



# Visualization Techniques

- 1. Text as Data
- 2. Visualizing Document Content
- 3. Evolving Documents
- 4. Visualizing Conversation
- 5. Document Collections



### 2. DOCUMENT CONTENT

# Information Retrieval – Document Content

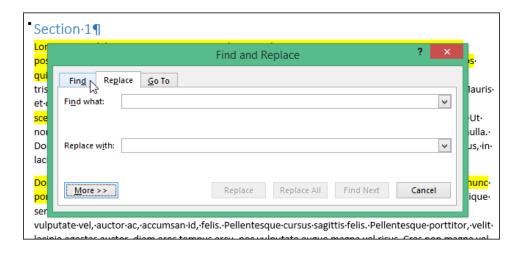
Search for documents or within a document

- Match query string
- How can we use data visualization?



### **Document Content**

Simple find and highlight



When there is no correlation in the variable selection space, an evolutionary search procedure must include both functional variables in the network in order to see an increase in fitness, regardless of NN weights. With increasing amounts of correlation in the variable space, local optima exist in the joint variable-weight space that center around each of the two functional variables. Effectively, the evolutionary procedure can explore the weight space to find a NN function that provides elevated fitness to variables correlated to one of the two XOR functional variables. This would allow NNs containing only one of the two functional variables to be propagated in the solution population where it could eventually be crossed with a NN containing the other functional variable. As such, correlation in the variable selection space provides building blocks for the XOR function.

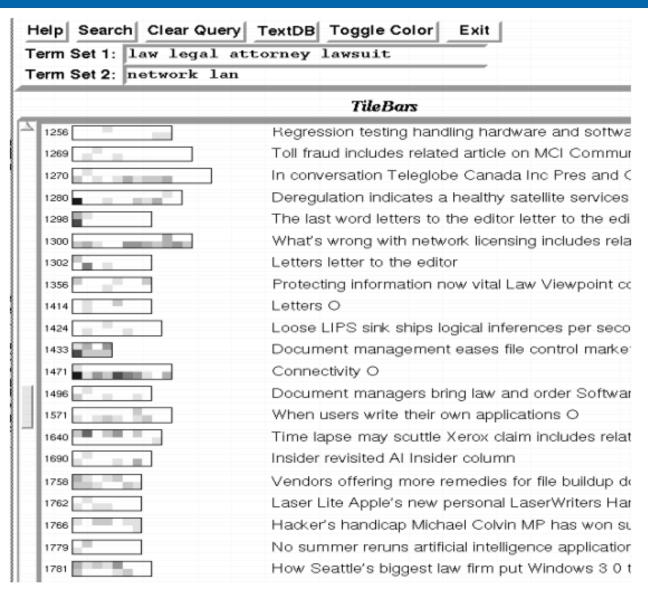
With a needle in the haystack problem like the XOR, the likelihood of finding the global optimum depends on the ability of the search algorithm to pair the two functional variables together in the NN solution. Correlation can induce the formation of local optima that center around one of the functional variables under some weight combinations. Therefore, correlation provides building blocks to evolutionary procedures that explore the joint variable-weight space. Although not explicitly tested here, it is likely that this phenomenon is not limited to the XOR function alone, and may extend to other complex non-linear problems.

Finally, these results may lead to innovations in searching the variable selection space when correlation is present. In genetics studies, correlation is highest among genetic variants in close physical proximity due to linkage disequilibrium. This creates a correlation structure that is tied to spatial relationships between variables.

Current hybrid search strategies use a combination of evolutionary algorithms to select input variables and architectures, and local optimization routines such as backpropagation to fit NN weights. Our observations in this study suggest that when there is correlation between variables, contours appear in the variable selection space which a local optimization routine could exploit, even when NN weights are nonoptimal. When a spatial relationship exists, this local search could be accomplished by exploring neighboring variables using a fixed set of weights. When there is no natural spatial relationship between variables, variable position can be artificially defined based on correlation structures within the data. Search routines that supplement evolutionary algorithms with local optimization in both weight fitting and variable selection may have an advantage when correlation exists.

