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INTELLECTUAL PROPERTY FOR DYNAMIC ALGORITHMS AND DATA VISUALIZATION IN BIG DATA

UCLA

World Economic Forum's Global Agenda Council on the Intellectual Property System:
The Intersection of Big Data and Intellectual Property in the 21st Century.
University of Washington, Seattle, June 23, 2014

Outline

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- Big data **dynamic algorithms** require a **responsive patent system**.
- Innovation in **big data visualization algorithms** should be valued.

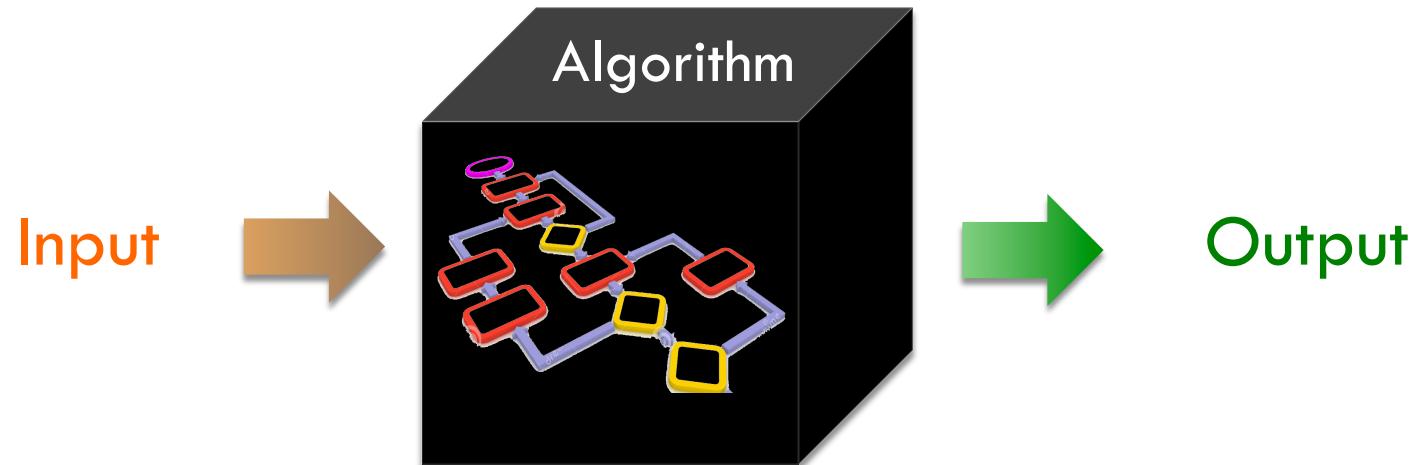


What is an algorithm?

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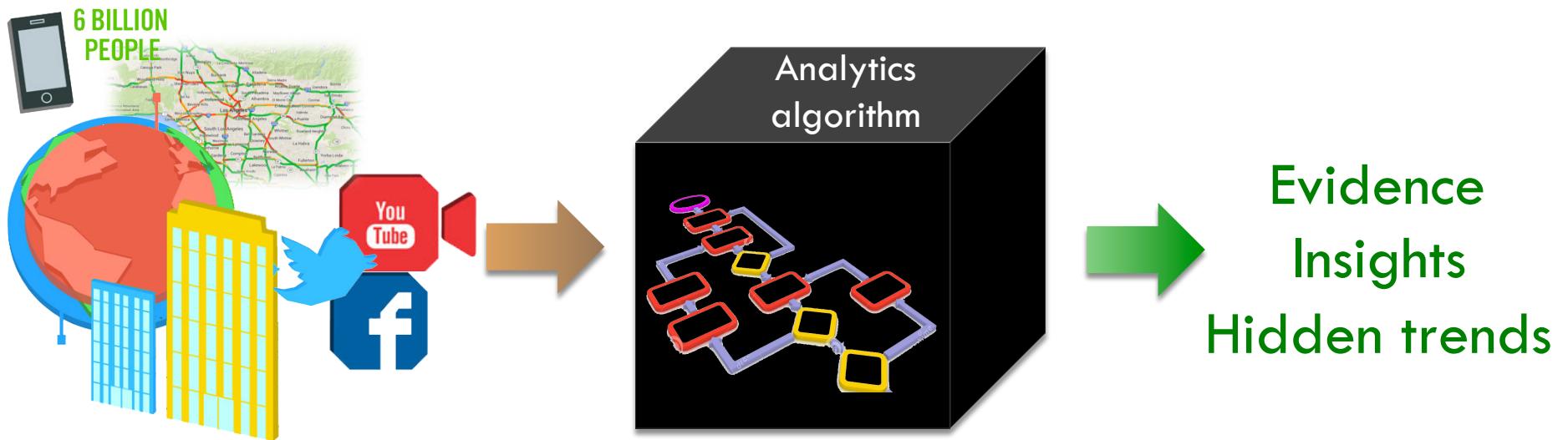
- **Algorithm:** a set of steps that are followed in order to solve a mathematical problem or to complete a computer process.

