

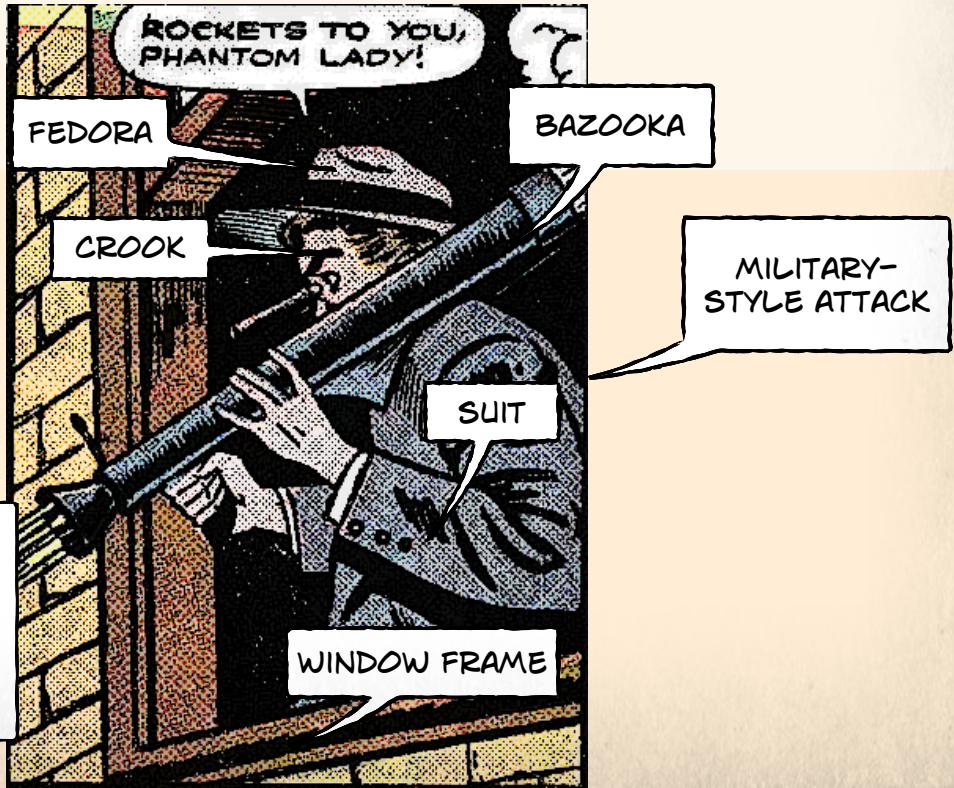
IMAGE CLASSIFICATION

USING

TEI/CBM

6

ARTIFICIAL INTELLIGENCE



VISUAL RECOGNITION IN COMIC BOOKS USUALLY MEANS THAT THE READER HAS "CLASSIFIED" DRAWN OBJECTS ("ENTITIES") AS MEMBERS OF A CLASS OF OBJECTS, OR CHARACTERS, OR SETTINGS.

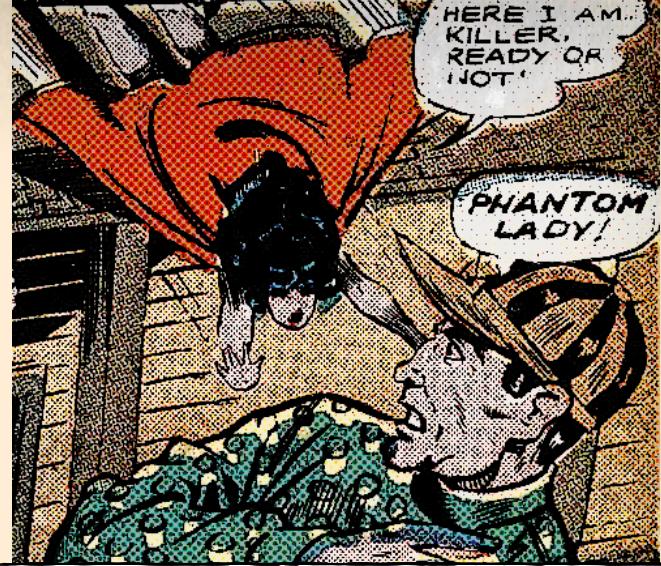
Classes	Score
comic book	0.83
magazine	0.91
news magazine	0.50
bottle green color	0.81

Type Hierarchy

/magazine/comic book

/magazine/news magazine

THE CLASSIFICATION CAN BE THAT OF A FORM: "COMIC BOOK" "GRAPHIC NOVEL" "LINE DRAWING" OR GENRE: "SUPERHERO COMIC" "CRIME COMIC" "ROMANCE COMIC."