This study is a qualitative examination of the variable selection fitness landscape for the XOR problem. Future work should include quantitative examination of locality and problem hardness for this as well as other nonlinear problems in addition to the XOR. Furthermore, this study examines datasets with very uniform patterns of

### Engineering for Professionals

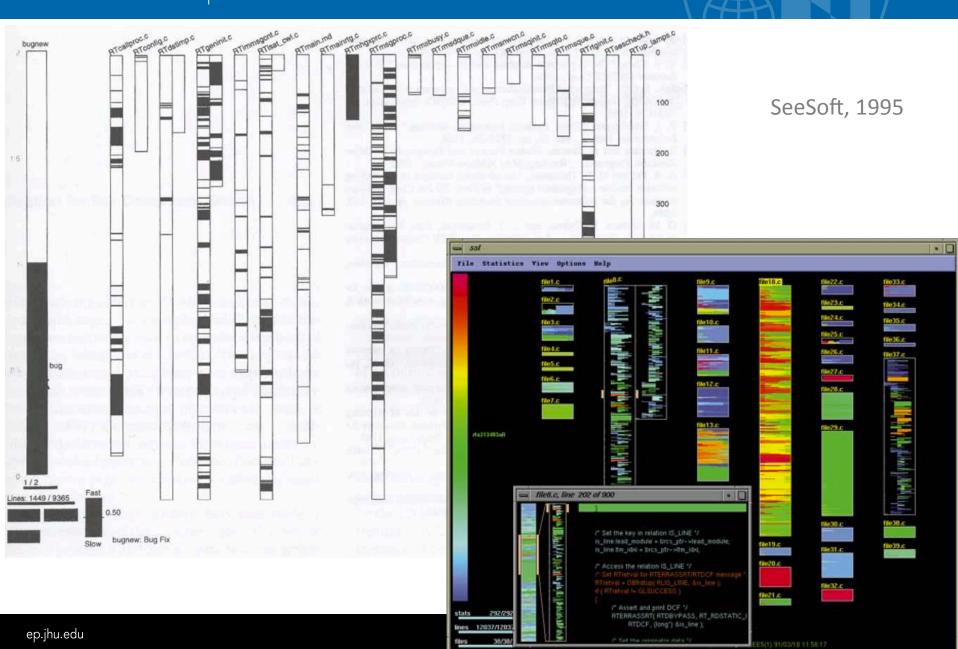


- The TileBar display paradigm
- Rectangles correspond to documents or pages
- Squares correspond to text segments
- The darkness of a square indicates the frequency of terms in the segment

TileBars, 1995

### JOHNS HOPKINS UNIVERSITY

# **Engineering** for Professionals



### JOHNS HOPKINS **UNIVERSITY**

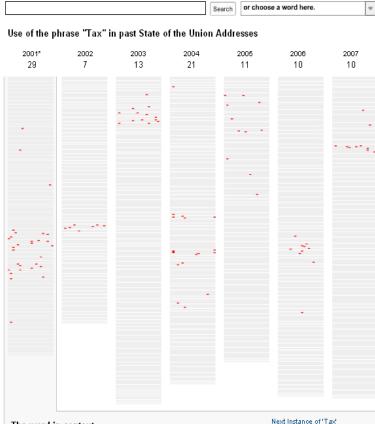
### **Engineering** for Professionals

THE WORDS THAT WERE USED

READ 2007 SPEECH | FEEDBACK

### The 2007 State of the Union Address

Over the years, President Bush's State of the Union address has averaged almost 5,000 words each, meaning the the President has delivered over 34,000 words. Some words appear frequently while others appear only sporadically. Use the tools below to analyze what Mr. Bush has said.

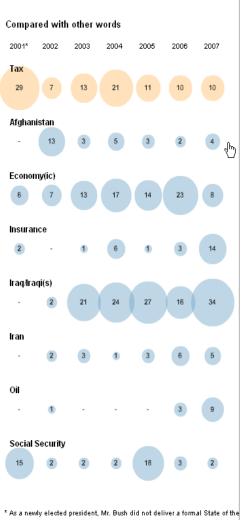


#### The word in context

I believe in local control of schools. We should not, and we will not, run public schools from Washington, D.C. Yet when the federal government spends TAX dollars, we must insist on results. Children should be tested on basic reading and math skills every year between grades three and eight. Measuring is the only way to know whether all our children are learning. And I want to know, because I refuse to leave any child behind in America.

-- 2001 (Paragraph 14 of 73)

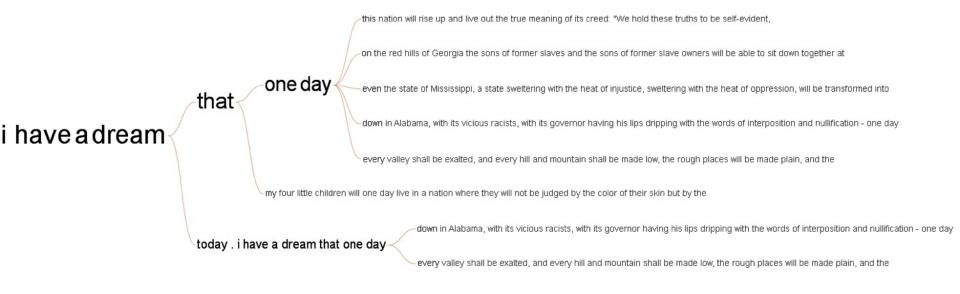
### **New York Times**



Union address in 2001. His Feb. 27 speech to a joint session of Congress was analogous to the State of the Union, but without the title.