— Merriam-Webster dictionary



Analytics algorithms in big data

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- Key value because they reveal useful information
- Many algorithms are patented, including big data analytics algorithms...



Example of analytics algorithm in big data

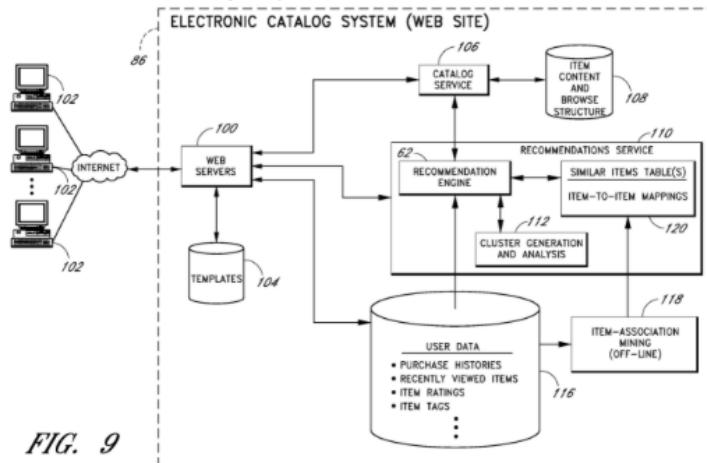
5

(12) United States Patent Chan et al.

(54) RECOMMENDATION SYSTEM WITH CLUSTER-BASED FILTERING OF RECOMMENDATIONS

(75) Inventors: **James D. Chan**, Seattle, WA (US);
Kushal Chakrabarti, Seattle, WA (US);
George M. Ionkov, Seattle, WA (US)

(73) Assignee: **Amazon Technologies, Inc.**, Reno, NV (US)



(10) Patent No.: **US 8,095,521 B2**
(45) Date of Patent: **Jan. 10, 2012**

1. A computer-implemented method, comprising:
maintaining a collection of items in association with a user,
said collection comprising items rated by the user;
applying a clustering algorithm to said collection of items
to subdivide the collection into multiple clusters,
wherein the clusters are generated based, at least in part,

A computer-implemented method, comprising:
therein, as representing an area in which the user lacks
interest, based at least partly on the user's ratings of items
therein, as representing an area of interest to the user;
obtaining a set of recommended items for the user from a
recommendation engine;

filtering the set of recommended items based, at least in
part, on distances between the recommended items and
one or more of said clusters of items, wherein filtering
the set of recommended items comprises filtering out at
least one item from the set of recommended items based
on a determination that the recommended item corre-
sponds to an area in which the user lacks interest, said

outputting the filtered set of recommended
items...

