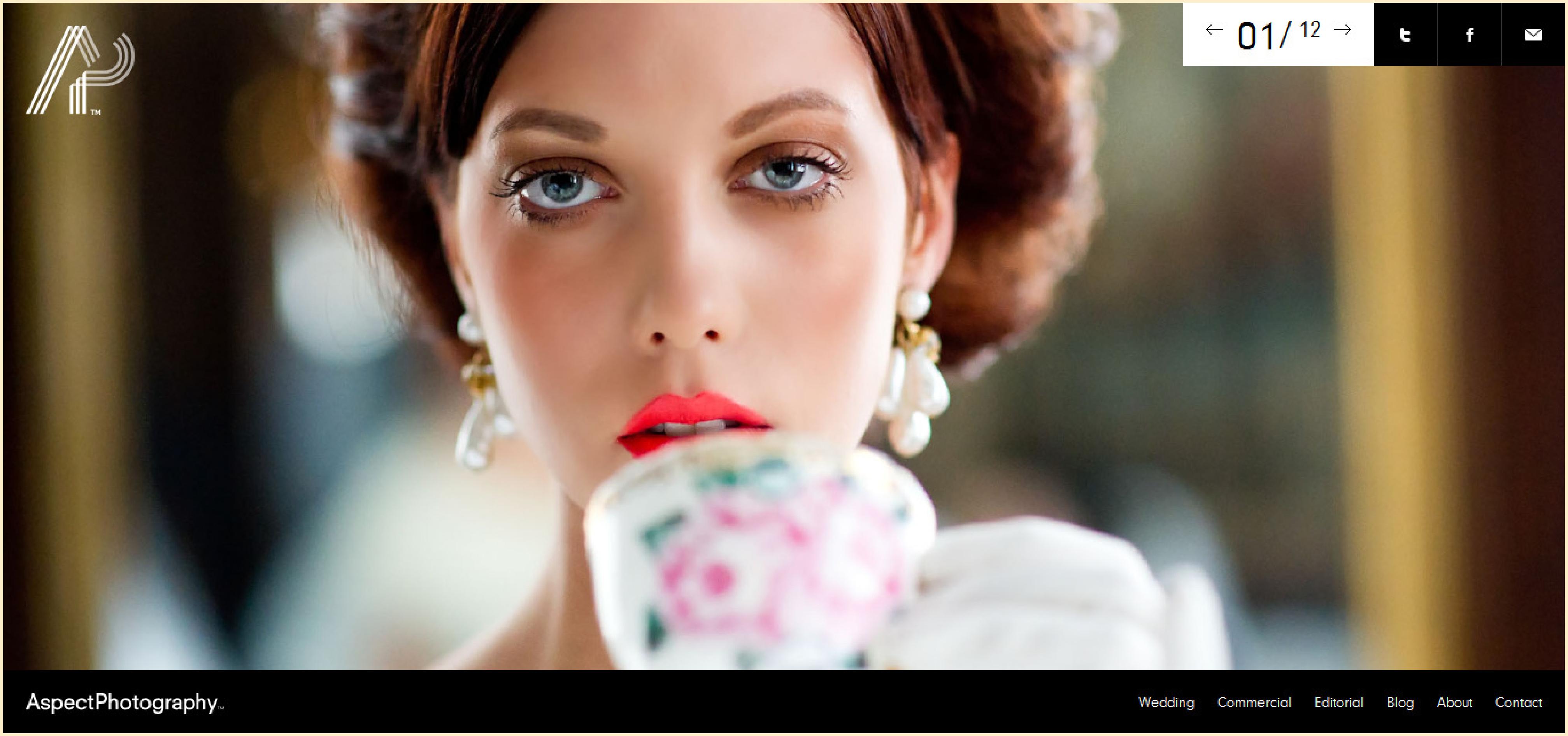

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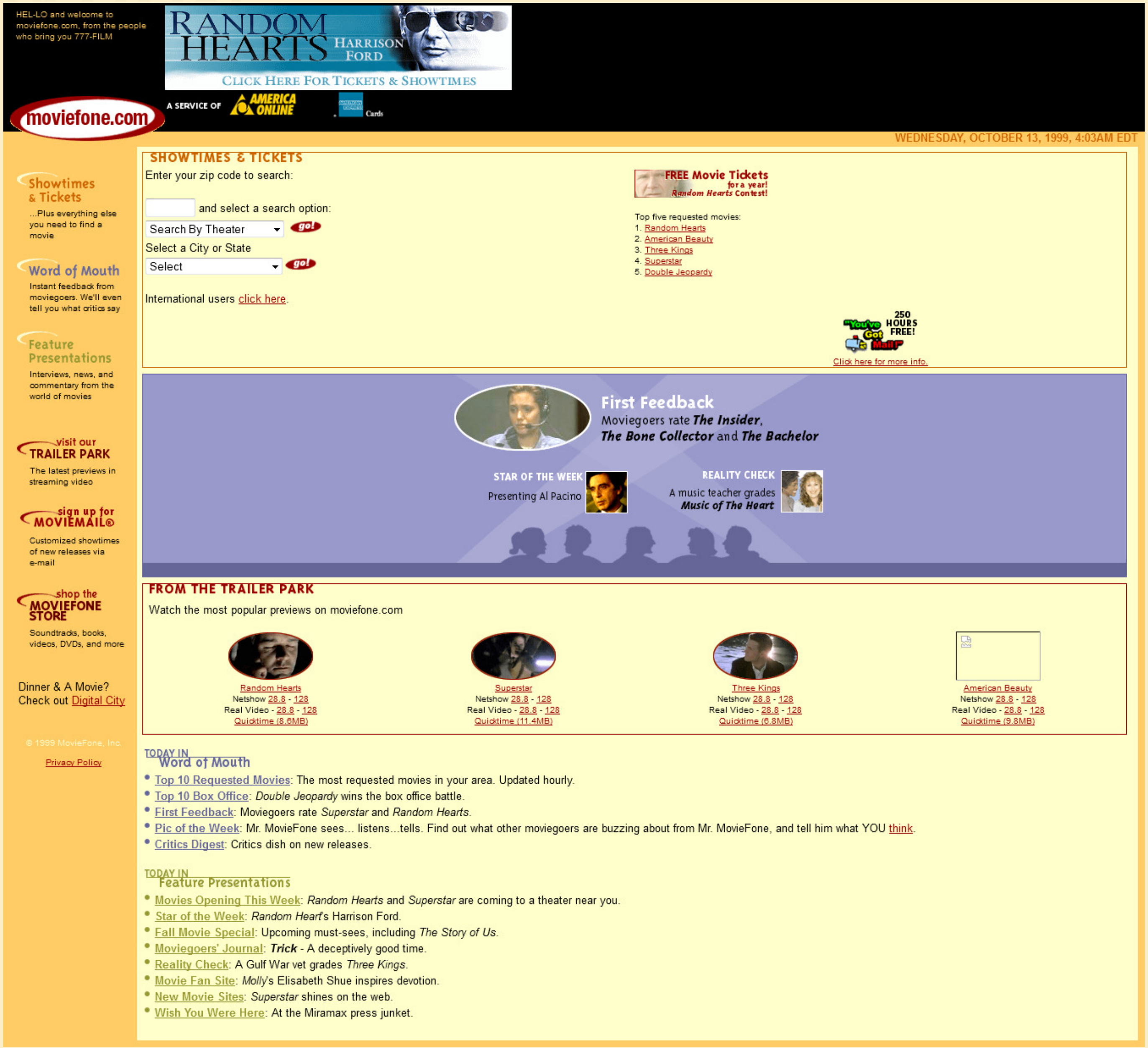

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Top five requested movies:

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4. Superstar
5. Double Jeopardy

Click here for more info.

First Feedback
Moviegoers rate ***The Insider***, ***The Bone Collector*** and ***The Bachelor***

STAR OF THE WEEK
Presenting Al Pacino

REALITY CHECK
A music teacher grades ***Music of The Heart***

FROM THE TRAILER PARK

Watch the most popular previews on moviefone.com

Random Hearts
Netshow 28.8 - 128
Real Video - 28.8 - 128
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Superstar
Netshow 28.8 - 128
Real Video - 28.8 - 128
Quicktime (11.4MB)

Three Kings
Netshow 28.8 - 128
Real Video - 28.8 - 128
Quicktime (6.8MB)

American Beauty
Netshow 28.8 - 128
Real Video - 28.8 - 128
Quicktime (9.8MB)

TODAY IN **Word of Mouth**

- Top 10 Requested Movies: The most requested movies in your area. Updated hourly.
- Top 10 Box Office: *Double Jeopardy* wins the box office battle.
- First Feedback: Moviegoers rate *Superstar* and *Random Hearts*.
- Pic of the Week: Mr. MovieFone sees... listens...tells. Find out what other moviegoers are buzzing about from Mr. MovieFone, and tell him what YOU think.
- Critics Digest: Critics dish on new releases.

TODAY IN **Feature Presentations**

- Movies Opening This Week: *Random Hearts* and *Superstar* are coming to a theater near you.
- Star of the Week: *Random Heart*'s Harrison Ford.
- Fall Movie Special: Upcoming must-sees, including *The Story of Us*.
- Moviegoers' Journal: ***Trick*** - A deceptively good time.
- Reality Check: A Gulf War vet grades *Three Kings*.
- Movie Fan Site: *Molly*'s Elisabeth Shue inspires devotion.
- New Movie Sites: *Superstar* shines on the web.
- Wish You Were Here: At the Miramax press junket.

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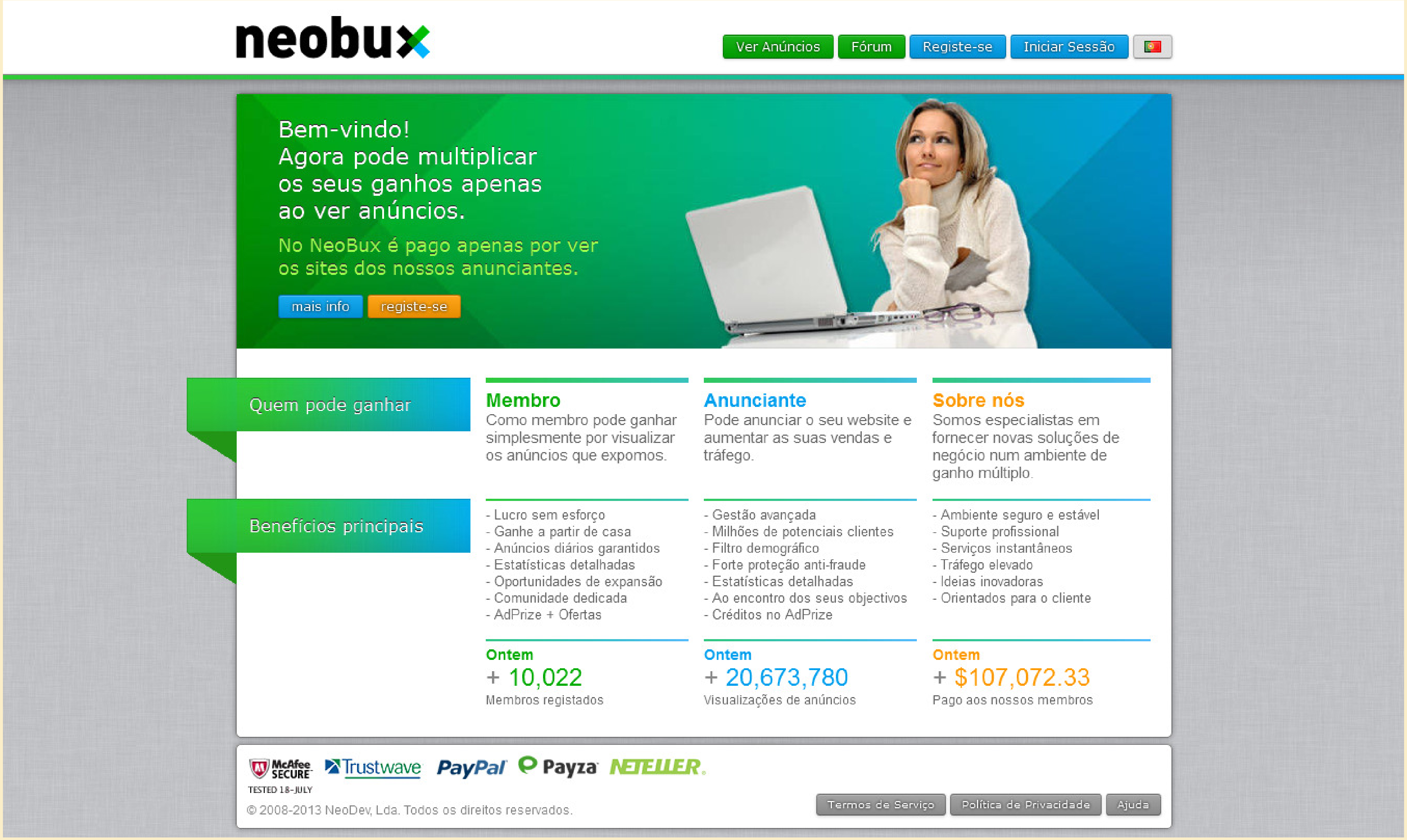

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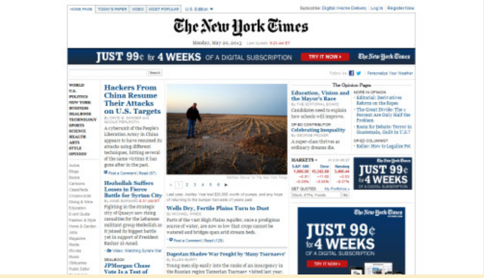

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By DAVID E. SANGER and NICOLE PERLROTH

A cyberunit of the People's Liberation Army in China appears to have resumed its attacks using different techniques, hitting several of the same victims it has gone after in the past.