Ben Werschkul/The New York Times

# Recurrent Themes in Speeches



### Word Tree [Wattenberg et al.]

and with all thy might thine heart, and with all thy soul, that thou mayest live . with all mind thy heart, and with all thy soul, and with all thy thygod strength, an keep his charge, and his statutes, and his judgments, and his commandments, alway and to walk ever in his ways; then shalt thou add three cities more for thee, beside these three: 19 lord that thou mayest obey his voice, and that thou mayest cleave unto him: for he is thy life, and the to walk in his ways , and to keep his commandments and his statutes and his judgments , that thou mayest live serve him with all your heart and with all your soul, 11:14 that I will give you the rain of your land and to walk in all his ways, and to keep his commandments, and to cleave unto him, and to serve him yourgod to walk in all his ways, and to cleave unto him; 11:23 then will the lord drive out all these nations from with all your heart and with all your soul all ye his saints: for the lord preserveth the faithful, and plentifully rewardeth the proud doer. hate evil: he preserveth the souls of his saints; he delivereth them out of the hand of the wicked because he hath heard my voice and my supplications. name of the lord, to be his servants, every one that keepeth the sabbath from polluting it, and taketh hold of my covenant good, and establish judgment in the gate: it may be that the lord god of hosts will be gracious unto the remnant of joseph

love the

other; or else he will hold to the one, and despise the other. ye cannot serve god and mammon.

evil; who pluck off their skin from off them, and their flesh from off their bones; 3:3 who also eat the

uppermost rooms at feasts, and the chief seats in the synagogues, 23: 7 and greetings in the markets, and to be called of seats in the synagogues, and greetings in the markets.

father ; and as the father gave me commandment , even so i do .

hath bestowed upon us, that we should be called the sons of god: therefore the world knoweth us not, because it knew him

6: 25 therefore i say unto y

16: 14 and the pharisees a

brotherhood

truth and peace

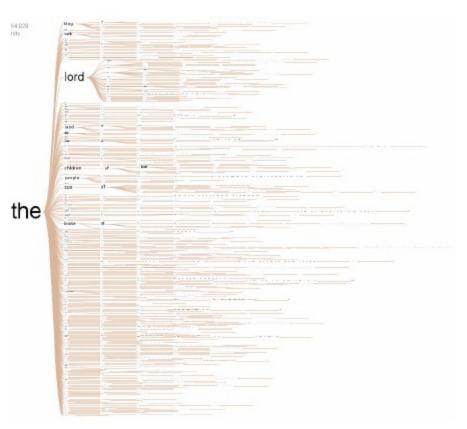
world, the love of the father is not in him.