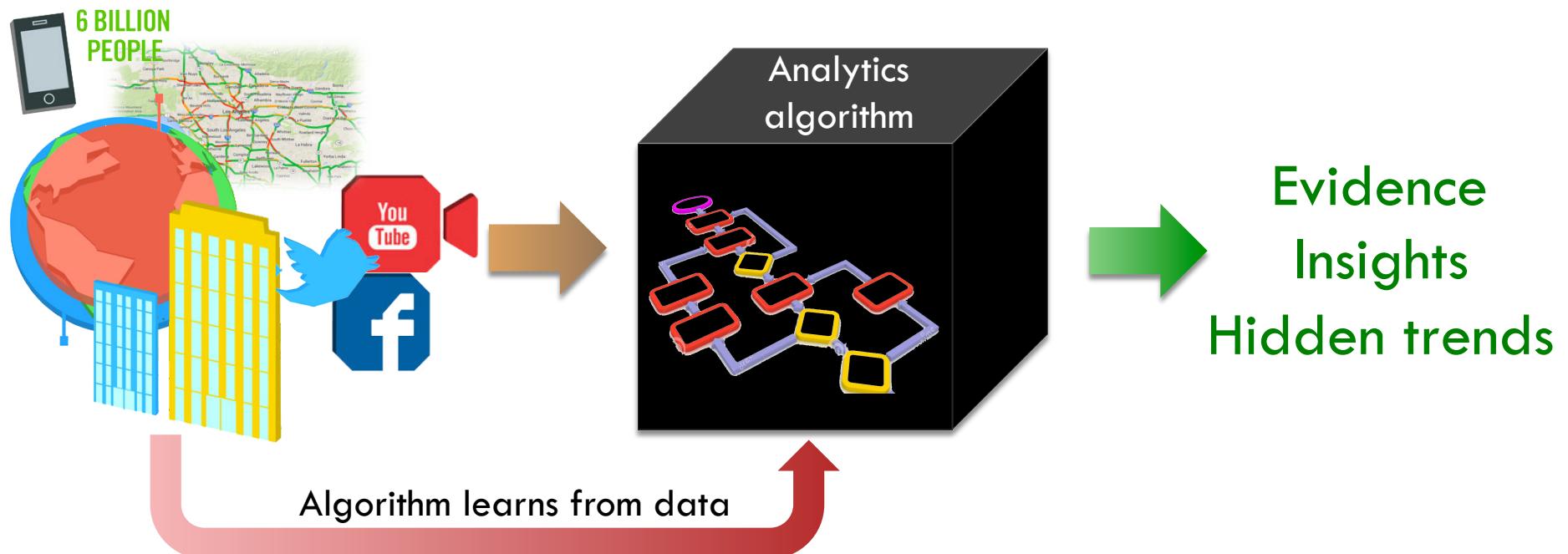
filtering performed automatically by a computer system;
and
outputting the filtered set of recommended items for pre-
sentation to the user.



Data-driven analytics algorithms

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- Formed by training data, many analytics algorithms are data-driven.



- Data-driven algorithms are patentable too...



Example of a data-driven analytics algorithm

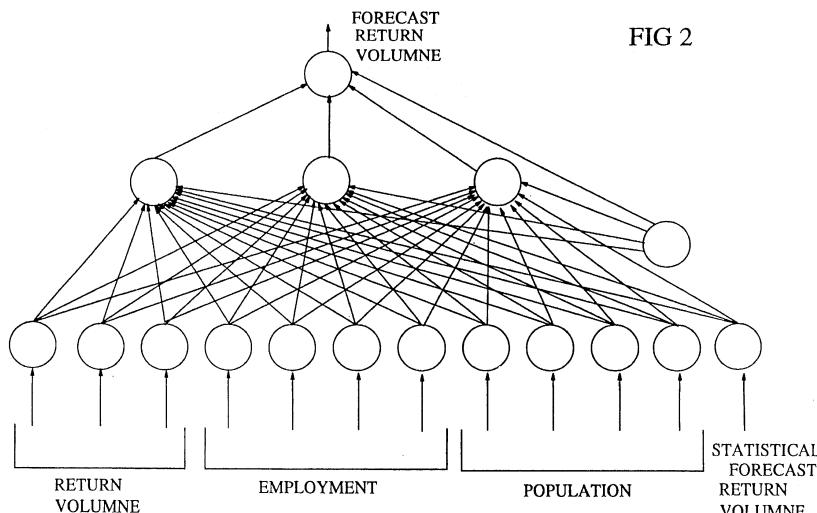
7

United States Patent [19]
Arbabi et al.