OR THEY CAN BE IDENTIFIED AS NAMED ENTITIES, LIKE PHANTOM LADY, THE BATMOBILE, PLANET KRYPTON.

VISUAL
CLASSIFICATION CAN WORK AT THE CONCEPTUAL LEVEL, SUCH AS CONVENTIONAL MARKERS FOR HUMAN RACE, GENDER, AGE, SOCIO-ECONOMIC STATUS, OR ENVIRONMENT AND EVENT SETTING.



A USEFUL WAY TO THINK ABOUT COMIC BOOK IMAGE RECOGNITION, HUMAN OR MACHINE, IS A HIERARCHY:

- 1) IDENTIFICATION OF WORK ("SOURCE")
- 2) FORM OR GENRE CLASSIFICATION
- 3) ENTITY CLASSIFICATION
- 4) CONCEPT CLASSIFICATION

IDENTIFICATION OF A PARTICULAR COMIC WORK OPERATES AT THE LEVEL OF INTELLECTUAL PROPERTY RIGHTS: STAR WARS 2015 #033, PHANTOM LADY #17 (1948), BATMAN: THE DARK KNIGHT RETURNS.



1) WORK
IDENTIFICATION

THE TEIHEADER
SECTION IN THE TEI
DOCUMENT SUPPORTS
"SOURCE"
IDENTIFICATION AT ANY
LEVEL OF EXACTITUDE:

10¢

```
<tei:fileDesc>
  <tei:titleStmt>
    <!-- tei:title: name of the comic book or graphic novel -->
    <tei:title>Phantom Lady, Vol. 17, April 1948</tei:title>
    <!-- tei:author: repeatable field for any creator of the content, whether writer, colorist, penciller, etc, specified using a "role" attribute -->
    <tei:author role="writer">Ruth Ann Roche</tei:author>
    <tei:author role="illustrator">Clarence Matthew Baker</tei:author>
    <tei:editor>[If the comic or graphic novel has an editor, use this tag to record the name]</tei:editor>
    <tei:respStmt>
      <!-- party responsible for the creation of the TEI file -->
      <tei:resp>Encoded in TEI/CBML by</tei:resp>
      <tei:persName xml:id="SWH">Steven W. Holloway</tei:persName>
    </tei:respStmt>

    <tei:author role="penciller">
      <tei:persName>
        <tei:forename>Rudy</tei:forename>
        <tei:surname>Palais</tei:surname>
      </tei:persName>
      <tei:note>For "Evelyn Ellis".  
Source:<a href="https://www.comics.org/issue/6644">https://www.comics.org/issue/6644</a></tei:note>
    </tei:author>
    <tei:imprint>
      <tei:pubPlace>Wilkes-Barre, Pennsylvania</tei:pubPlace>
      <tei:publisher>Fox Feature Syndicate, Inc.</tei:publisher>
      <tei:date>April 1948</tei:date>
    </tei:imprint>
    <tei:biblScope>36 pages</tei:biblScope>
    <tei:biblScope type="vol">17</tei:biblScope>
    <tei:biblScope type="issue">April</tei:biblScope>
    <tei:biblScope type="pp">36</tei:biblScope>
```

YOU ARE PAINFULLY
FAMILIAR WITH THIS IN
THE GUISE OF CORRECT
ACADEMIC CITATION OF
SOURCES!