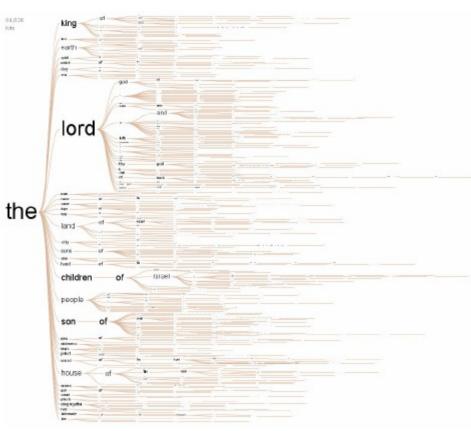
brethren

children of god , when we love god , and keep his commandments

# JOHNS HOPKINS

# Filter Infrequent Runs

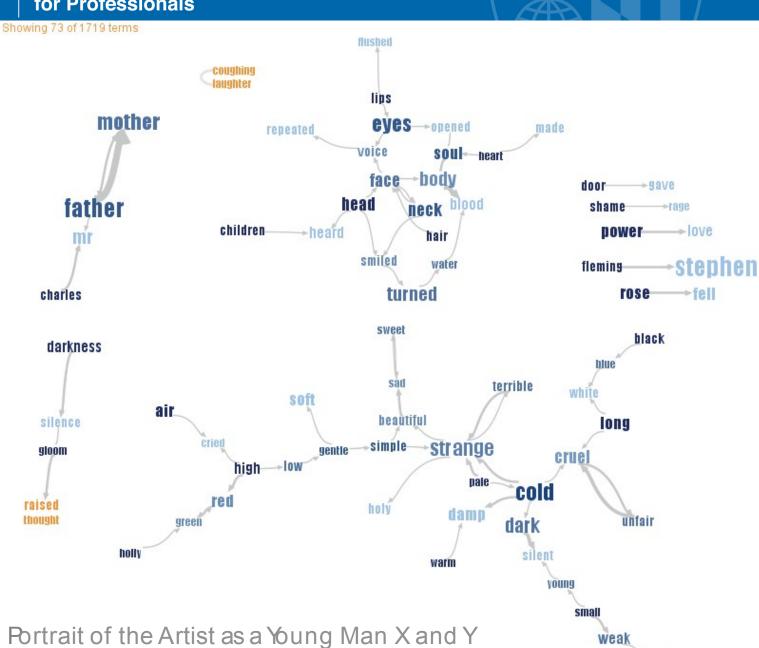




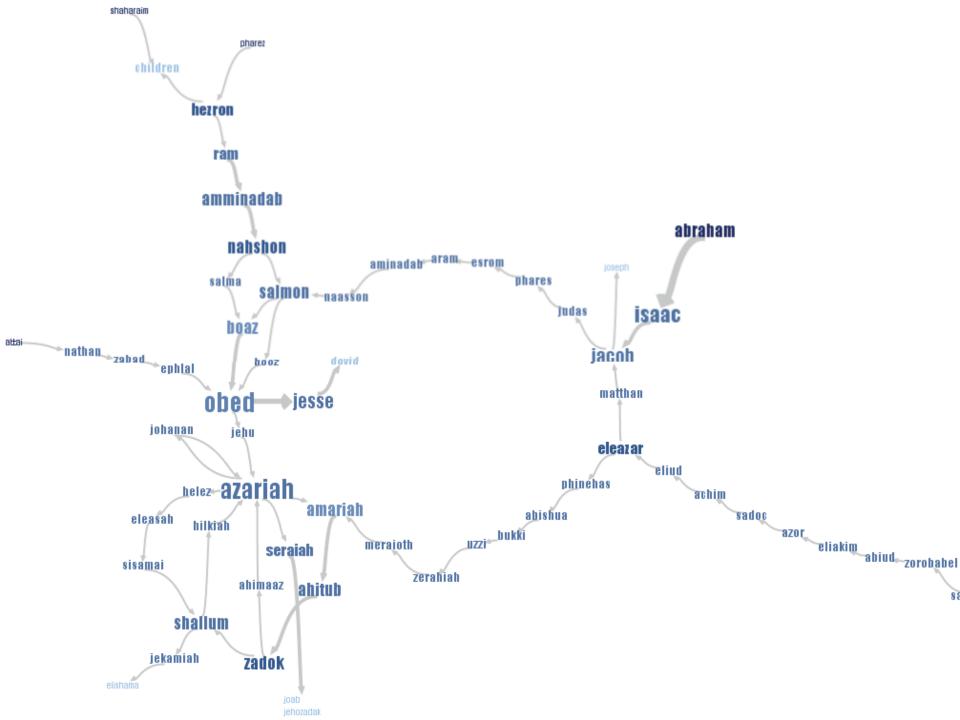
### JOHNS HOPKINS UNIVERSITY

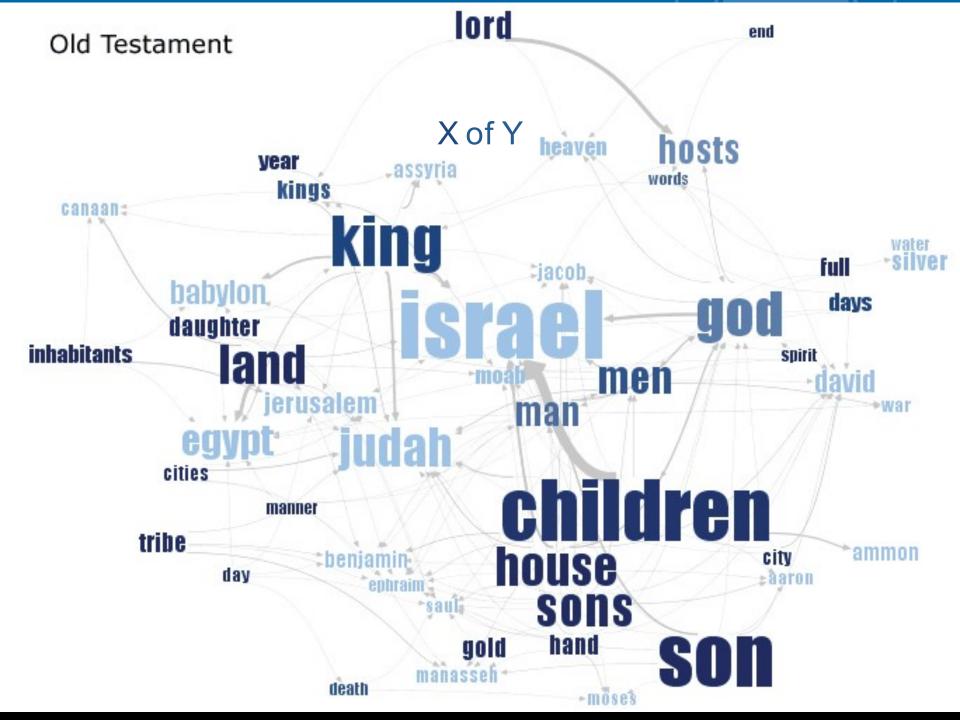
# **Engineering for Professionals**

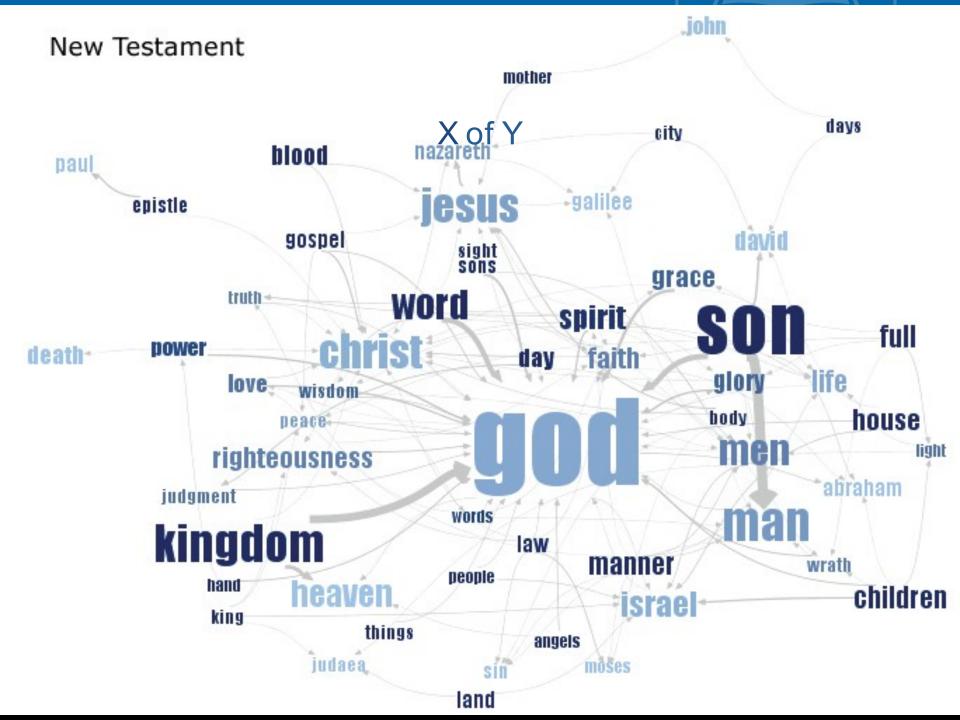




humble