[54] **FORECASTING USING A NEURAL NETWORK AND A STATISTICAL FORECAST**

[75] Inventors: **Mansur Arbabi**, Bethesda; **Scott M. Fischthal**, Gaithersburg, both of Md.

[73] Assignee: **International Business Machines Corporation**, Armonk, N.Y.



[11] Patent Number: **5,461,699**
[45] Date of Patent: **Oct. 24, 1995**

1. A forecasting system comprising:
a statistical model means for producing a statistical forecast from a set of historical data;
a neural network comprising an input layer, a hidden layer, and an output layer, each layer comprising one or more nodes, a first node in the input layer being connected to each node in the hidden layer, each node in the hidden layer being connected to each node in the output layer, the output layer outputting a forecast, each connection between nodes having an associated weight; and
A forecasting system comprising
a neural network comprising ...
the neural a training means for ...
a training means for ...
the neural a training means for ...
a statistical forecast generated from the statistical model means and
the set of historical data for outputting the forecast.

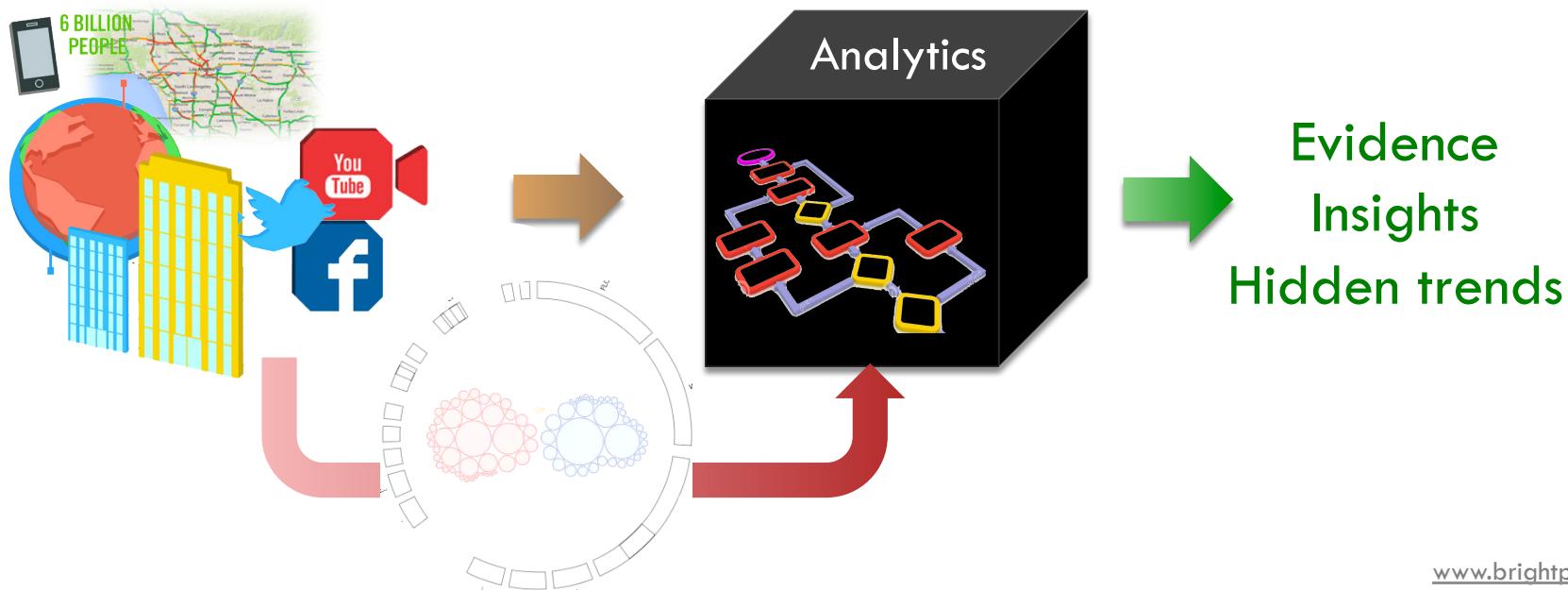


In dynamic analytics algorithms, training is an ongoing process

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- Ongoing training because of:
 - Velocity of data: data tsunami
 - Variety of data: new data types coming from new social media, new games, new smart home utilities, new apps, new wearable devices, ...