1) WORK
IDENTIFICATION

SEARCH ENGINE REVERSE-
IMAGE LOOKUPS CAN
SOMETIMES IDENTIFY COMIC
BOOKS CORRECTLY, AS
WITNESS THIS BING SEARCH:

Phantom Lady
Comics

Phantom Lady
Cosplay

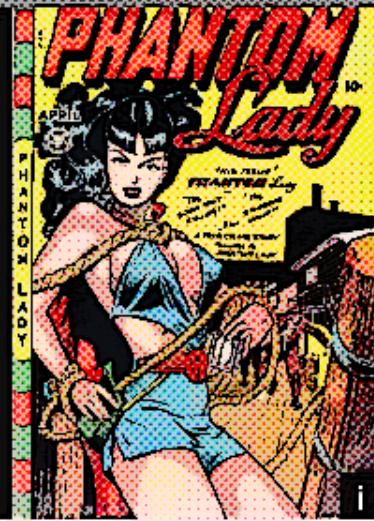
Phantom Lady
Costume

Miss America
DC Comics

Cyborg Woman
Comic

Amalgam Comics Giant
Girl Adventures

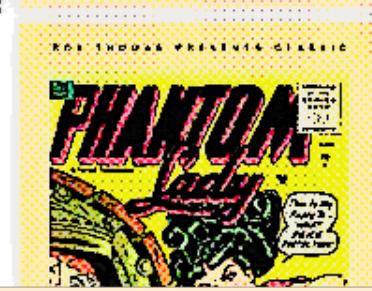
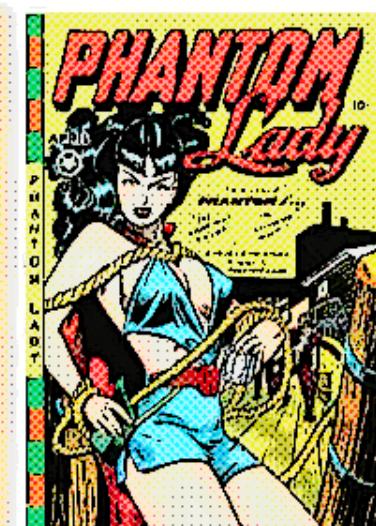
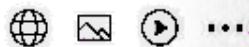
Garg...
Comics



❖ Phantom Lady Comics

... now all of the Fox Phantom Lady comics have been
reprinted, and are also accessible on the web.

— marvelmasterworksfansite.yuku.com



1) WORK IDENTIFICATION

GOOGLE CLOUD VISION API, IF "WEB" SERVICE IS SPECIFIED, AUTOMATICALLY PERFORMS REVERSE-IMAGE LOOKUPS USING GOOGLE IMAGES:

Logos

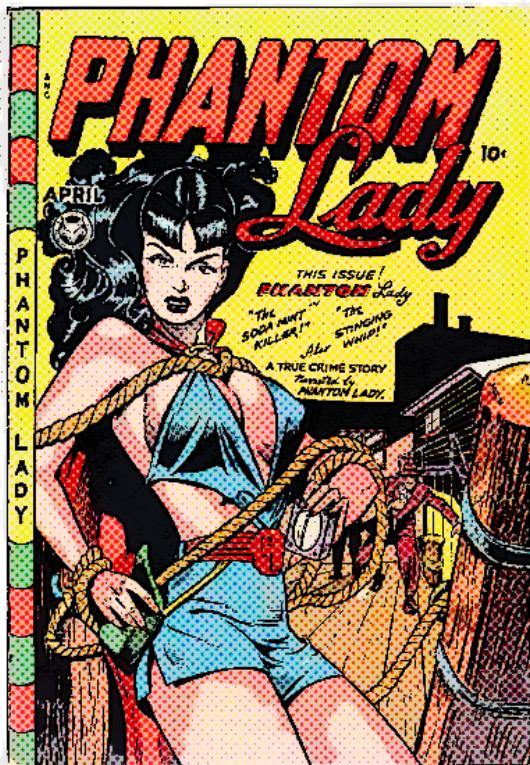
Web

Text

Document

Properties

S



Phantom_Lady_01/-01.jpg

Pages with Matched Images

[comics.ha.com/...](#)
[majorspoilers.com/...](#)
[comicbookplus.com/...](#)
[comicvine.gamespot.com/...](#)
[comicvine.gamespot.com/...](#)
[www.ebay.com/...](#)
[www.coverbrowser.com/...](#)
[www.ebay.com/...](#)
[www.ha.com/...](#)
[enypdrinon.blogspot.com/...](#)
[www.pinterest.com/...](#)
[steemit.com/...](#)
[www.wikiwand.com/...](#)
[www.amazon.com/...](#)
[www.mycomicshop.com/...](#)
[cbldf.org/...](#)
[www.zazzle.com/...](#)
[www.ebay.ca/...](#)