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By ANNE BARNARD 8:51 AM ET

Fighting in the strategic city of Qusayr saw rising casualties for the Lebanese militant group Hezbollah as it joined its biggest battle yet in support of President Bashar al-Assad.

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Matthew Staver for The New York Times

1 2 3 4 5 6

Last year, Ashley Yost lost $20,000 worth of pumps, and any hope of returning to the bumper harvests of years past.

Wells Dry, Fertile Plains Turn to Dust

By MICHAEL WINES

Parts of the vast High Plains Aquifer, once a prodigious source of water, are now so low that crops cannot be watered and bridges span arid stream beds.

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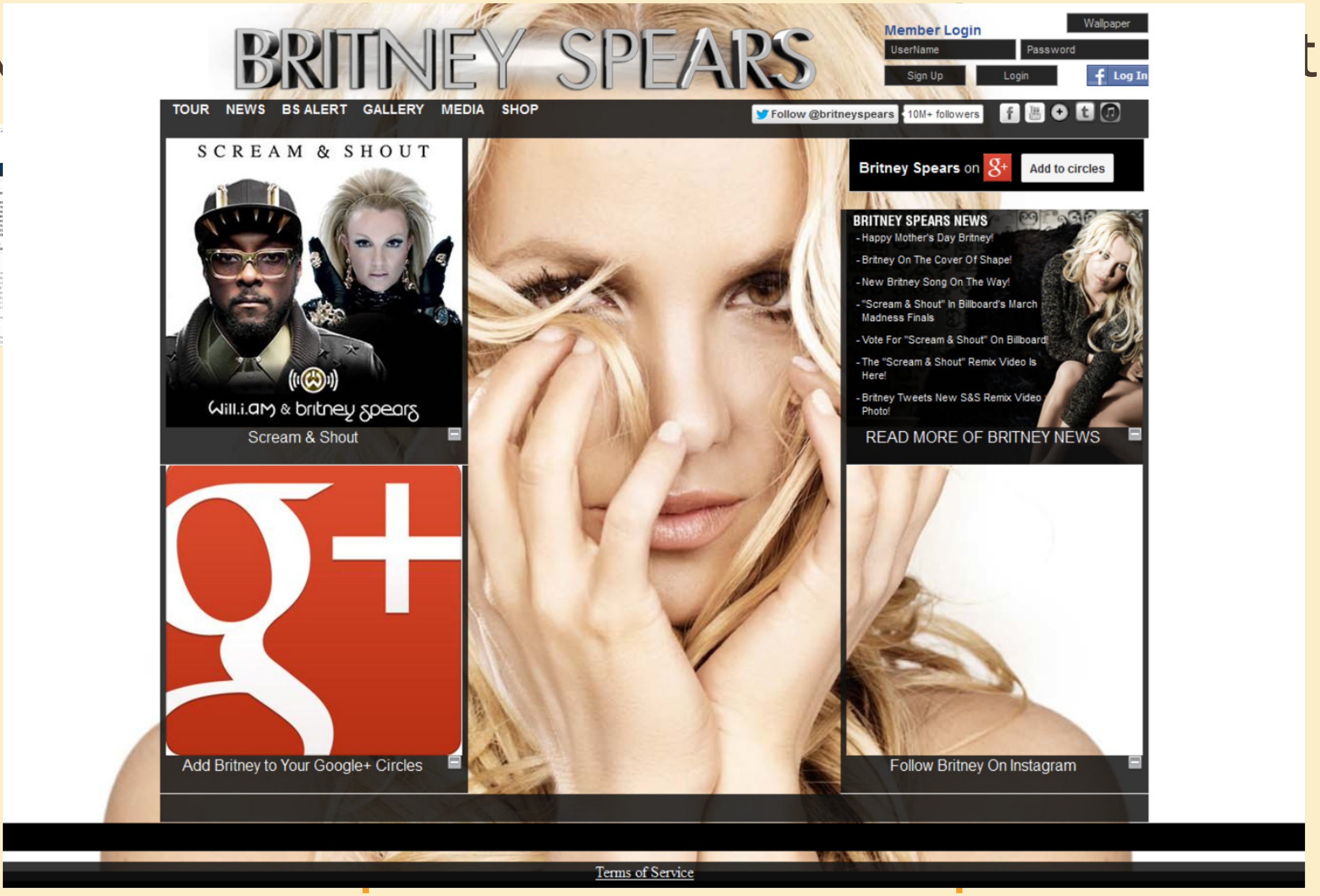

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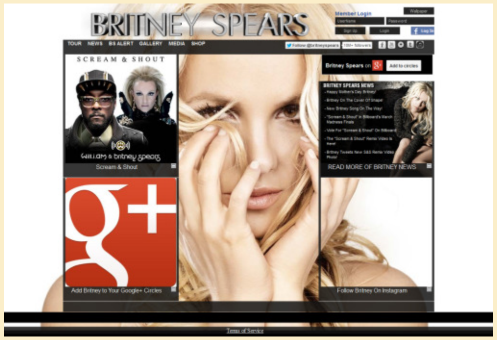

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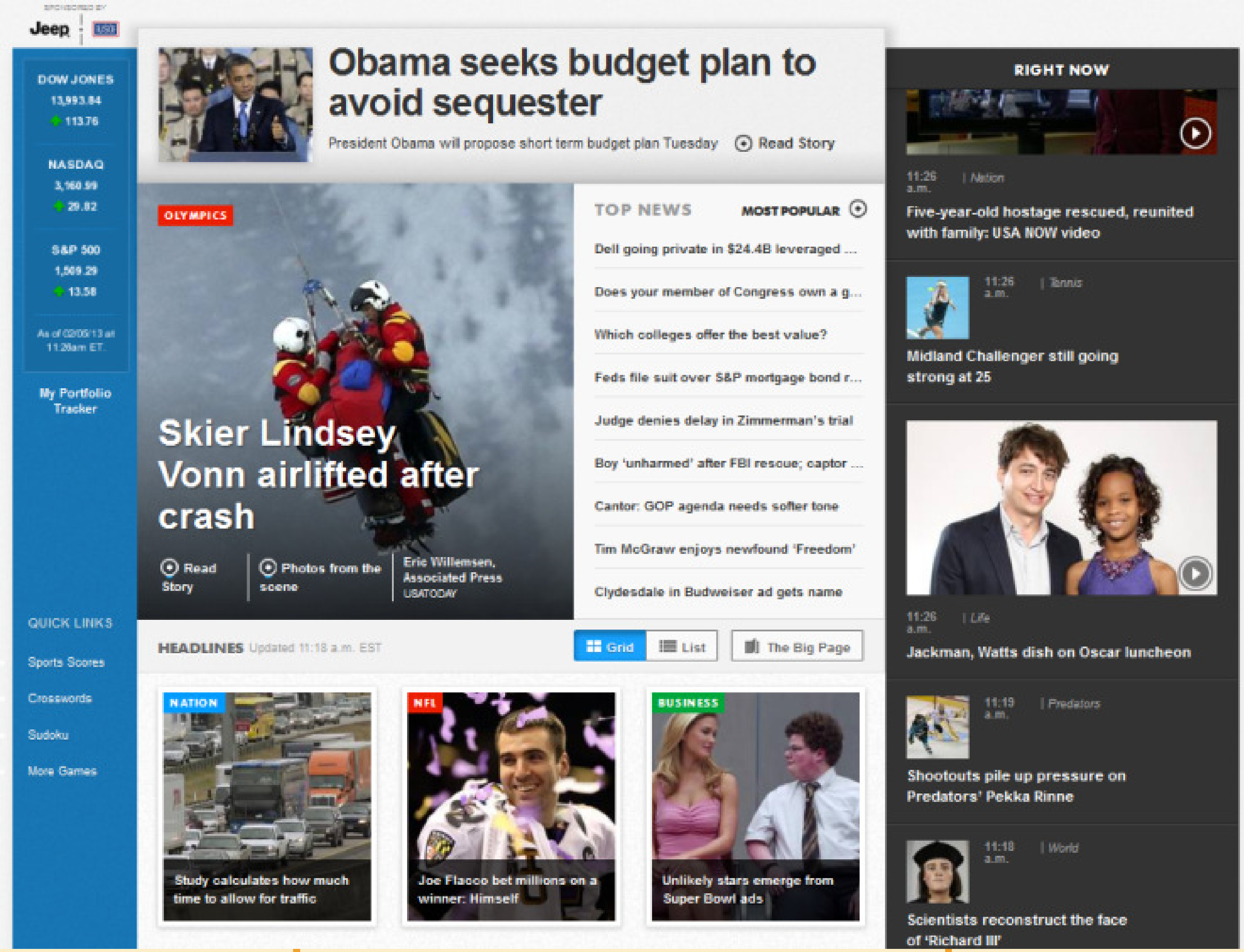

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11:19 a.m. | Predators
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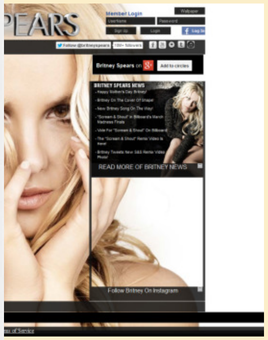

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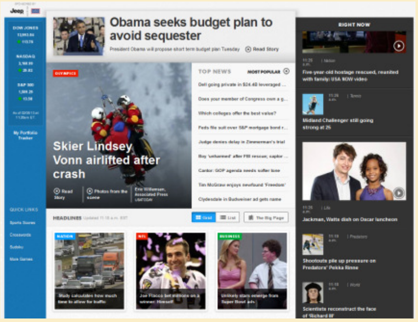

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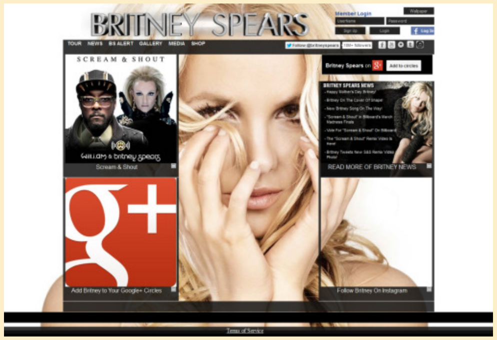

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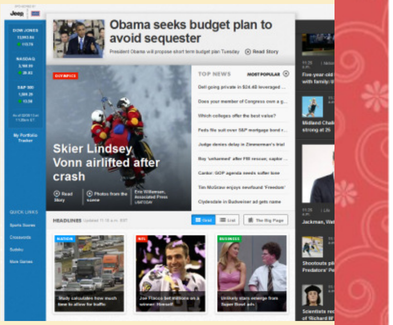

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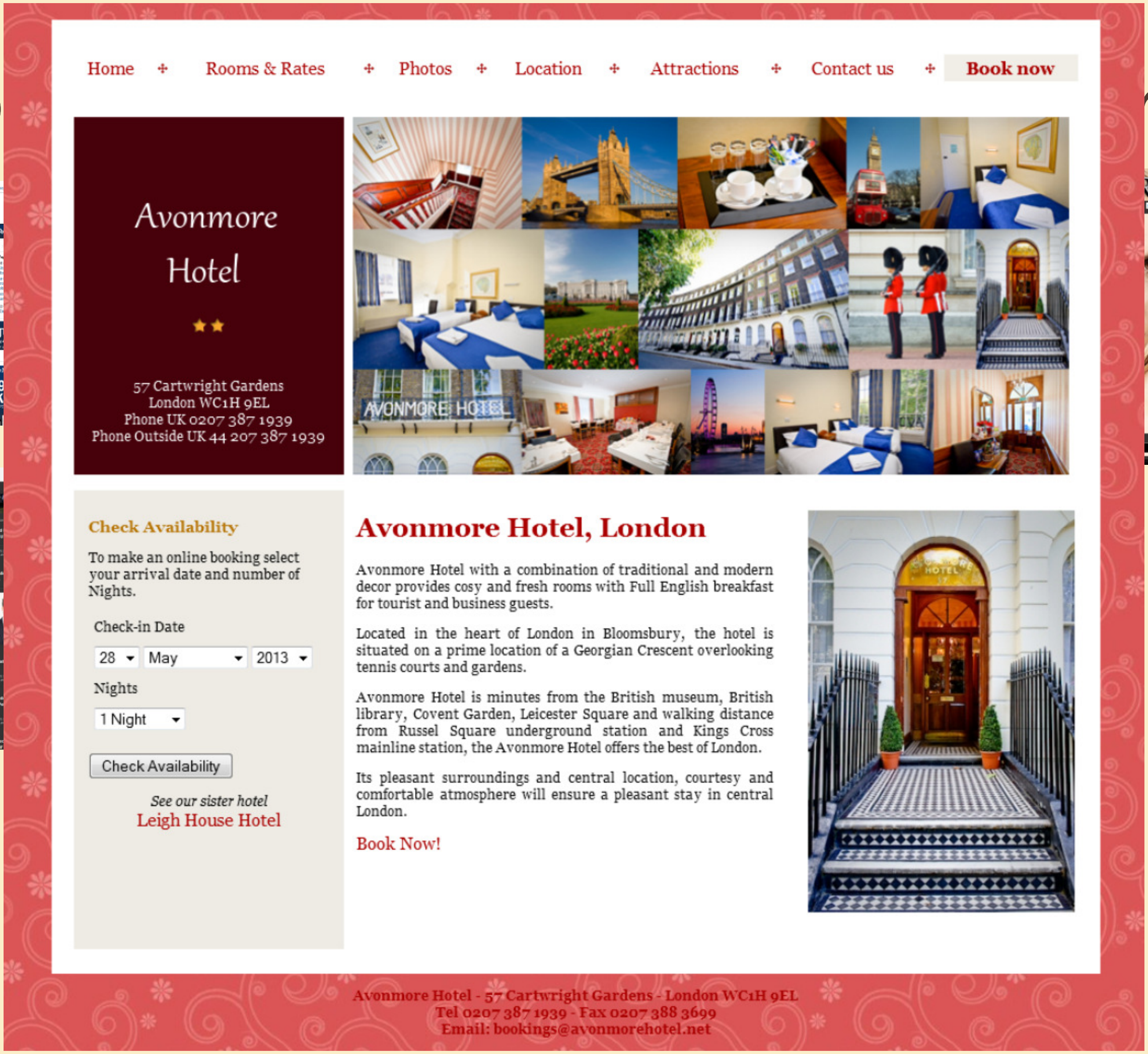