Challenges in describing dynamic analytics algorithms

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- Patent: typically a snapshot of an invention, freezes the algorithm in time
- Big data **dynamic** analytics algorithms are constantly evolving

- New challenges in writing and evaluating claims to capture this level of dynamism
- Needs to ensure that the patent system is responsive and balanced with respect to innovations in this area

Showing patentability is an issue

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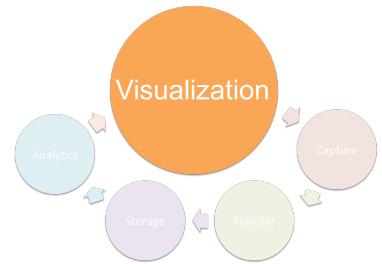
- Big data analytics algorithms may look like a computerization of abstract ideas.

— *A new issue*

Alice Corp. v. CLS Bank Int'l

- But, in reality, the implementation can be very complex, and certainly patent-eligible.

Big data visualization algorithms turns numbers into patterns



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Abortion: Revision history

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From year (and earlier): 2014 From month (and earlier): all Tag filter: [Go]

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External tools: Revision history statistics • Revision history search • Contributors • Edits by user # • Number of watchers • Page view statistics

(cur) difference from current version, (prev) difference from preceding version, m = minor edit, s = section edit, ~ = automatic edit summary

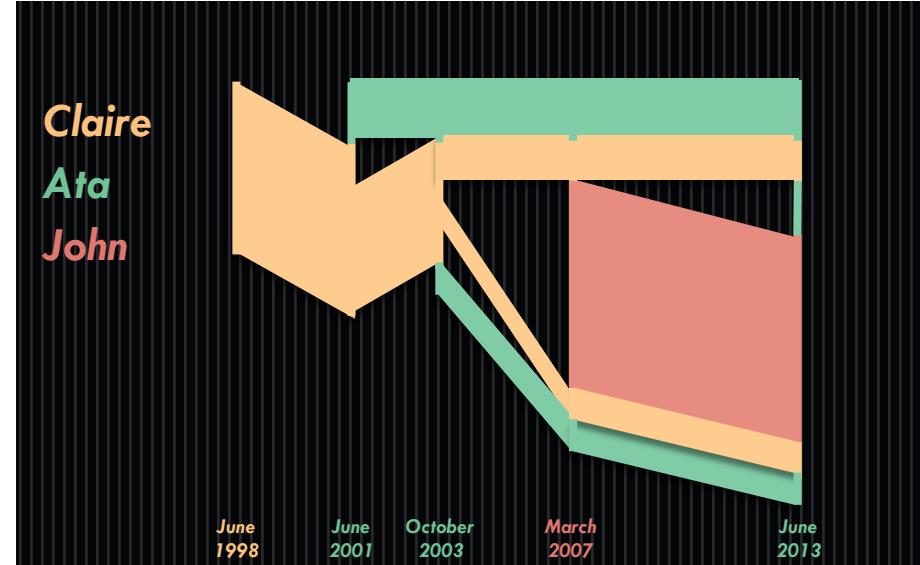
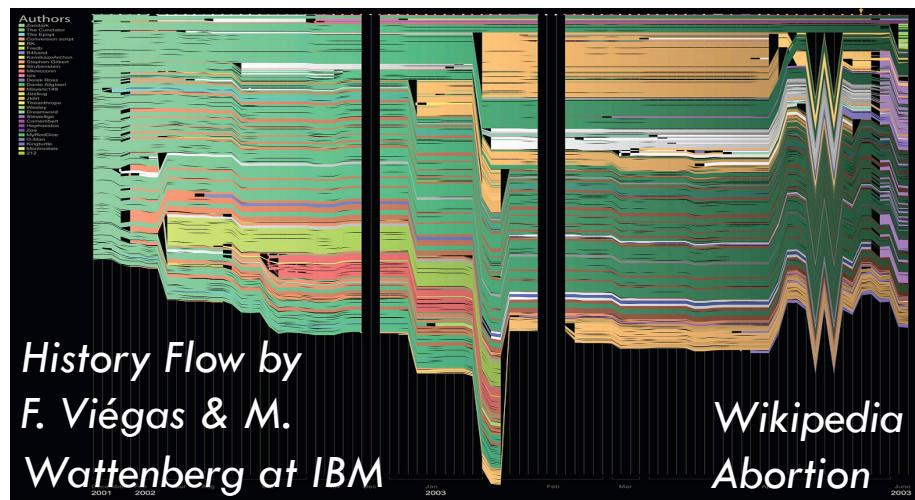
(newest | oldest) View (newer | 20 | older | 20) (20 | 50 | 100 | 250 | 500)