THE AI TOOLS IBM WATSON VISUAL RECOGNITION SERVICE OR CLARIFAI API, OUT-OF-THE-BOX, DO NOT ATTEMPT TO IDENTIFY IMAGES AS PARTS OF SPECIFIC WORKS. THEY WORK INSTEAD AT THE LEVEL OF IMAGE CLASSIFICATION.

2) FORM CLASSIFICATION

GOOGLE VISION API, WATSON VISUAL RECOGNITION API, CLARIFAI API AND THE REVERSE IMAGE LOOKUPS SOMETIMES SUCCESSFULLY IDENTIFY IMAGES AS "COMIC BOOKS", SOMETIMES NOT!



Phantom_Lady_01/-01.jpg

Web Entities

Comics	1.34123
Seduction of the Innocent	0.76502
Phantom Lady	0.70943
Comic book	0.70801
Superhero	0.61339
Comics artist	0.39351
Hero	0.39155
The Phantom	0.37934
Female	0.37842
Good girl art	0.37644
Fox Feature Syndicate	0.35403
Cartoon	0.34711
Bondage	0.33766
Image	0.32789
Matt Baker	0.08837

Pages with Matched Images

2) FORM CLASSIFICATION

CLASSIFICATION BY FORM OR GENRE CAN BE EXPRESSED EXPLICITLY IN THE TEIHEADER SECTION:

```
<tei:classDecl>
  <tei:taxonomy>
    <tei:bibl>Library of Congress Thesaurus for Graphic Materials</tei:bibl>
    <tei:category>
      <tei:catDesc>Comic books</tei:catDesc>
    </tei:category>
  </tei:taxonomy>
</tei:classDecl>
</tei:encodingDesc>
```

3) ENTITY CLASSIFICATION

MOVING DOWN THE LADDER FROM FORM TO ENTITY CLASSIFICATION, HUMAN FACES ARE TREATED DIFFERENTLY! GOOGLE, WATSON AND CLARIFAI APIs WILL ALL TRY TO TAG HUMAN FACES.

Faces

Labels

Text

Document

Properties



GOOGLE VISION API DOCUMENTATION EXPRESSLY DECLares THAT IT WILL NOT PERFORM FACIAL RECOGNITION OUT-OF-THE-BOX, THAT IS, POSITIVELY ASSOCIATE A NAME WITH A HUMAN FACE.

Joy		Very Unlikely
Sorrow		Very Unlikely
Anger		Very Unlikely
Surprise		Very Unlikely
Exposed		Very Unlikely
Blurred		Very Unlikely
Headwear		Very Likely

Roll: 8° Tilt: -3° Pan: 4°

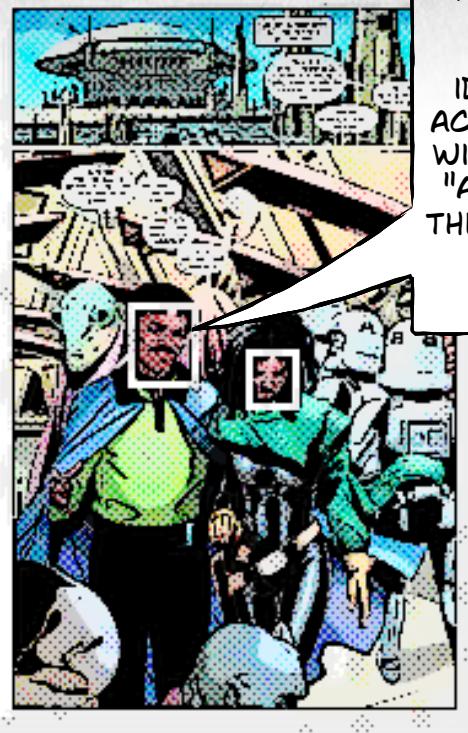
Confidence

56%

3) ENTITY CLASSIFICATION

WATSON AND CLARIFAI VISION APIs WILL PERFORM WHAT THEY CALL "CELEBRITY MATCH" IDENTIFICATIONS.