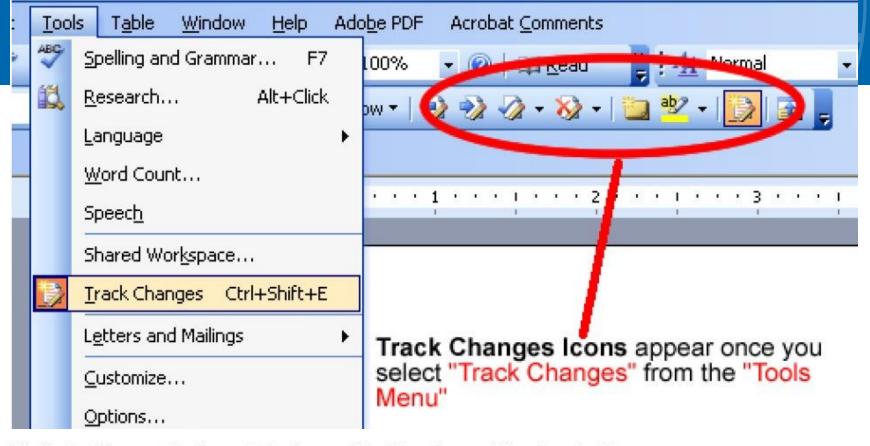


### **Document Content**

- Understand Your Analysis Task
- Visually: Word position, browsing, brush & link
- Semantically: Word sequence, hierarchy, clustering
- Both: Spatial layout reflects semantic relationships
- The Role of Interaction
- Language model supports visual analysis cycles Allow modifications to the model: custom patterns for expressing contextual or domain knowledge