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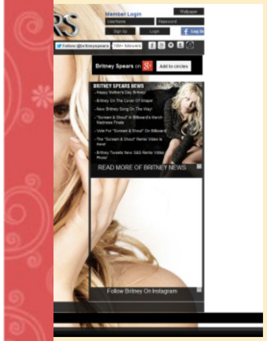

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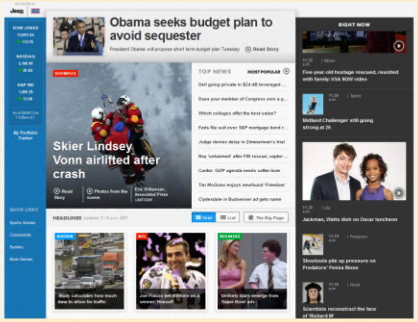

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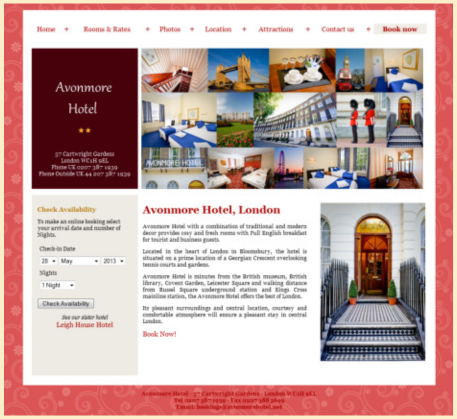

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57 Cartwright Gardens
London WC1H 9EL
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Check-in Date: 28 | May | 2013

Nights: 1 Night

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Avonmore Hotel, London

Avonmore Hotel with a combination of traditional and modern decor provides cosy and fresh rooms with Full English breakfast for tourist and business guests.

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Avonmore Hotel is minutes from the British museum, British library, Covent Garden, Leicester Square and walking distance from Russel Square underground station and Kings Cross mainline station, the Avonmore Hotel offers the best of London.

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Book Now!

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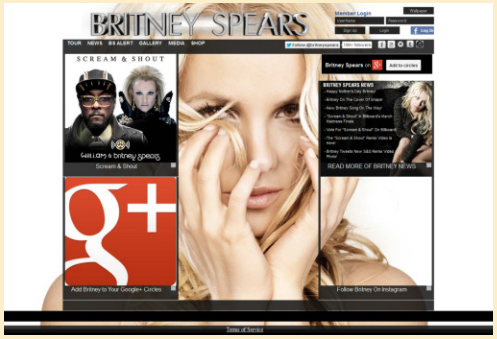
Email: bookings@avonmorehotel.net

Celebrities



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- Britney On The Cover Of Shape!
- New Britney Song On The Way!
- "Scream & Shout" In Billboard's March Madness Finals
- Vote For "Scream & Shout" On Billboard
- The "Scream & Shout" Remix Video Is Here!
- Britney Tweets New S&S Remix Video Photo!

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OUTLINE

- Related work
- Problem statement
- Our approach:
  - Feature extraction
  - Feature selection
  - Classifiers: training and testing
- Experiments
- Conclusions
- Future work

RELATED WORK

- Classification of web pages has been traditionally done using only text.
- Text is rich in semantic content.
- Classification is focused on the topic.
- Text sources:
  - html code (tags: keywords, title, description, ...)
  - html code (text in paragraphs or anchors)
  - url (self url or page hyperlinks)

RELATED WORK

- Text only:
  - Neural networks + PCA [Selamat and Omatu, 2004]
  - SVM + semantic [Chen and Hsieh, 2006]
  - Web crawlers (Google, Yahoo, …)

- Text + images:
  - Structure of page + images [Asirvatham and Ravi, 2001]
  - Visual Adjcency Multigraph (graphs) [Kovacevic et al., 2004].

- Visual only:
  - Several features + classifiers [Boer et al., 2010].

RELATED WORK

- Positives of using text:
  - very fast
  - easy to implement
  - rich content to classify the topic of the page.

- Negatives of using text:
  - it has a lot of irrelevant data
  - absolutely no information on some subjective variables

PROBLEM STATEMENT

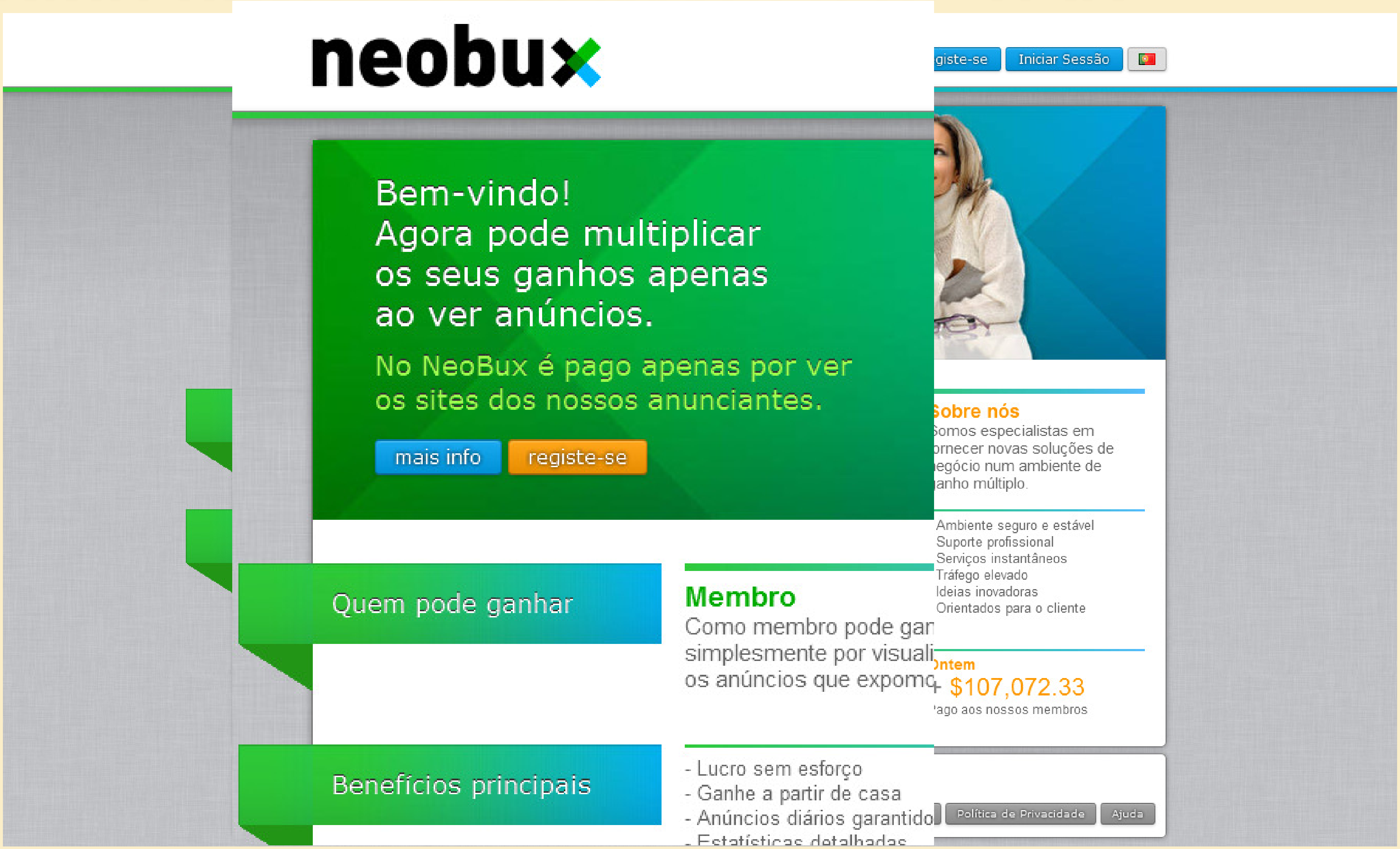
- Classification of web pages
- Using only the visual content
- Subjective variables
  - whether a page is beautiful or ugly – aesthetic value
  - whether a page is old fashioned or has newer design – design recency
- Topic of the web page

VISUAL CONTENT

- Positives of using visual content:
  - rich content that we can not find in text
  - can ben applied to subjective variables
  - there is a growing trend to use images and banners in the design/layout of the page – these images contain visual text that is not caught by crawlers

- Negatives of using visual content:
  - slow

RICH CONTENT IN IMAGES OF TEXT



neobux

giste-se Iniciar Sessão

Bem-vindo!
Agora pode multiplicar
os seus ganhos apenas
ao ver anúncios.

No NeoBux é pago apenas por ver
os sites dos nossos anunciantes.

mais info registe-se

Quem pode ganhar

Membro
Como membro pode gan
simplesmente por visuali
os anúncios que expomo

Benefícios principais

- Lucro sem esforço
- Ganhe a partir de casa
- Anúncios diários garantido
- Estatísticas detalhadas

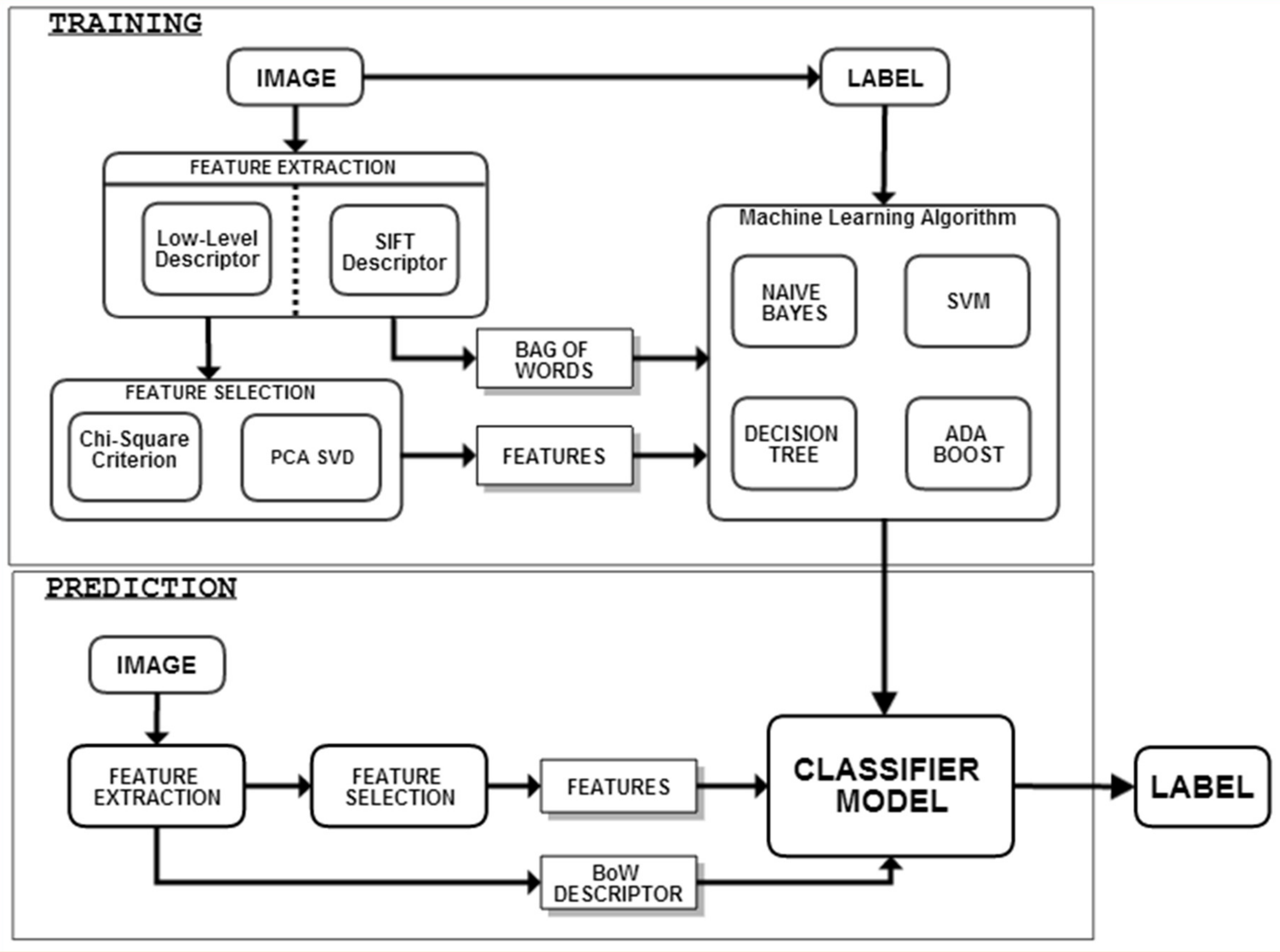
Sobre nós
Somos especialistas em
ornecer novas soluções de
egócio num ambiente de
anho múltiplo.