ALL OF THE FOR-PAY API SERVICES CAN BE TRAINED TO RECOGNIZE PARTICULAR HUMAN FACES, HOWEVER, IF THAT IS HOW YOU WISH TO USE THE TECHNOLOGY...



FOR EXAMPLE, WATSON POSITIVELY IDENTIFIED THE ACTOR BILLY DEE WILLIAMS AS THE "ARCHETYPE" OF THIS STAR WARS COMIC BOOK DRAWING.

JSON

JSON

Classes	Score	Faces	Score
comic book	0.83	age 25 - 34	0.37
magazine	0.91	male	0.98
news magazine	0.50	Celebrity Match	
bottle green color	0.81	Billy Dee Williams	0.62
Type Hierarchy		people > celebrities > billy dee williams	
/magazine/comic book		age 18 - 24	0.70
/magazine/news magazine		female	0.98

Did We Wow You? Yes No

Did We Wow You? Yes No

3) ENTITY CLASSIFICATION

BRIEF BIOGRAPHIES OF COMIC BOOK CHARACTERS, THE DRAMATIS PERSONAE, CAN BE "SKETCHED" IN THE TEI TEXT SECTION:

```
<tei:person xml:id="joe">
  <tei:persName>
    <tei:name>Joe</tei:name>
  </tei:persName>
  <tei:note>wears grey fedora with leopard-print band, matching necktie and handkerchief, green suit, clean-shaven // Tony and Joe were confused by the comic book letterer</tei:note>
  <tei:affiliation>member of Ellis Gang</tei:affiliation>
  <tei:occupation>criminal</tei:occupation>
  <tei:sex value="1">male</tei:sex>
  <tei:nationality>American</tei:nationality>
</tei:person>
<tei:person xml:id="pete">
  <tei:persName>
    <tei:name>Pete</tei:name>
  </tei:persName>
  <tei:note>wears brown fedora with black band, light blue or grey suit, clean-shaven</tei:note>
  <tei:affiliation>member of Ellis Gang</tei:affiliation>
  <tei:occupation>criminal</tei:occupation>
  <tei:sex value="1">male</tei:sex>
  <tei:nationality>American</tei:nationality>
</tei:person>
<tei:person xml:id="sheriff">
  <tei:occupation>sheriff</tei:occupation>
  <tei:sex value="1">male</tei:sex>
  <tei:nationality>American</tei:nationality>
</tei:person>
</tei:listPerson>

<cbml:panel n="1.10.2" ana="#action-to-action" characters="#phantom_lady #soda_mint_killer">
  <tei:note resp="#SWH" type="panelDesc">The Soda Mint Killer lobs the grenade at PL as he leaps down the basement stairs.</tei:note>
  <tei:note type="gender-markers" ana="#soda_mint_killer #short-hair #suit"/>
  <tei:note type="gender-markers" ana="#phantom_lady #long-hair"/>
  <tei:note type="uniforms" subtype="crime-fighting-hero"/>
  <tei:note type="weapon-tech" subtype="hand-grenade"/>
  <cbml:balloon type="speech" ana="#dialogue" who="#soda_mint_killer">COMING AT YOU, CUTIE! TOO BAD YOU HAVE TO CROAK SO YOUNG!</cbml:balloon>
  <cbml:balloon type="speech" ana="#dialogue" who="#phantom_lady">OH-OH!</cbml:balloon>
</cbml:panel>
```

WHEREAS THE PRESENCE OF PARTICULAR CHARACTERS IN A COMIC BOOK PANEL CAN BE NOTED IN SEVERAL WAYS, USING CBML ENCODING:

3) ENTITY CLASSIFICATION



THE AI APIS LABEL ("CLASSIFY") NON-CHARACTER COMIC BOOK ENTITIES WITH WILDLY VARYING DEGREES OF SUCCESS! CLARIFAI API:

OUT-OF-THE-BOX CLARIFAI WILL CLASSIFY IMAGES BY "GENERAL", FACE, NSFW, COLOR, WEDDING, TRAVEL, CELEBRITY, LOGO, FOOD, APPAREL, AND "MODERATION" (VIOLENCE OR OBSCENITY).