Changes since last revision

- (cur) (prev) 16:43, 24 October 2002 64.193.188 (talk) m .. (20,164 bytes) (+28) .. (abortion = genocide)
- (cur) (prev) 03:19, 20 October 2002 216.229.0.232 (talk) m .. (20,150 bytes) (-496)
- (cur) (prev) 11:17, 7 October 2002 Stephen Gilbert (talk | contribs) .. (19,772 bytes) (+64) .. (editing -Talk)
- (cur) (prev) 23:49, 20 September 2002 KamikazeKoch (talk | contribs) m .. (19,837 bytes) (-1) .. (spelling)
- (cur) (prev) 04:55, 7 August 2002 82.253.64.7 (talk) m .. (19,838 bytes) (+87)
- (cur) (prev) 08:53, 5 August 2002 Bähnd (talk | contribs) m .. (19,751 bytes) (+4) .. (Changed "a" to "an")
- (cur) (prev) 11:12, 30 July 2002 128.148.33.20 (talk) m .. (19,750 bytes) (+8)
- (cur) (prev) 03:24, 26 July 2002 213.253.40.70 (talk) .. (19,742 bytes) (+2) .. (controversial topic)
- (cur) (prev) 12:36, 10 July 2002 Fredo (talk | contribs) m .. (19,740 bytes) (+1) .. (Formatting fix)
- (cur) (prev) 10:06, 10 July 2002 PK (talk | contribs) .. (19,739 bytes) (+2,688) .. (Expanding religious views of abortion section)
- (cur) (prev) 02:45, 31 March 2002 82.98.138.3 (talk) m .. (17,471 bytes) (-2)
- (cur) (prev) 12:50, 28 February 2002 202.139.116.143 (talk) .. (17,472 bytes) (+199)
- (cur) (prev) 15:43, 25 February 2002 64.236.243.243 (talk) m .. (17,304 bytes) (-2)
- (cur) (prev) 15:34, 21 February 2002 Conversion script (talk) m .. (17,306 bytes) (+520) .. (Automated conversion)
- (cur) (prev) 17:09, 14 January 2002 165.155.128.0 (talk) m .. (16,788 bytes) (+429) .. (Adding info on Jewish view of abortion)
- (cur) (prev) 22:59, 23 December 2001 The Epopi (talk | contribs) m .. (16,357 bytes) (-17)
- (cur) (prev) 20:08, 23 December 2001 The Cundactor (talk | contribs) .. (16,374 bytes) (+45) .. ("Rewording a little meta-commentary")
- (cur) (prev) 18:19, 9 December 2001 Zundark (talk | contribs) m .. (16,419 bytes) (+160) .. (unnecessary > unnecessary)
- (cur) (prev) 00:35, 8 December 2001 Alan D (talk | contribs) .. (16,259 bytes) (+70,944) .. (linked "Intruterine cranial decompression" to existing "partial-birth abortion" link, common name for DandK, not DandE btw, it was established for mid-late term specifically)
- (cur) (prev) 21:03, 5 November 2000 200.191.188.0 (talk) m .. (16,234 bytes) (-70,669)