Ambiente seguro e estável
Suporte profissional
Serviços instantâneos
Tráfego elevado
Ideias inovadoras
Orientados para o cliente

Ontem
+ $107,072.33
Pago aos nossos membros

Política de Privacidade Ajuda

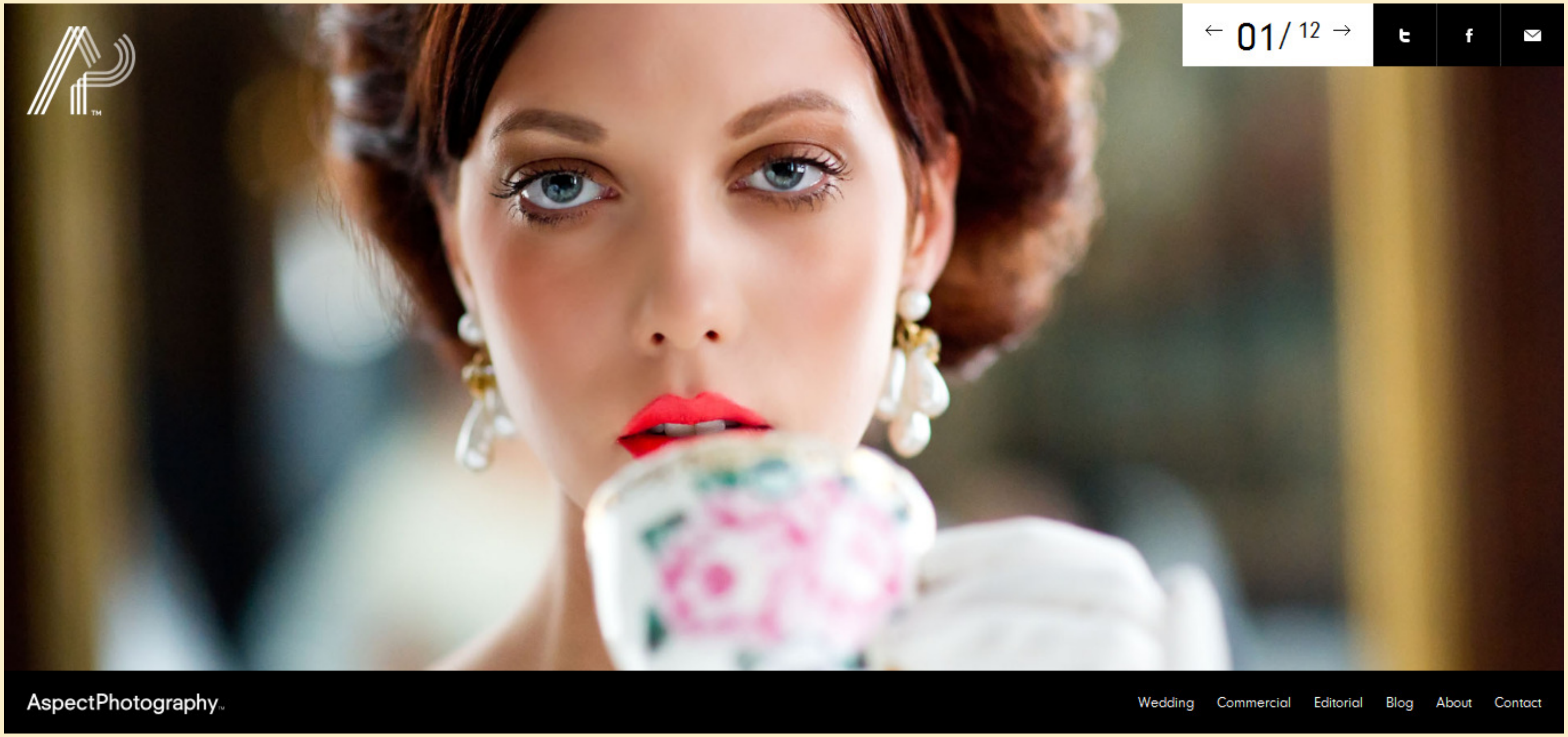
OUR APPROACH

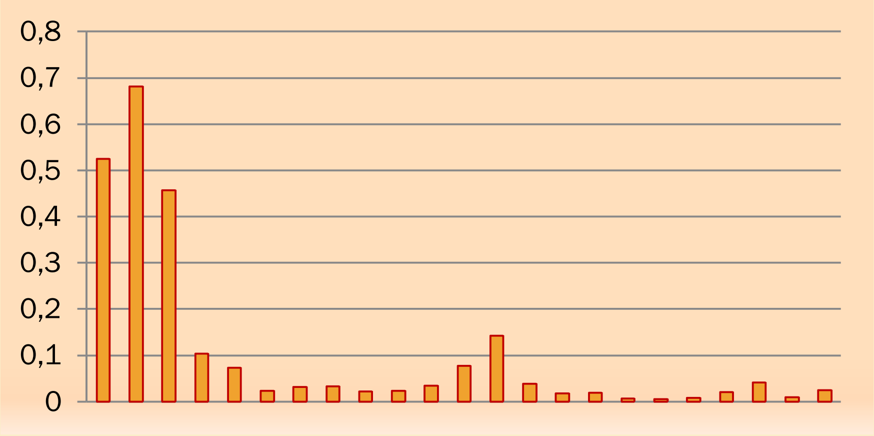


FEATURE VECTORS

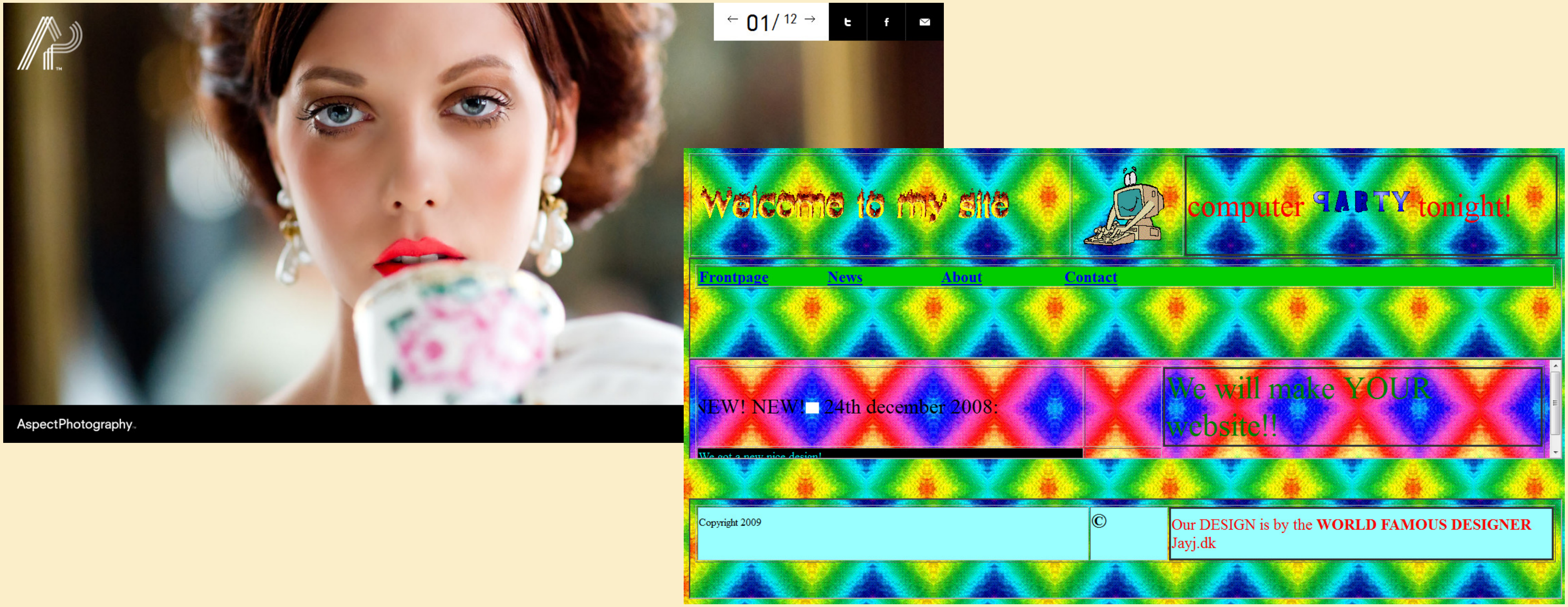
- 1 – Low- level descriptor (166 dimensions)
  - Color Histogram
  - Edge Histogram
  - Gabor
  - Tamura
- 2 – Mid- level descriptor (100, 200 or 500 dimensions)
  - SIFT
  - Bag Of Words (BOW)

COLOR HISTOGRAM





COLOR HISTOGRAM



Welcome to my site

computer PARTY tonight!

NEW! NEW! 24th december 2008:

We got a new nice design!

We will make YOUR website!!

Copyright 2009

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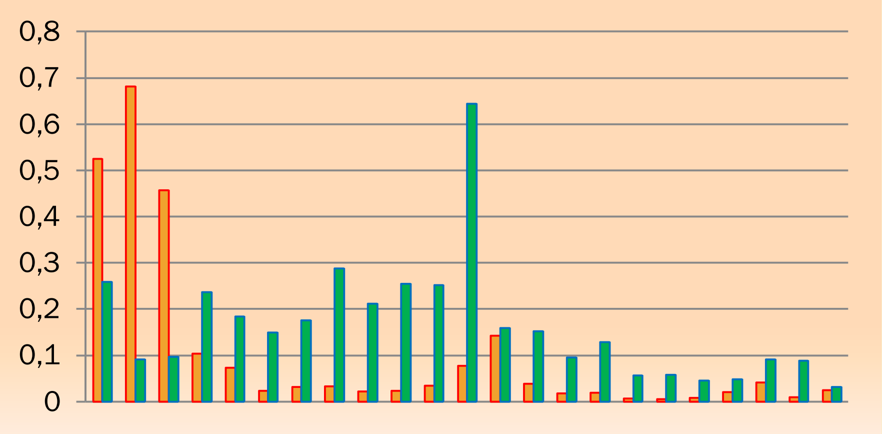
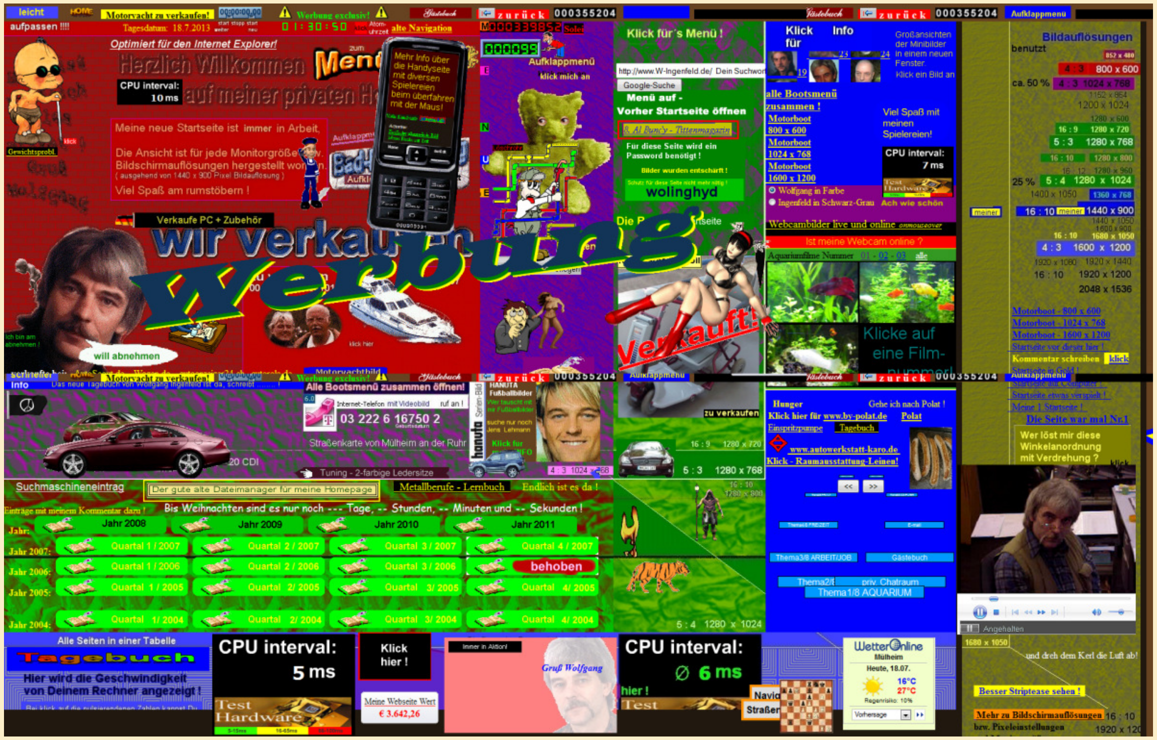
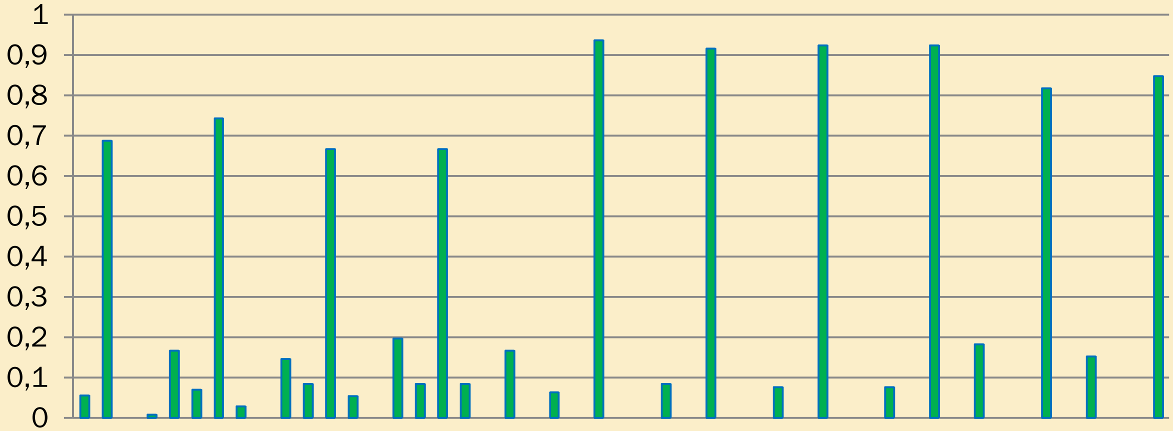
Our DESIGN is by the **WORLD FAMOUS DESIGNER** Jayj.dk