FEB 2017 OWNERS OF IMAGE



Phantom_Lady_01/-01.jpg

PREDICTED CONCEPT	PROBABILITY
horror	0.989
Halloween	0.988
portrait	0.988
people	0.978
art	0.973
vicious	0.965
skittish	0.961
costume	0.950
mystery	0.949
illustration	0.947
fear	0.946
face	0.932

Comics	1.34123
Seduction of the Innocent	0.76502
Phantom Lady	0.70943
Comic book	0.70801
Superhero	0.61339
Comics artist	0.39351
Hero	0.39155
The Phantom	0.37934
Female	0.37842
Good girl art	0.37644
Fox Feature Syndicate	0.35403
Cartoon	0.34711
Bondage	0.33766
Image	0.32789
Matt Baker	0.08837

Pages with Matched Images

3) ENTITY CLASSIFICATION

COMIC BOOK VISUAL ENTITIES OTHER THAN ACTORS/CHARACTERS CAN BE "MARKED" IN A VARIETY OF WAYS USING TEI:

PROSE DESCRIPTION OF THE CONTENTS OF THE PANEL

```
<cbml:panel n="#soda_mint_killer">
  <tei:note resp="#SWH" type="panelDesc">The Soda Mint Killer lobs the grenade
  UNIFORMS, USING A ps down the basement stairs.</tei:note>
  DEDICATED NOTE FIELD "gender-markers" ana="#soda_mint_killer #short-hair #suit"/>
  "gender-markers" ana="#phantom_lady #long-hai
  <tei:note type="uniforms" subtype="crime-fighting-hero"/>
  <tei:note type="weapon-tech" subtype="hand-grenade"/>
  <cbml:balloon type="speech" ana="#dialogue" who="#soda_mint_killer">COMING AT
  YOU, CUTIE! TOO BAD YOU HAVE TO CROAK SO YOUNG!</cbml:balloon>
  <cbml:balloon type="speech" ana="#dialogue"
  who="#phantom_lady">OH-OH!</cbml:balloon>
</cbml:panel>
```

IF A VISUAL ENTITY OR CONCEPT IN A COMIC BOOK CAN BE OBJECTIVELY LABELED, IT CAN BE ENTERED INTO A TEI NOTE FIELD.

YOU ARE IN COMPLETE CONTROL OF THE CLASSIFICATION GRANULARITY!

aracters="#phantom_lady

WEAPONS

SPEECH BALLOONS, DESCRIBING KIND OF SPEECH, WHO MADE IT, AND THE TEXT ITSELF

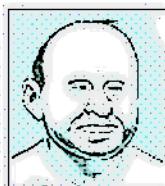


Image size:
344 × 396

No other sizes of this image found.

Best guess for this image: *facial expression*

REVERSE-IMAGE LOOKUPS USE MYSTERIOUS ALGORITHMS THAT ARE SENSITIZED TO BINARY GENDER MARKING, DRAWING STYLE, PIXEL COLORATION AND DISTRIBUTION, AND OTHERS...

Facial expression - Wikipedia

https://en.wikipedia.org/wiki/Facial_expression ▾

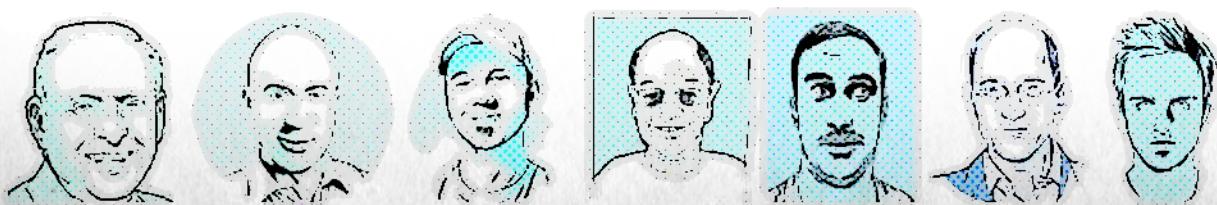
A **facial expression** is one or more motions or positions of the muscles beneath the skin of the face. According to one set of controversial theories, these ...