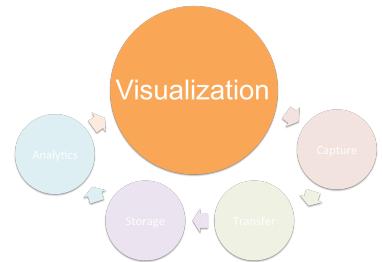
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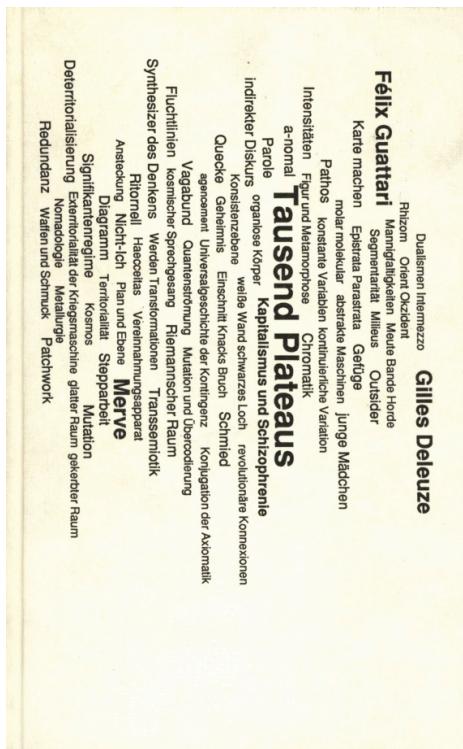


Another case study: Tag Cloud

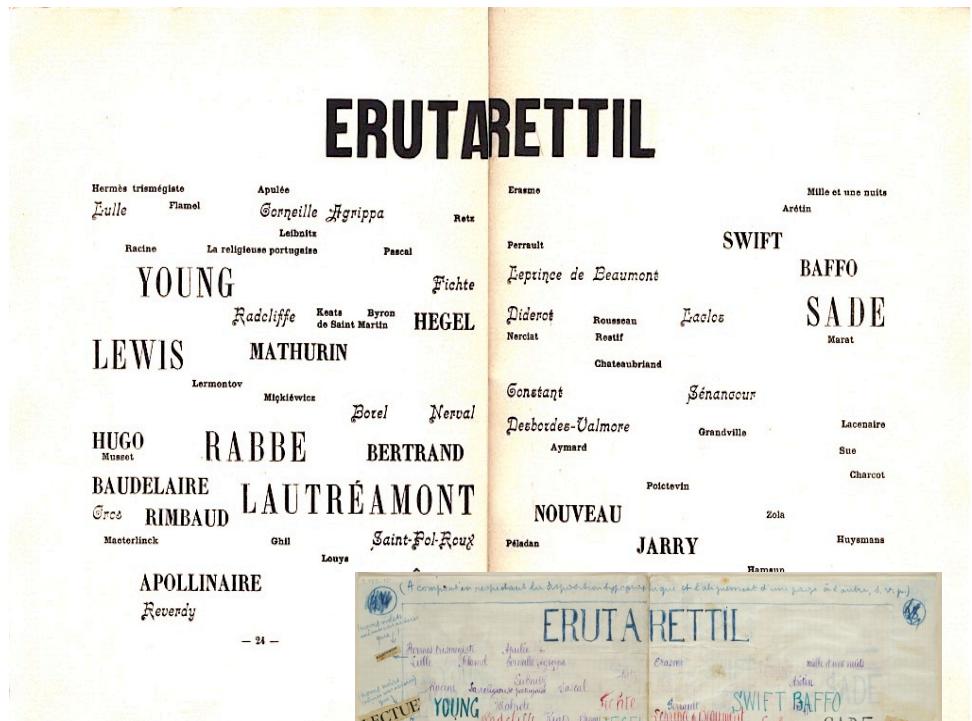
12



Tag Cloud



Cover of German translation of
“A Thousand Plateaus”, 1992



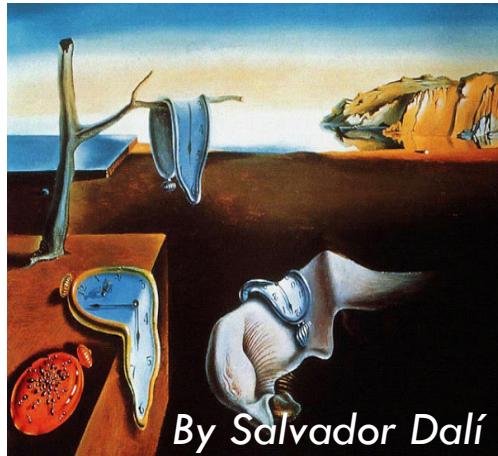
Robert Desnos (1945) & André Breton (1966)