EDGE HISTOGRAM


Herzlich Willkommen
auf meiner privaten H
Optimiert für den Internet Explorer!
Meine neue Startseite ist immer in Arbeit
Viel Spaß am rumstöbern !
wir verkaufen
Werbung
Verkauft!
Klick für`s Menü !
Bildauflösungen
alle Bootsmenü zusammen !
Webcambilder live und online
Klicke auf eine Film-
Alle Bootsmenü zusammen öffnen!
03 222 6 16750 2
Suchmaschineneintrag
Der gute alte Dateimanager für meine Homepage
Metallberufe - Lernbuch
Endlich ist es da !
Bis Weihnachten sind es nur noch --- Tage, -- Stunden, -- Minuten und -- Sekunden !
Jahr 2008
Jahr 2009
Jahr 2010
Jahr 2011
behoben
Alle Seiten in einer Tabelle
Tagebuch
Hier wird die Geschwindigkeit von Deinem Rechner angezeigt !
CPU interval:
5 ms
Klick hier !
CPU interval:
∅ 6 ms
WetterOnline
Wer löst mir diese Winkelanordnung mit Verdrehung ?
Besser Striptease sehen !
Mehr zu Bildschirmauflösungen



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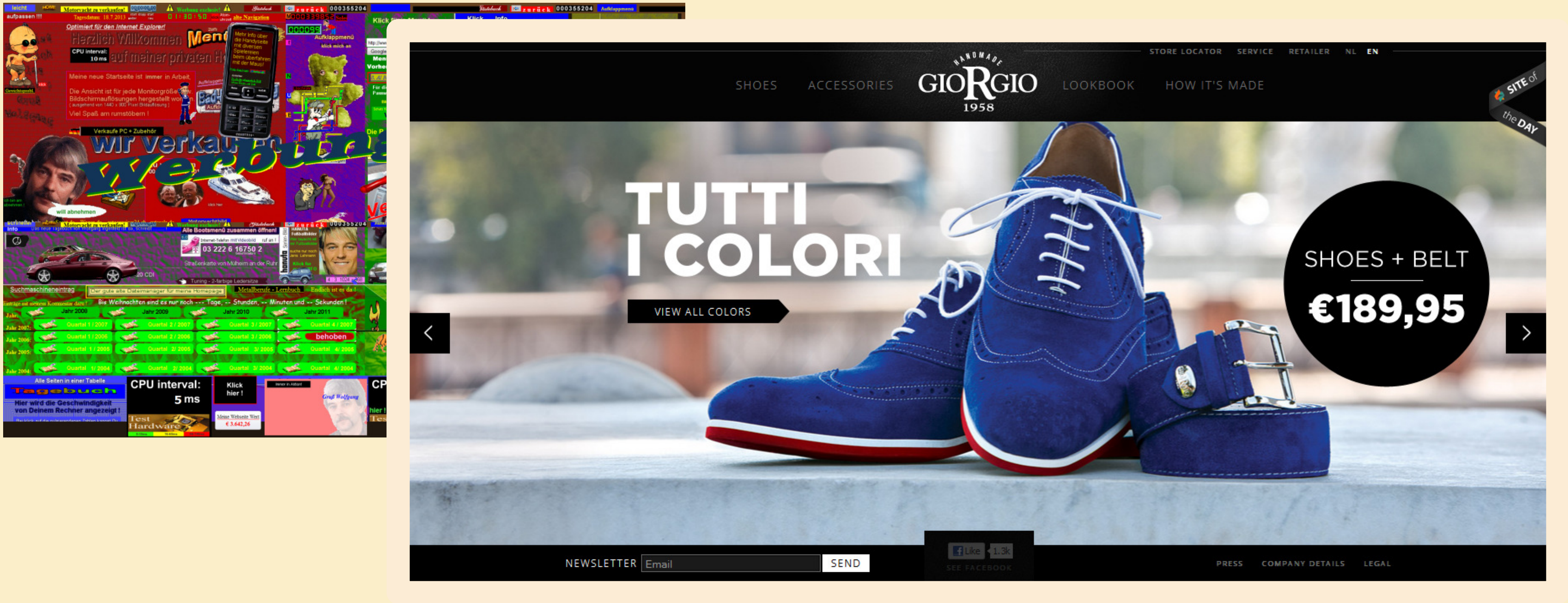
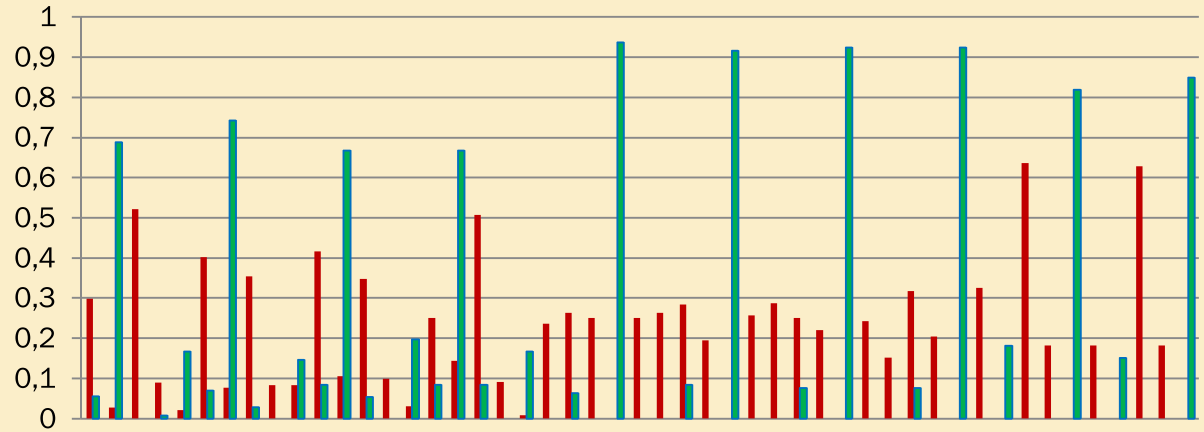
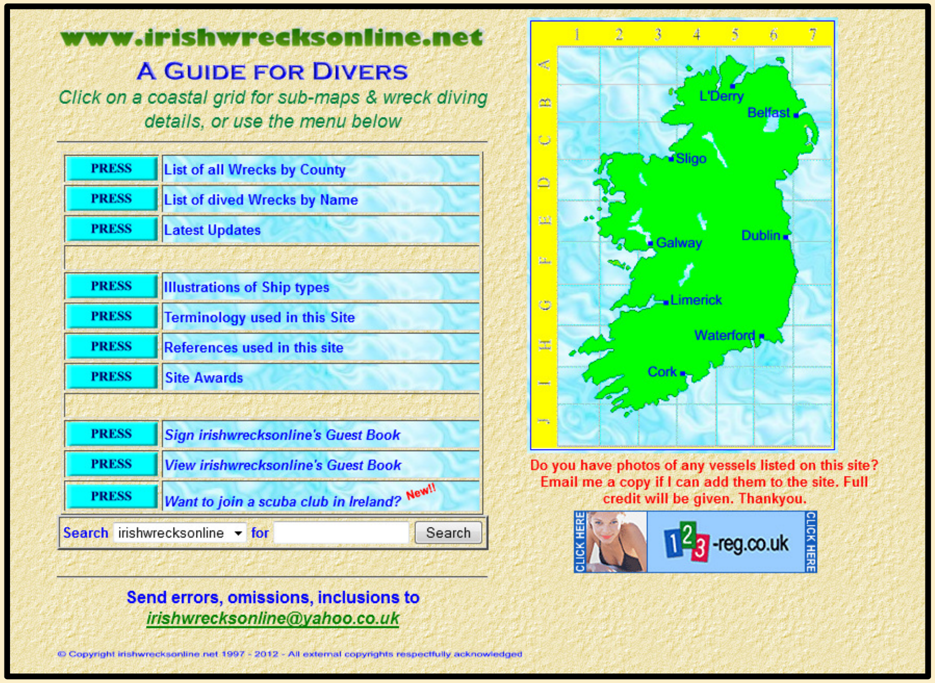




GABOR FEATURES



www.irishwrecksonline.net

A GUIDE FOR DIVERS

Click on a coastal grid for sub-maps & wreck diving details, or use the menu below

PRESS List of all Wrecks by County

PRESS List of dived Wrecks by Name

PRESS Latest Updates

PRESS Illustrations of Ship types

PRESS Terminology used in this Site

PRESS References used in this site

PRESS Site Awards

PRESS *Sign irishwrecksonline's Guest Book*

PRESS *View irishwrecksonline's Guest Book*

PRESS *Want to join a scuba club in Ireland?* *New!!*

Search irishwrecksonline for Search

Do you have photos of any vessels listed on this site? Email me a copy if I can add them to the site. Full credit will be given. Thankyou.

Send errors, omissions, inclusions to
irishwrecksonline@yahoo.co.uk

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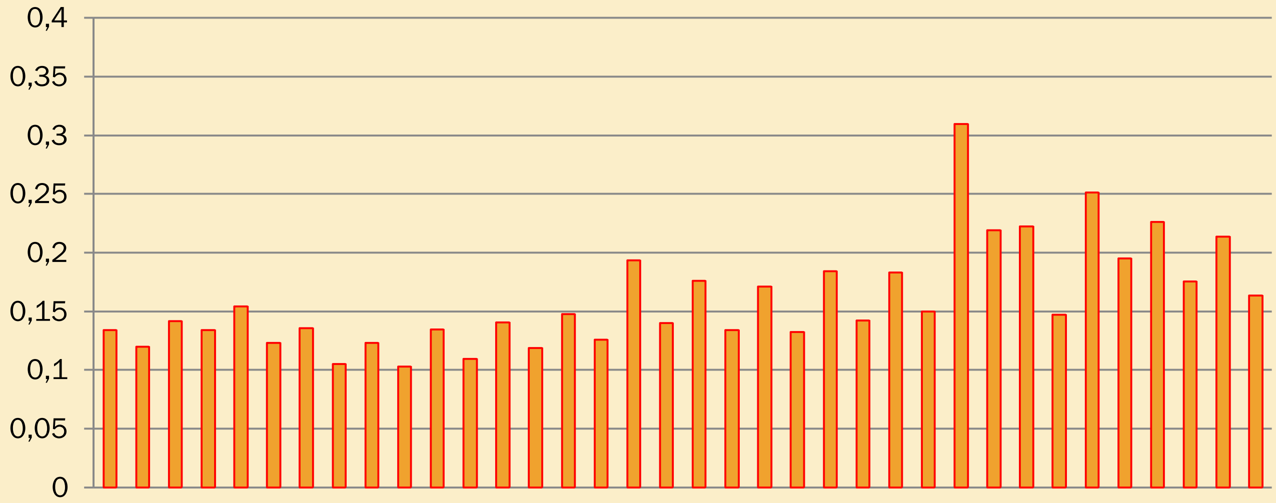
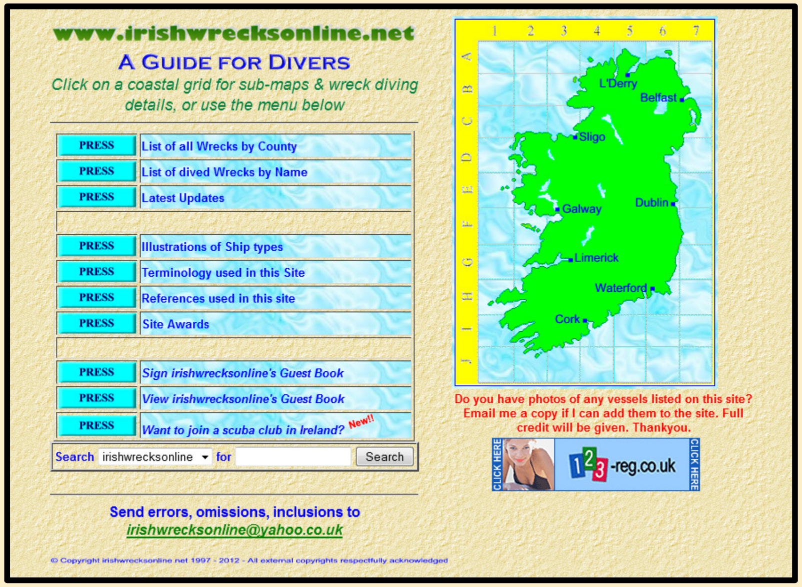


GABOR FEATURES



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A Guide for Divers

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PRESS	Terminology used in this Site
PRESS	References used in this site
PRESS	Site Awards
PRESS	*Sign irishwrecksonline's Guest Book*
PRESS	*View irishwrecksonline's Guest Book*
PRESS	*Want to join a scuba club in Ireland?* New!!