In pictures: Scientists map 21 facial expressions and emotions ...

www.telegraph.co.uk › News › Picture Galleries › How about that ▾

Researchers Ohio State University have discovered how we can convey a much wider range of emotions through **facial expressions** than previously thought.

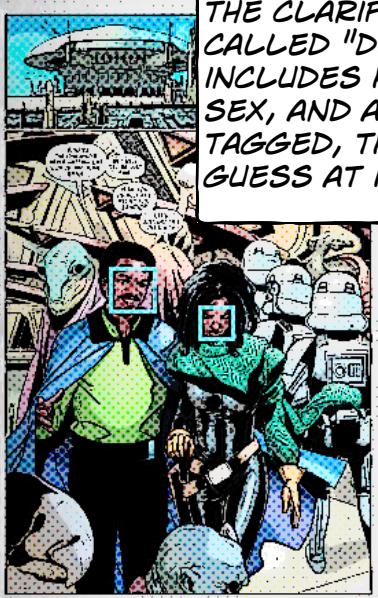
Visually similar images



4) CONCEPT CLASSIFICATION

COMIC BOOK IMAGE CLASSIFICATION AT THE LEVEL OF CONCEPT, TRAIT, FEATURE, OR MARKER, IS POTENTIALLY THE MOST INTERESTING AND CHALLENGING OF THESE.

THE AI IMAGE APIs ALL SEEM TO PRIVILEGE BINARY GENDER MARKERS. FOR EXAMPLE, ONE OF THE CLARIFAI API SERVICES IS CALLED "DEMOGRAPHICS." THIS INCLUDES HUMAN RACE, BINARY SEX, AND AGE. IF A HUMAN FACE IS TAGGED, THE AI WILL HAZARD A GUESS AT ITS "DEMOGRAPHICS."



FAILING A WORK-SOURCE IDENTIFICATION, THE GOOGLE REVERSE-IMAGE LOOKUP ABOVE CLEARLY PRIVILEGED (STEREOTYPICAL) MALE GENDER MARKERS. WHY?

THERE IS CLEARLY MARKET DEMAND FOR SUCH IMAGE CLASSIFICATION.

WERE YOU AWARE OF THIS HARD-CODED BIAS IN THE SEARCH ENGINES AND ENTERPRISE ARTIFICIAL INTELLIGENCE SERVICES?

GENDER APPEARANCE	PROBABILITY
feminine	0.820
masculine	0.180
ACE APPEARANCE	PROBABILITY
24	0.474
MULTICULTURAL APPEARANCE	PROBABILITY
black or african american	0.922
white	0.109
american indian or alaska native	0.018
asian	0.017
hispanic, latino, or spanish origin	0.012
middle eastern or north african	0.001

SUCCESSFUL COMIC BOOK ARTISTS MASTER STYLES THAT COMMUNICATE FORCEFULLY WITH AN AUDIENCE EMBEDDED A PARTICULAR CULTURAL MILIEU.

MATT BAKER, THE PHANTOM LADY #17 ILLUSTRATOR, HEAVILY INTEGRATED BINARY GENDER-MARKERS THROUGHOUT THE COMIC BOOK FOR A 1948 AUDIENCE. I COUNT NO FEWER THAN 50!

THE TEI STANDARD CAN HOST SUCH IMAGE CLASSIFICATION "MARKUP". BY ORGANIZING THEM IN AN "INTERPRETATIVE GROUP" LIST, THE TERMS FUNCTION AS A CONTROLLED VOCABULARY, MAKING IT EASY TO COMBINE QUERIES FOR ADVANCED ANALYSIS.

```
<tei:interpGrp type="gender-markers">
  <tei:desc>a structured note field for (binary) gender marking</tei:desc>
  4) CONCEPT CLASSIFICATION
    <tei:interp xml:id="cleavage"/>
    <tei:interp xml:id="prominent-breasts"/>
    <tei:interp xml:id="bare-legs"/>
    <tei:interp xml:id="bare-arms"/>
    <tei:interp xml:id="prominent-eyelashes"/>
    <tei:interp xml:id="bracelet"/>
    <tei:interp xml:id="earring"/>
    <tei:interp xml:id="necklace"/>
    <tei:interp xml:id="dress"/>
    <tei:interp xml:id="blouse"/>
    <tei:interp xml:id="skirt"/>
    <tei:interp xml:id="dress-gloves"/>
    <tei:interp xml:id="mink-coat"/>
    <tei:interp xml:id="lipstick"/>
    <tei:interp xml:id="dress-hat"/>
    <tei:interp xml:id="silk-stockings"/>
    <tei:interp xml:id="purse"/>
    <tei:interp xml:id="apron"/>
    <tei:interp xml:id="dishes"/>
    <tei:interp xml:id="mop"/>
    <tei:interp xml:id="long-hair"/>
```