Stretching the boundaries of IP protection

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Style of Art: Cannot be copyrighted or patented

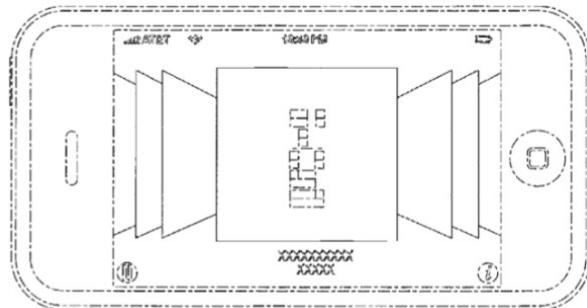


By Salvador Dalí



By Sarah Cook

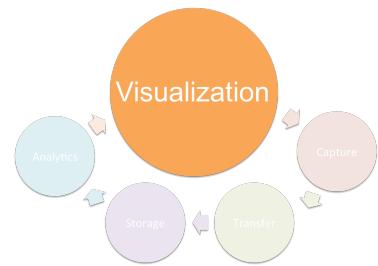
Design Patents: Ornamental Aspects of Functional Items



Apple's Cover Flow
USD613300, Filed 2007



Google's Home Page Layout
USD599372S, Filed 2006



**Utility Patents:
Functionality of Items**

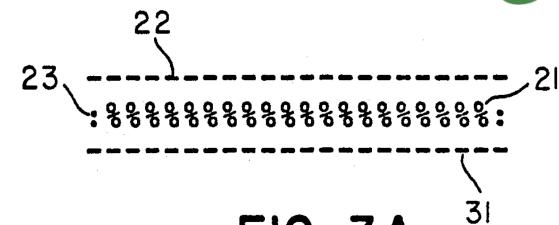


FIG. 3A

**Utility Patent on Progress Bar
US5301348, Filed 1992**

Example of a visualization algorithm

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(12) **United States Patent**
Feinberg et al.

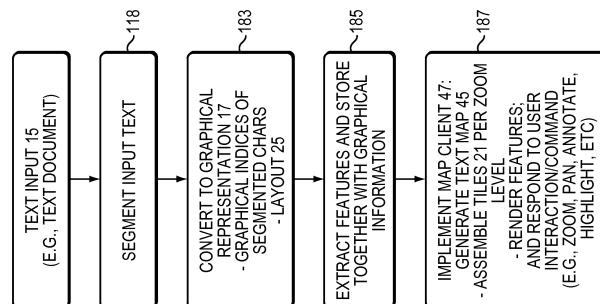
(10) **Patent No.:** US 8,566,743 B2
(45) **Date of Patent:** Oct. 22, 2013

(54) **COMPUTER METHOD AND SYSTEM FOR TOPOGRAPHICAL REPRESENTATION OF TEXTUAL DATA**

(75) Inventors: **Jonathan Feinberg**, Medford, MA (US); **Irina Ros**, Chelmsford, MA (US); **Martin M. Wattenberg**, Winchester, MA (US); **Fernanda B. Viegas**, Cambridge, MA (US)

(73) Assignee: **International Business Machines Corporation**, Armonk, NY (US)

1. A computer-implemented method of navigating textual data comprising:
given a body of text in a computer, converting the body of text to a graphical representation, said converting being by a computer processor; and rendering through the computer the graphical representation. **A computer-implemented method ... graphical representation employing geographical mapping operations ...** and **... converting the body of text to a graphical representation ...** and zooming of the text map, wherein panning includes re-centering of the text map in relation to a viewport that is represented by a user's browser window.



Dynamic and Visualization Algorithms in Big Data

Speakers:

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