Search irishwrecksonline for Search

Do you have photos of any vessels listed on this site? Email me a copy if I can add them to the site. Full credit will be given. Thankyou.

CLICK HERE 123-reg.co.uk CLICK HERE

Send errors, omissions, inclusions to irishwrecksonline@yahoo.co.uk

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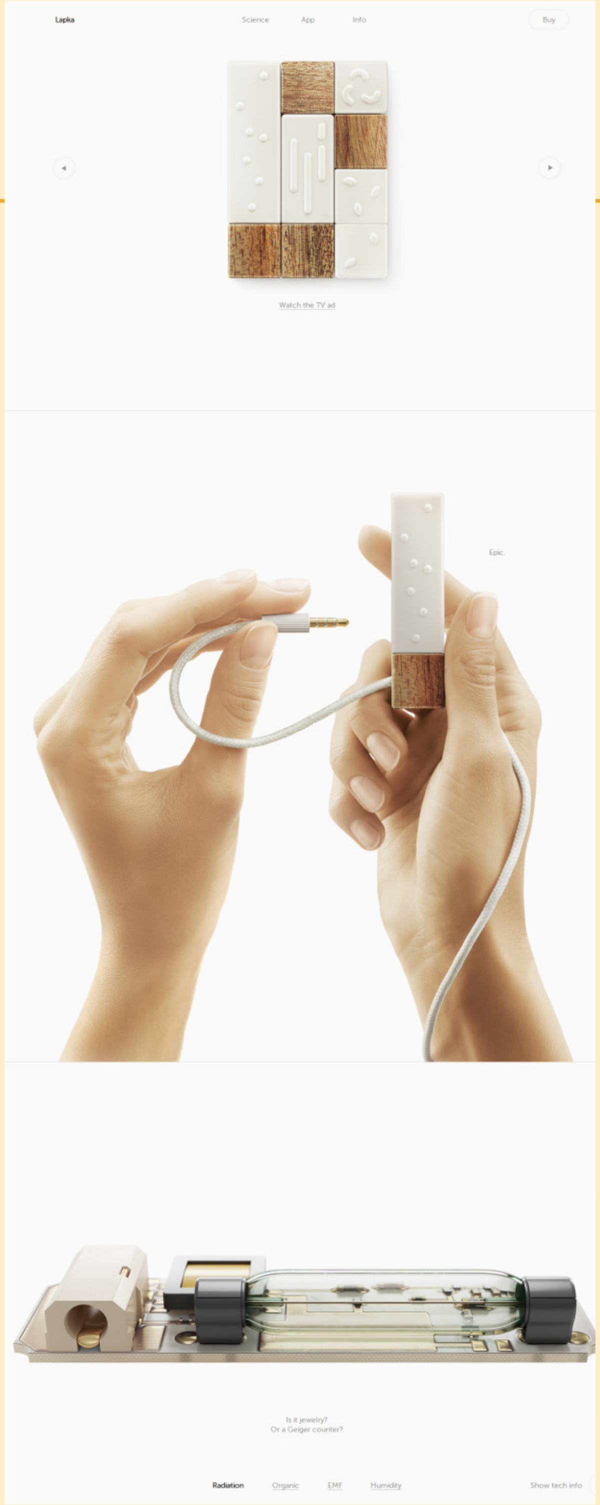
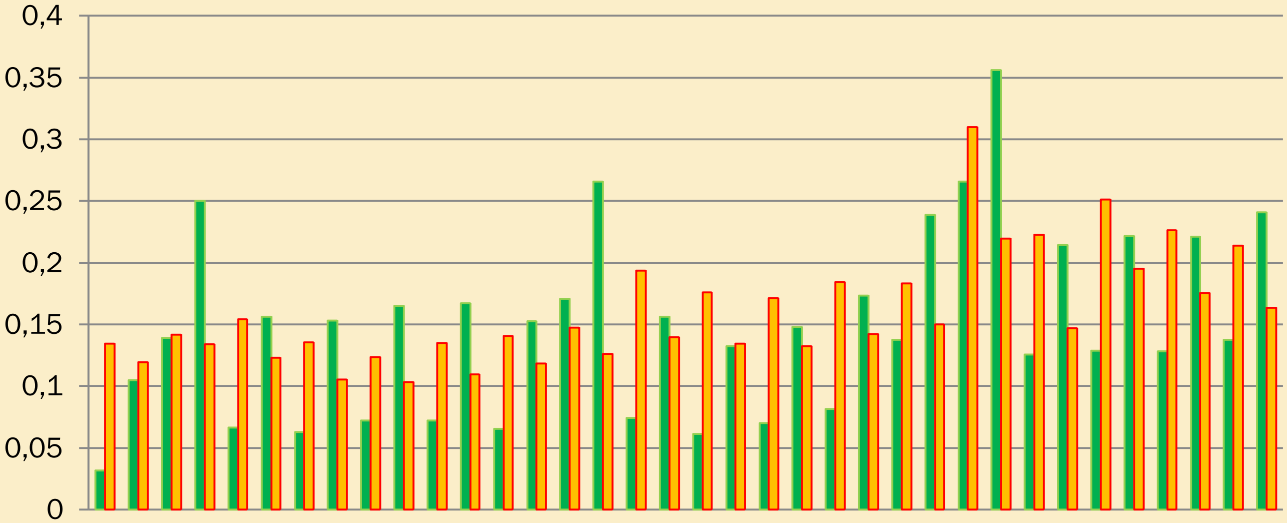
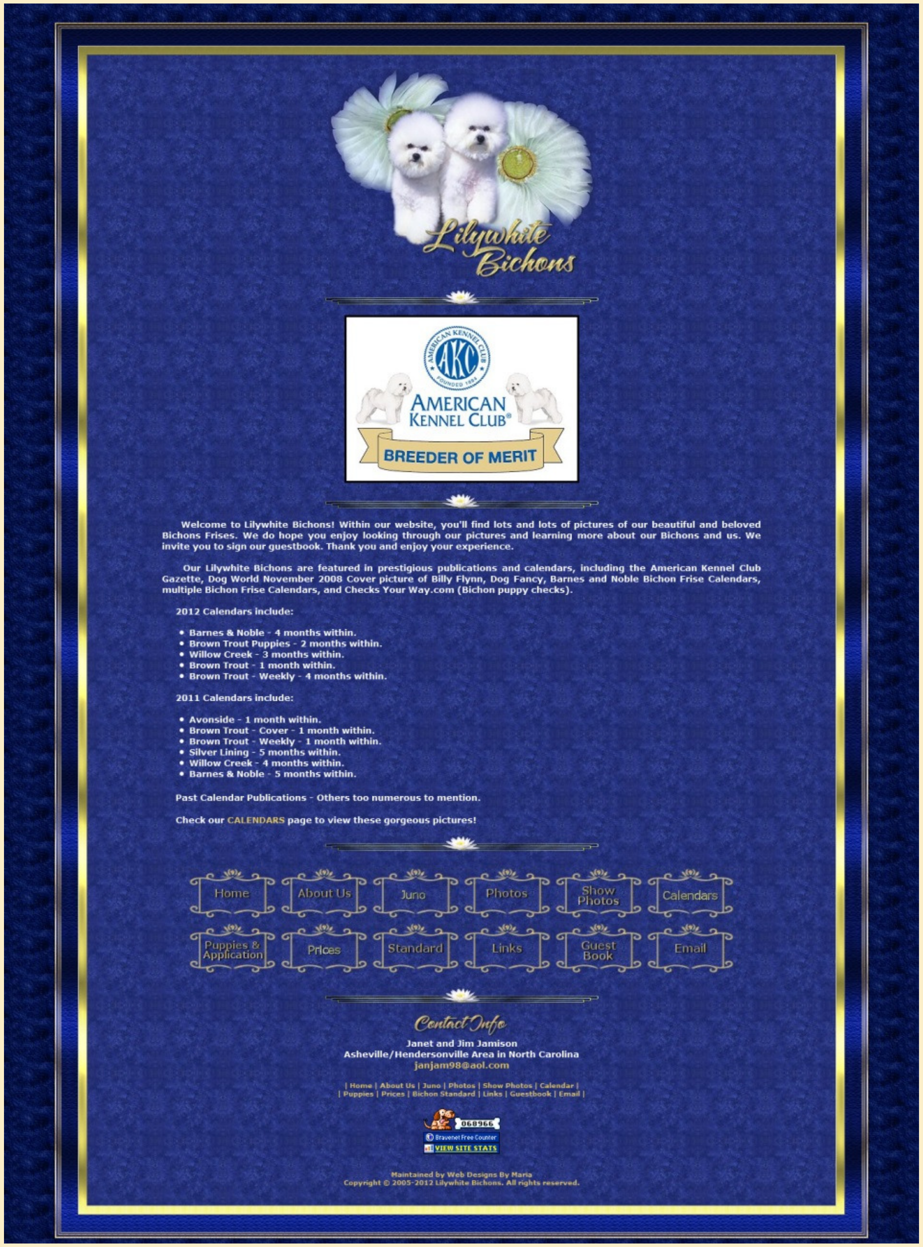




TAMURA FEATURES



Welcome to Lilywhite Bichons! Within our website, you'll find lots and lots of pictures of our beautiful and beloved Bichons Frises. We do hope you enjoy looking through our pictures and learning more about our Bichons and us. We invite you to sign our guestbook. Thank you and enjoy your experience.

Our Lilywhite Bichons are featured in prestigious publications and calendars, including the American Kennel Club Gazette, Dog World November 2008 Cover picture of Billy Flynn, Dog Fancy, Barnes and Noble Bichon Frise Calendars, multiple Bichon Frise Calendars, and Checks Your Way.com (Bichon puppy checks).

2012 Calendars include:

- Barnes & Noble - 4 months within.
- Brown Trout Puppies - 2 months within.
- Willow Creek - 3 months within.
- Brown Trout - 1 month within.
- Brown Trout - Weekly - 4 months within.

2011 Calendars include:

- Avonside - 1 month within.
- Brown Trout - Cover - 1 month within.
- Brown Trout - Weekly - 1 month within.
- Silver Lining - 5 months within.
- Willow Creek - 4 months within.
- Barnes & Noble - 5 months within.

Past Calendar Publications - Others too numerous to mention.

Check our CALENDARS page to view these gorgeous pictures!

Contact Info

Janet and Jim Jamison
Asheville/Hendersonville Area in North Carolina
janjam98@aol.com

| Home | About Us | Juno | Photos | Show Photos | Calendar |
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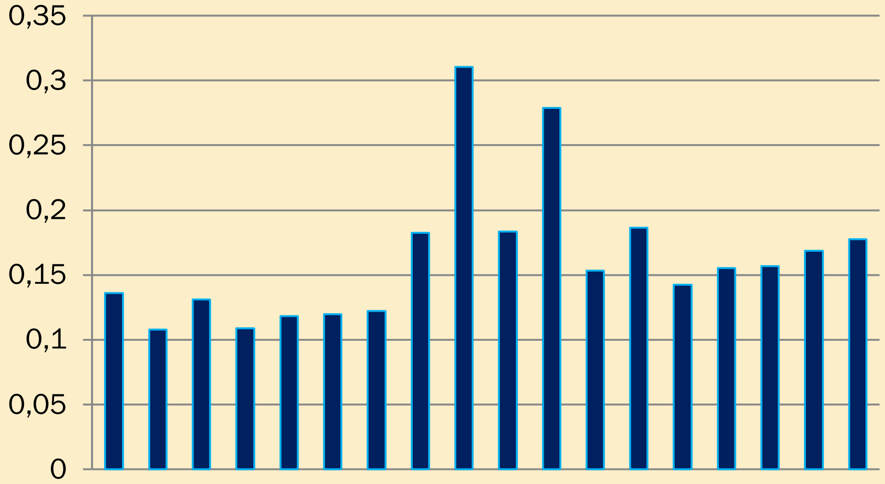
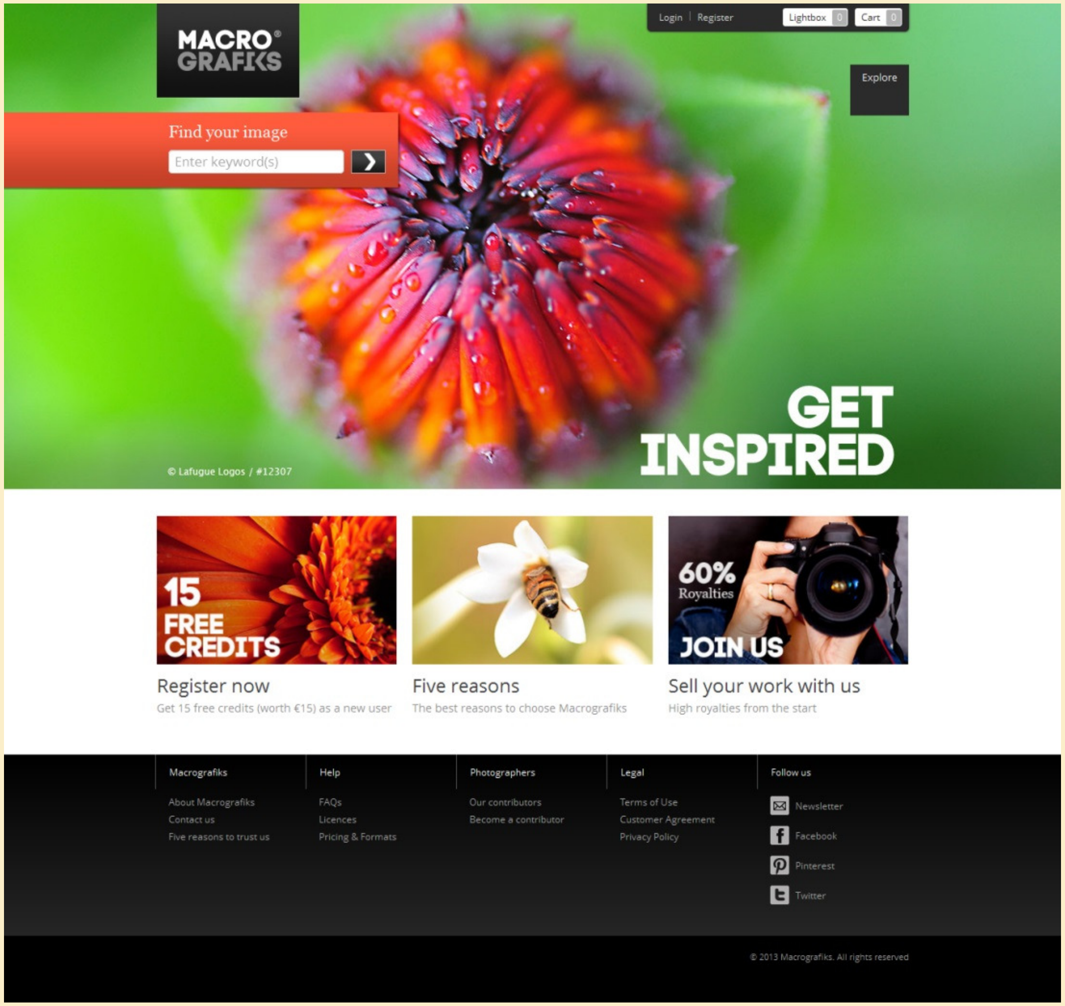