### 3. EVOLVING DOCUMENTS

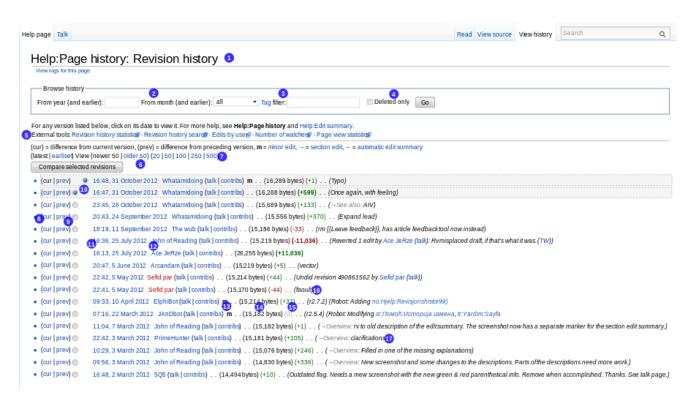


This is a test document to demonstrate the use of tracking changes. The characters in black font represent the original document while the characters in red font represent the changes which are being tracked.



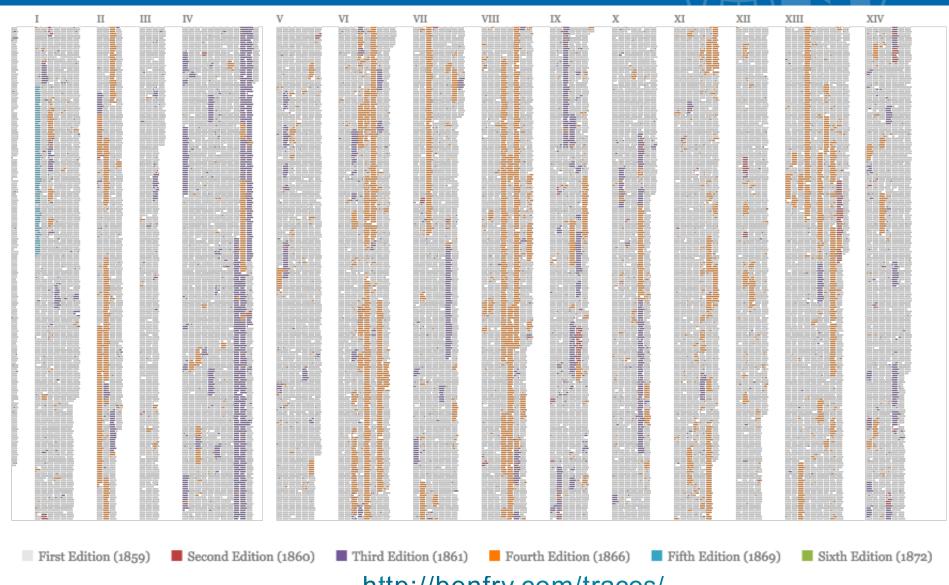