DEDICATED NOTE
FIELDS FOR GENDER-
MARKER IMAGE
CLASSIFICATION



```
<cbml:panel n="1.3.5" na="#subject-to-subject" characters="#sandra_knight
#anonymous_criminal">
  <tei:note resp="#SWH" type="panelDesc">Sandra, attempting to wait on table,
  is grabbed around the waist by one of the Soda Mint Gang members</tei:note>
  <tei:note type="gender-markers" ana="#sandra_knight #dress #long-hair #apron
#high-heeled-shoes #bare-arms"/>
  <tei:note type="gender-markers" ana="#anonymous_criminal #fedora #suit #shirt
#short-hair #facial-hair"/>
  <cbml:balloon type="speech" ana="#dialogue" who="#sandra_knight">WHAT'LL IT
  BE? HEY...!</cbml:balloon>
  <cbml:balloon type="speech" ana="#dialogue" who="#anonymous_criminal">COME
  HERE, CUTIE! YOU LOOK GOOD ENOUGH TO EAT!</cbml:balloon>
  <tei:fw place="end" type="number">3</tei:fw>
</cbml:panel>
```

RESOURCES:

REVERSE-IMAGE LOOKUPS USING GOOGLE, BING AND YANDEX:

<http://www.reverse-image-search.com/>

AND SEE THE GUIDE FOR THIS COURSE, "REVERSE-IMAGE LOOKUPS."

ENTERPRISE ARTIFICIAL INTELLIGENCE VISUAL RECOGNITION DEMO SITES:

<https://cloud.google.com/vision/>

<https://visual-recognition-demo.mybluemix.net/>

<https://www.clarifai.com/demo>

TEI (TEXT ENCODING INITIATIVE):

<http://teibyexample.org/>

http://www.tei-c.org/release/doc/tei-p5-exemplars/html/tei_lite.doc.html

<http://www.ultraslavonic.info/intro-to-tei-header/>

CBML (COMIC BOOK MARKUP LANGUAGE):

Walsh, John A. "[Comic Book Markup Language.](#)"

AND SEE THE GUIDE FOR THIS COURSE, "TEI/CBML SCRIPTING"

IMAGE CLASSIFICATION:

[HTTPS://EN.WIKIPEDIA.ORG/WIKI/COMPUTER_VISION](https://en.wikipedia.org/wiki/Computer_vision)

[HTTPS://EN.WIKIPEDIA.ORG/WIKI/FACE_DETECTION](https://en.wikipedia.org/wiki/Face_detection)

[HTTPS://EN.WIKIPEDIA.ORG/WIKI/FACIAL_RECOGNITION_SYSTEM](https://en.wikipedia.org/wiki/Facial_recognition_system)

MATTHEW KAY, CYNTHIA MATUSZEK AND SEAN A. MUNSON, "UNEQUAL REPRESENTATION AND GENDER STEREOTYPES IN IMAGE SEARCH RESULTS FOR OCCUPATIONS," CHI 2015, PROCEEDINGS OF THE 33RD ANNUAL ACM CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS, ACM DIGITAL LIBRARY, PP. 3819-3828. [HTTPS://DL.ACM.ORG/CITATION.CFM?ID=2702520](https://dl.acm.org/citation.cfm?id=2702520)

Noble, S. U. (October, 2013). Google search: Hyper-visibility as a means of rendering black women and girls invisible. *InVisible Culture*: Issue 19.



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