TAMURA FEATURES



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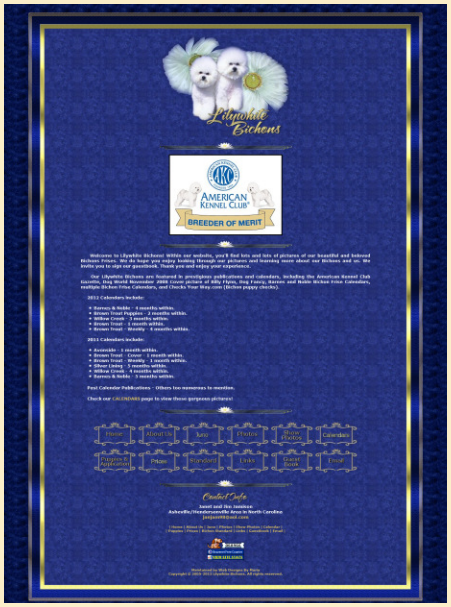

Lilywhite Bichons

AMERICAN KENNEL CLUB
BREEDER OF MERIT

Welcome to Lilywhite Bichons! Within our website, you'll find lots and lots of pictures of our beautiful and beloved Bichons Frises. We do hope you enjoy looking through our pictures and learning more about our Bichons and us. We invite you to sign our guestbook. Thank you and enjoy your experience.

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Puppies & Application | Prices | Standard | Links | Guest Book | Email

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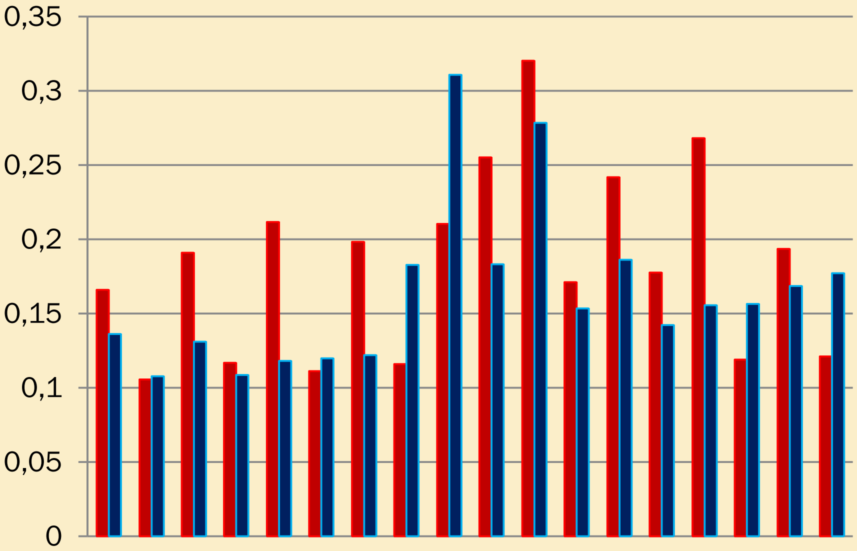
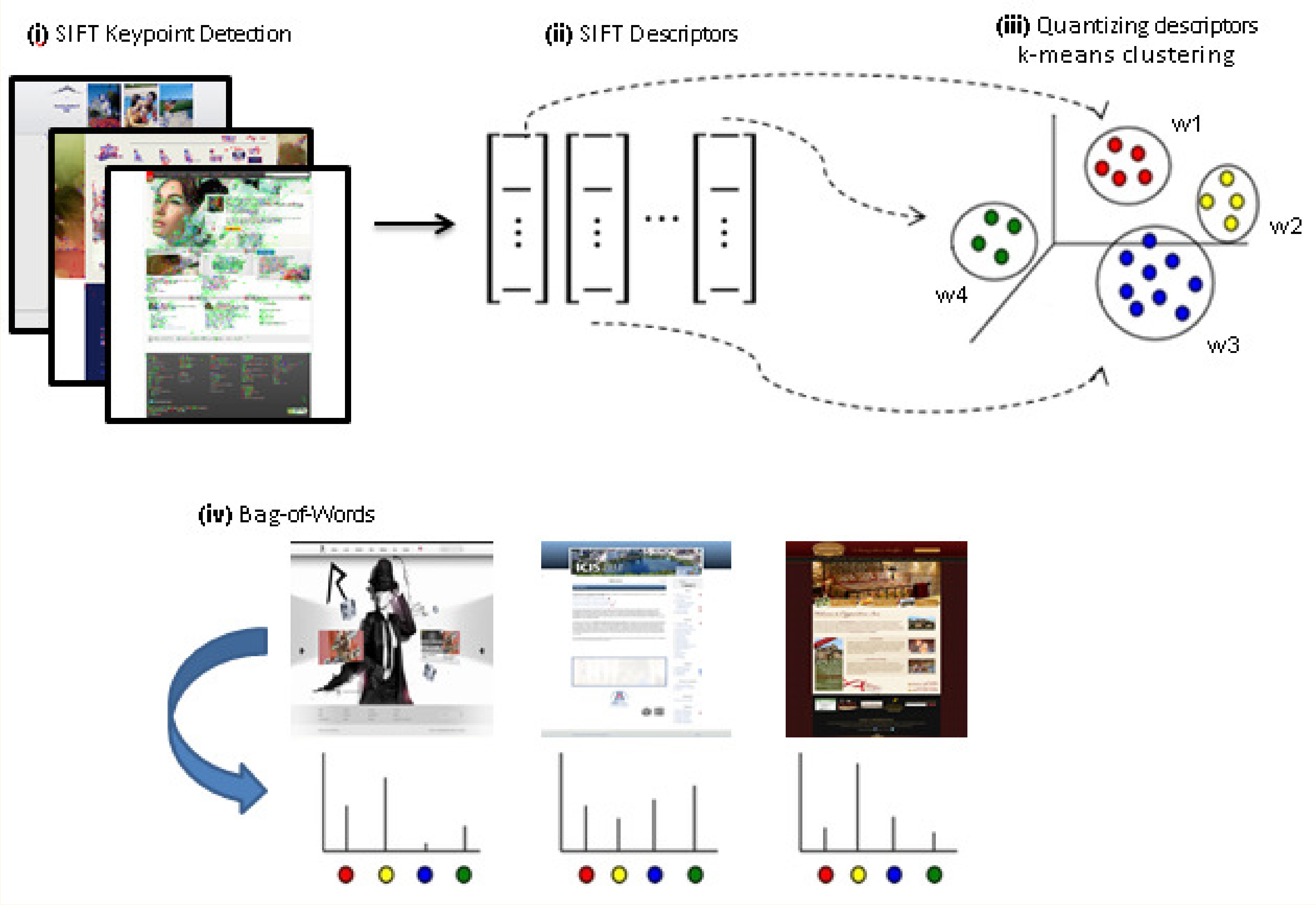


SIFT + BoW

- SIFT features – David Lowe [1999, 2003]
- They are:
  - scale and orientation invariant
  - local descriptors
  - slow to compute
  - keypoint descriptor is an orientation histogram
- Bag of Words (BoW) – we use Jialu Liu [2013]
  - All keypoint descriptors are used to build a dictionary by grouping SIFT features in “visual words”.
  - A good trade-off between size and accuracy.

SIFT + BoW



(i) SIFT Keypoint Detection

(ii) SIFT Descriptors

(iii) Quantizing descriptors
k-means clustering

(iv) Bag-of-Words

SELECTION OF FEATURES

- Features are selected by their discriminative power.

- Chi Square criterion (χ^2)
  - it relies on maximizing the matching between observed and expected frequencies.

- Principal Component Analysis (PCA)
  - it relies on explaining the most variability of the sample

CLASSIFIERS

- Most representative classifiers were used in a supervised learning scheme:
  - Naïve Bayes
  - SVM
  - Decision Tree
  - AdaBoost

EXPERIMENTS

- 90 images for each class
- Images are renderings of landing web pages

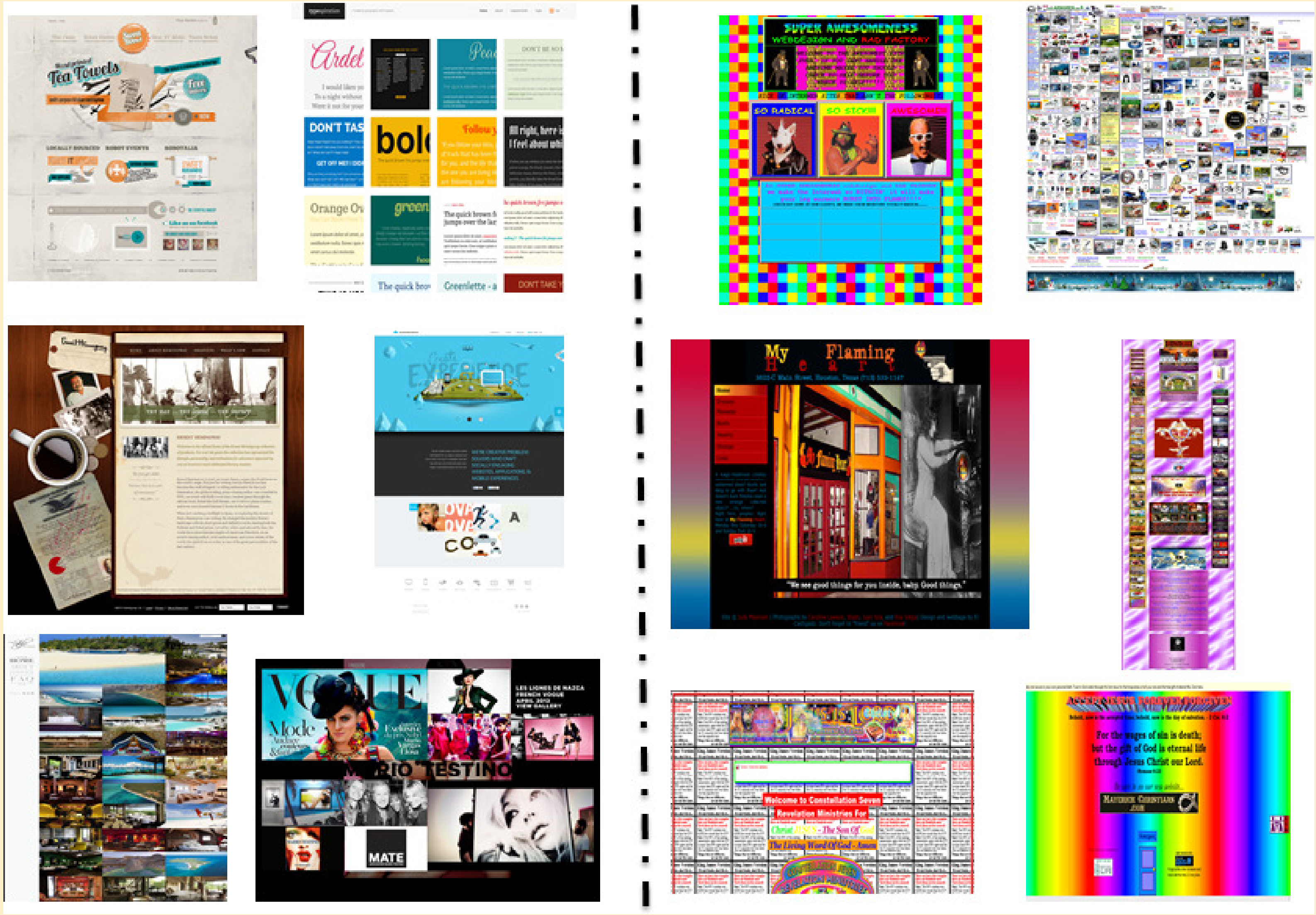
- 2 binary classifications
  - Aesthetic value (beautiful/ugly)
  - Design recency (new/old fashioned)
- 1 multi-class classification
  - Web page topic (4 classes and 8 classes)

AESTHETIC VALUE

- This is an inherently subjective variable
- Aesthetic notion is a valuable concept for marketing and psychology.

- Ugly pages are retrieved from blogs and public listings: [Andrade, 2009] and [Shuey, 2013].
- Beautiful pages are retrieved from designer blogs [Crazyleafdesign.com, 2013].