# Visualizing Revision History

How to depict contributions over time? Example: Wikipedia history log

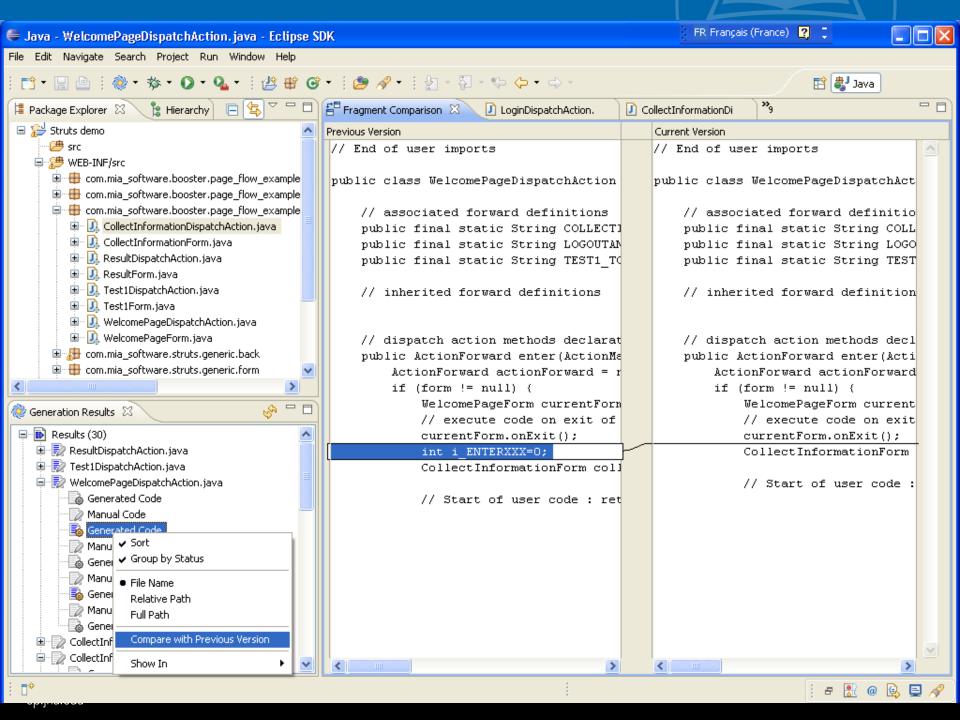




# **Engineering for Professionals**



http://benfry.com/traces/



Side-by-side ~ Diff style:

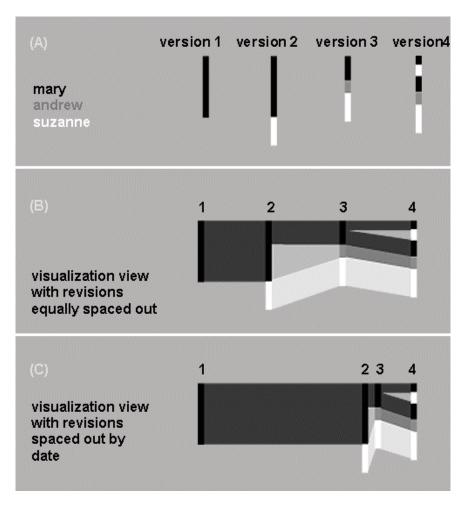
Enable syntax coloring

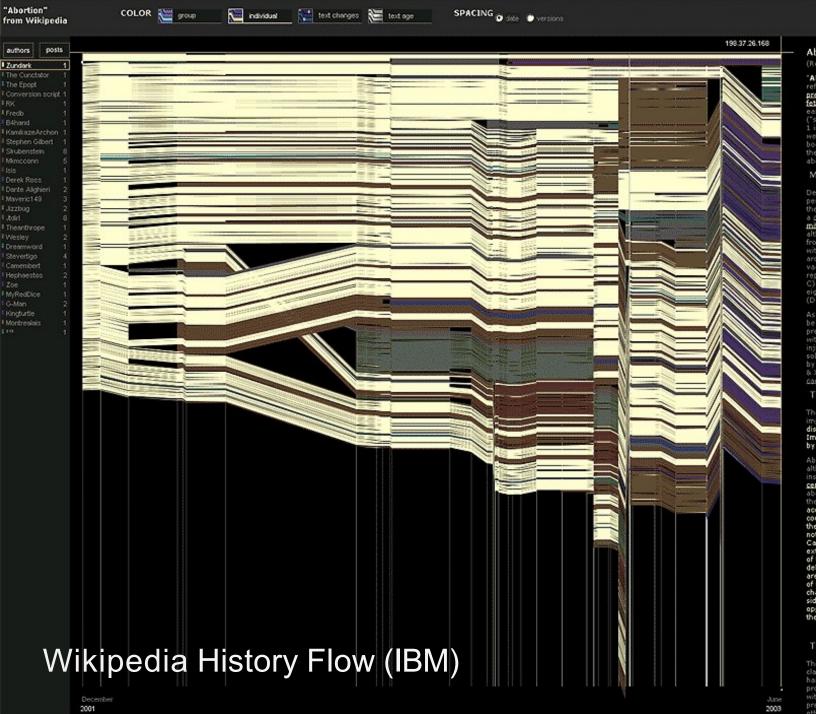
#### Files Changed:

sshconsole.js: 1 change [ 1 ]

```
/home/toddw/src/sshconsole-read-only/content/sshconsole.js
                                                                                 50 lines hidden [Expand]
51
           term = new VT100(80, 24, "term");
                                                                                         51
                                                                                                     term = new VT100(80, 24, "term");
                                                                                         52
52
          // term.debug = 1;
                                                                                                    // term.debug = 1;
53
                                                                                         53
                                                                                                    term.curs set(true, true, term box element);
          term.curs_set(true, true, _term box element);
54
                                                                                                    term.noecho();
          term.noecho();
55
56
          // Replace the go getch function with our own, this is called
                                                                                                    // Replace the go getch function with our own, this is called
57
          // for every keypress that is passed through the terminal to the
                                                                                                    // for every keypress that is passed through the terminal to the
58
          // remote server. The character is already converted into the
                                                                                                    // remote server. The character is already converted into the
59
          // required VT100 character sequence(s).
                                                                                                    // required VT100 character sequence(s).
60
          VT100.go getch = function() {
                                                                                                    VT100.go getch = function() {
61
                                                                                         61
              var vt = VT100.the vt ;
                                                                                                        var vt = VT100.the vt ;
62
              if (vt === undefined) {
                                                                                         62
                                                                                                        if (vt === somevalue) {
                                                                                         63
63
                       return;
                                                                                                                 return;
              }
                                                                                                        }
65
              var ch = vt.key buf .shift();
                                                                                                        var ch = vt.key buf .shift();
66
              //dump("go getch :: ch: '" + ch + "'\n");
67
              if (ch === undefined) {
                                                                                                        if (ch === undefined) {
68
                       return:
                                                                                                                 return:
69
70
              if (vt.echo_ && ch.length == 1) {
                                                                                                        if (vt.echo_ \&\& ch.length == 1) {
                                                                                         70
71
                      vt.addch(ch);
                                                                                                                vt.addch(ch);
                                                                                         71
                                                                                                                vt.refres();
72
              }
                                                                                         72
                                                                                                        if ( ssh_channel) {
73
              if ( ssh channel) {
                                                                                         73
                                                                                         74
                  ssh channel.sendStdin(ch);
                                                                                                            ssh channel.sendStdin(ch);
75
76
                                                                                         76
          }
                                                                                         77
77
78
          var serverTextbox = document.getElementById("sshconsole server textbox");
                                                                                                    var serverTextbox = document.getElementById("sshconsole server textbox");
79
          var connectionText;
                                                                                                    var connectionText;
80
          if ('connectionText' in window.arguments[0]) {
                                                                                                    if ('connectionText' in window.arguments[0]) {
81
              connectionText = window.arguments[0].connectionText;
                                                                                                        connectionText = window.arguments[0].connectionText;
82
          } else {
                                                                                                    } else {
                                                                                174 lines hidden [Expand]
```

# History Flow [Viegas et al.]





#### Abortion

(Revision as of 22:56 4 Jun 2003)

"Abortion," in its most commonly used so refers to the deliberate early termination of pregnancy, resulting in the death of the of fetus, [1] Medically, the term also refers to early termination of a pregnancy by nature ("spontaneous abortion" or missarriage, within the weeks) or to the cossation of normal growbody part or organ. What follows is a discriberative succession of normal growbody part or organ. What follows is a discriberative succession.

#### Methods

Depending on the stage of pregnancy and performed by a number of different method the earliest terminations (before nine weels chamical abortion is the usual method, the milepristone is usually the only legal method, the milepristone is usually the only legal method although research has uncovered similar from methodrexate and miscoprestal. Concluding the more interest of the miscopressal common appropriate the more risky distance and curet.

C). From the fifteenth week up until aroun eighteenth week a surgical dilation, and.ext (D & B) is used.

As the fetus size increases other technique be used to secure abortion in the third trip premature expulsion of the fetus can be in with prostaglandin, this can be coupled wit injecting the amniotic fluid with saline or u solution. Very late abortions can be broughly the controversal intact dilation and extra 8 X) or a hysterotomy, abortion, similar to cassarian section.

#### The controversy

The morality and legality of abortion is a la important topic in applied ethics, and is also discussed by legal scholars and religious p Important facts about abortion are also re by sociologists and historians.

Abortion has been common in most societical although it has often been opposed by son institutionalized religions and governments century politics in the United States and Exabortion became commonly accepted by the 20th century. Additionally, abortion is accepted in China. India and other populor countries. The Catholic Church remains of the procedure, however, and in other coun notably the United States, and the (predom Catholic) Republic of Ireland, the controve extremely active, to the extent that event of the respective positions are subject to heabate. While those on both sides of the 2 are generally peaceful, if heated, in their of their positions, the debate is sometimes characterized by violence. Though true of sides, this is more marked on the side of topposed to abortion, because of what they the gravity and urgency of their views.

#### The central question

The central question in the abortion debate clash of presumed or perceived rights. On hand, is a fetus (sometimes called the "unipro-life/anti-abortion advocates) a human with a right to life, and if so, at what point pregnancy does the fetus become human's other hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand, is a fetus part of a woman's butter hand.

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