AESTHETIC VALUE EXAMPLES

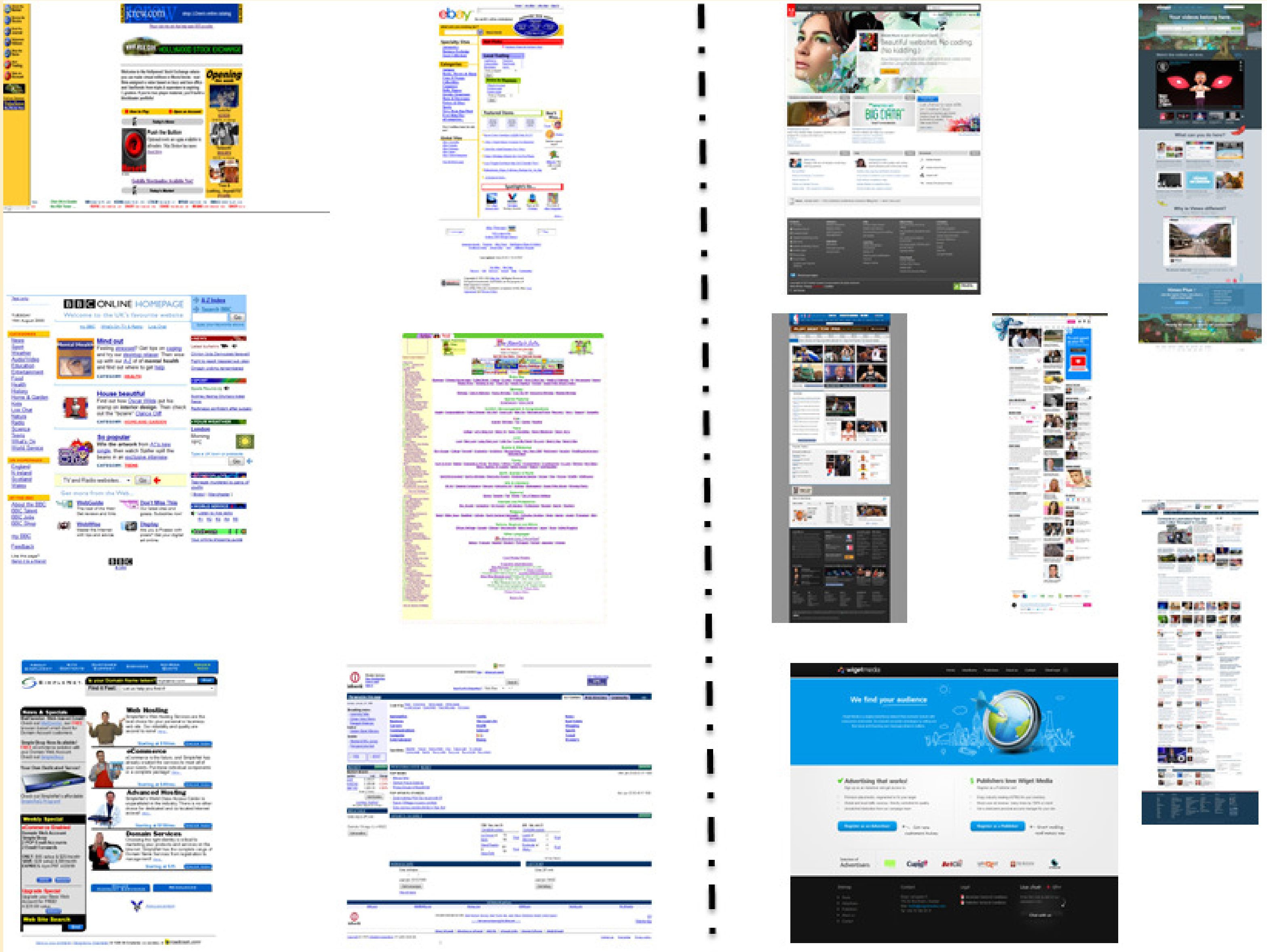

Tea Towels
Ardel
DON'T TAS
bold
green
Orange
The quick brown
Greenlette
EXPERIENCE
VOGUE
Mode
MARIO TESTINO
MATE
SUPER AWESOMENESS
WEBDESIGN AND RAD FACTORY
SO RADICAL
SO SICK!!!
AWESOME!
My Flaming Heart
"We see good things for you inside, baby Good things."
Welcome to Constellation Seven
Revelation Ministries For
Christ JESUS - The Son Of God
The Living Word Of God - Amen
For the wages of sin is death;
but the gift of God is eternal life
through Jesus Christ our Lord.

DESIGN RECENCY

- This is also an inherently subjective variable, however, design recency can be more rationalized.
- Design notion of recency is a highly valuable concept for marketing.

- Pages were retrieved by consulting the most popular pages from today (2013) and for 1999, using internet archives and alexa.com.

DESIGN RECENCY



WEB PAGE TOPIC

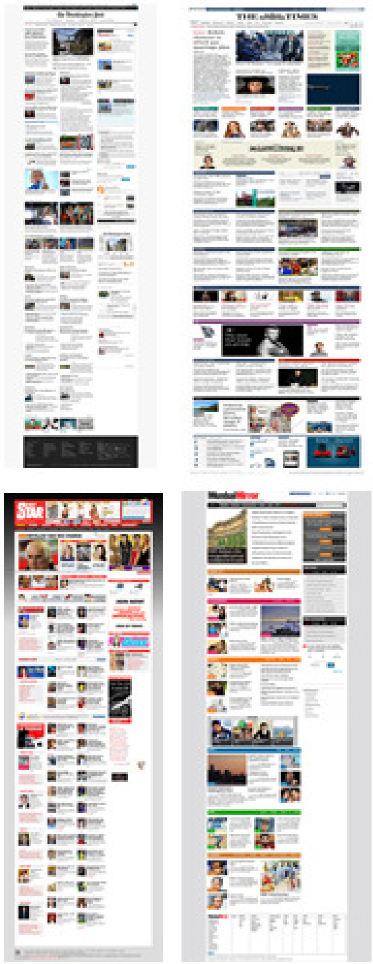
- Topic is the main focus of web page classification.
- We started with 4 classes (inspired in [Boer et al., 2010]):
  - Newspapers
  - Hotels
  - Celebrities
  - Conferences

WEB PAGE TOPIC

- We then added 4 additional ones:
  - Classified advertisements
  - Social networks
  - Gaming
  - Video-sharing

- These 8 classes represent a big majority of all web pages. They are, however, not a systematic study on the topic.

WEB PAGE TOPIC EXAMPLES



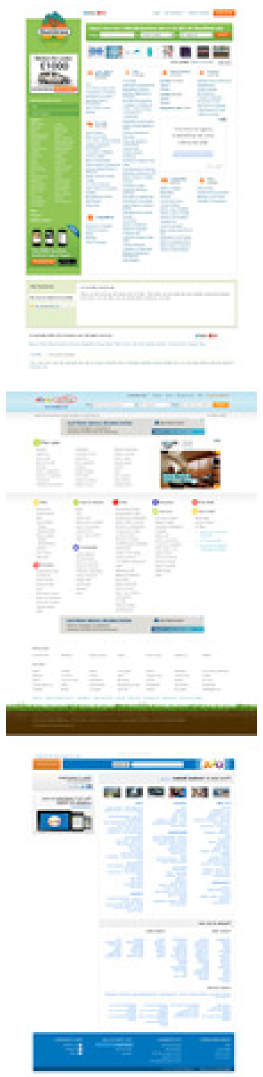
Newspapers

Conferences

Hotels

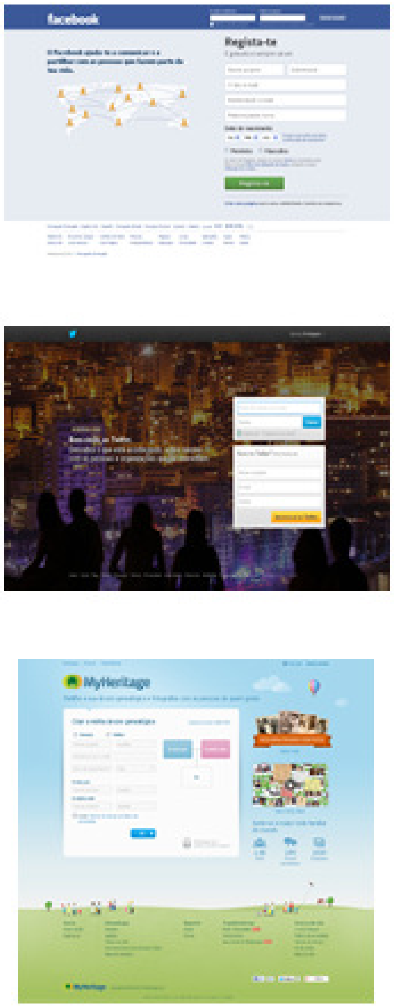
Celebrities

WEB PAGE TOPIC EXAMPLES

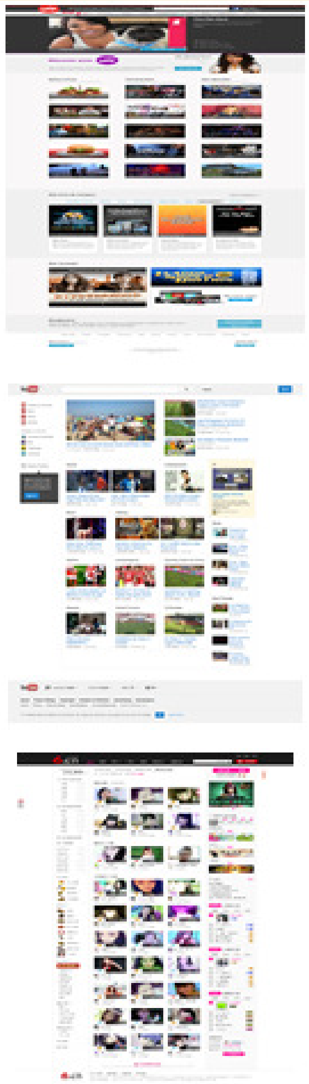


Classifieds

Gaming



Social Networks



Video Sharing

RESULTS – AESTHETIC VALUE

	Naïve Bayes	SVM	Decision Tree	AdaBoost
Color Histogram	65%	85%	70%	85%
Low-level (50%)	75%	65%	80%	80%
SIFT+BoW	80%	80%	75%	95%

- We observed that most of the features with higher discriminative power are collected from Color Histogram.

RESULTS – DESIGN RECENCY

	Naïve Bayes	SVM	Decision Tree	AdaBoost
Gabor only	85%	100%	95%	100%
Low-level (5%)	100%	85%	90%	90%
SIFT+BoW	90%	90%	90%	90%

- We observed that for design recency, Gabor features have the higher discriminative power. Gabor features are intrinsically related to texture and spatial frequency.

RESULTS – WEB PAGE TOPIC

4 CLASSES

	Naïve Bayes	SVM	Decision Tree	AdaBoost
Low-level	62,5%	72,5%	72,5%	70%
SIFT+BoW	70%	75%	82,5%	72,5%

- SIFT+BoW always improved results.
- Higher discriminative power is related with Tamura and Gabor features (texture, coarseness, frequency, ...).

RESULTS – WEB PAGE TOPIC

4 CLASSES

Predict\Actual	Newspapers	Conferences	Celebrities	Hotel
Newspapers	10	0	1	0
Conferences	0	9	0	1
Celebrities	0	1	7	2
Hotel	0	0	2	7

RESULTS WEB PAGE TOPIC

8 CLASSES

	Naïve Bayes	SVM	Decision Tree	AdaBoost
SIFT+BoW	**64%**	59%	49%	39%

Prd\Act	Newsp.	Conf.	Celeb.	Hotel	Classif.	Gaming	Social	Video
Newsp.	**9**	1	1	1	4	0	1	2
Conf.	1	**8**	0	0	0	0	0	0
Celeb.	0	0	**4**	2	0	3	2	1
Hotel	0	0	0	**7**	0	1	1	1
Classif.	0	0	1	0	**6**	1	0	0
Gaming	0	0	4	0	0	**5**	2	0
Social	0	1	0	0	0	0	**2**	0
Video	0	0	0	0	0	0	2	**6**

MAIN CONCLUSIONS

- Subjective variables are simpler to classify and features like color and edges have high discriminative power.
  - Beautiful web pages tend to have more soft colors
  - New fashioned web pages tend to have lower visual frequency and much lower density on information

- SIFT+BOW features are slower to compute and add only a small amount of discrimination.

MAIN CONCLUSIONS

- Web page topic is harder to classify using only visual content
- However, accuracies of 80% are generally achieved.
- SIFT+BoW features are able to enhance significantly the accuracy.

- A bigger database is, however, needed to achieve better results in classification of the topic.

CONCLUSION

- Visual content of web pages effectively has rich content to the task of classification in several variables: aesthetic value, design recency and web page topic.

- Classification using Visual content can be added to the traditional classification relying only on text to achieve a much powerful crawler, boosting its accuracy.

FUTURE DIRECTIONS

- Integrate visual content with text (html, url, ...) to achieve that powerful classifier.
- Explore the semantic content of the visual content, by segmenting the page and analyzing items separately (images, banners, flash, advertisement, ...).
- Analyze group differences of subjective variables and their implications on marketing (gender, age, culture, income rank, ...).

APPLICATIONS

- Building of an advice system to assist in the design of web pages.

- Marketing: targeting of consumers, campaign design, …

- Content filtering and content scoring, including ranking of web sites based on user profile.

- Recommender systems for product web pages.

- Sentiment and emotional implications of web pages.

THANK YOU

- Some questions?

- I am searching for partners for H2020!

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