Lecture 21:
Intellectual Property

Intellectual property issues for CS

- protection mechanisms
  - trade secrets, trademarks, patents, copyrights, licenses
  - DMCA
- standards and standardization
- GPL, open source, free software

Trade secrets

- information is a secret held by its owner
- disclosed only under some kind of agreement
  - e.g., "non-disclosure agreement" or NDA
- no recourse if secrecy is lost
- often used to argue that information should not be made public
  - voting machine technology
  - breathalyzer technology
  - ...

Patents & copyrights

- US Constitution, Article 1, Section 8:

- "The Congress shall have Power ...
  To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries;

- "Writings": copyright protects expression but not idea
  - you can't copy my program
  - but you can implement the same idea in some different form
- "Discoveries": patent protects an idea
  - you can't use my patented idea
  - but you can achieve the same effect in a different way

- the meaning of "different" is NOT usually clear

Patents

- exclusive right to make, use or sell an invention in US
- 20 years after filing

- requirements;
- statutory subject matter:
  - process, machine, article of manufacture, composition of matter
- novel
- useful
- unobvious to person having ordinary skill in the art
  - at the time of filing

- abstract
- drawings/diagrams
- specifications (narrative description, preferred embodiment)
- claims

Some notable software patents

- 1-click shopping (now expired)
- RSA public key encryption (now expired)
- Lempel Ziv compression (now expired)
- MP3 encoding (now expired)
- FAT file system
- JPEG (claimed)
- XML (claimed)

US005960411A

United States Patent [19]

Hartman et al.

[11] **Patent Number: 5,960,411**

[45] **Date of Patent: Sep. 28, 1999**

[54] **METHOD AND SYSTEM FOR PLACING A PURCHASE ORDER VIA A COMMUNICATIONS NETWORK**

[75] Inventors: **Peri Hartman**; **Jeffrey P. Bezos**; **Shel Kaphan**; **Joel Spiegel**, all of Seattle, Wash.

[73] Assignee: **Amazon.com, Inc.**, Seattle, Wash.

[21] Appl. No.: **08/928,951**

[22] Filed: **Sep. 12, 1997**

[51] **Int. Cl.**[6] **G06F 17/60**

[52] **U.S. Cl.** **705/26**; 705/27; 345/962

[58] **Field of Search** 705/26, 27; 380/24, 380/25; 235/2, 375, 378, 381; 395/188.01; 345/962

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Assistant Examiner—Demetra R. Smith
Attorney, Agent, or Firm—Perkins Coie LLP

[57] **ABSTRACT**

A method and system for placing an order to purchase an item via the Internet. The order is placed by a purchaser at a client system and received by a server system. The server system receives purchaser information including identification of the purchaser, payment information, and shipment information from the client system. The server system then assigns a client identifier to the client system and associates the assigned client identifier with the received purchaser information. The server system sends to the client system the assigned client identifier and an HTML document identifying the item and including an order button. The client system receives and stores the assigned client identifier and receives and displays the HTML document. In response to the selection of the order button, the client system sends to the server system a request to purchase the identified item. The server system receives the request and combines the purchaser information associated with the client identifier of the client system to generate an order to purchase the item in accordance with the billing and shipment information whereby the purchaser effects the ordering of the product by selection of the order button.

26 Claims, 11 Drawing Sheets

Amazon's 1-click patent

United States Patent 5,960,411 Hartman, et al. September 28, 1999
Method and system for placing a purchase order via a communications network

Abstract: A method and system for placing an order to purchase an item via the Internet. The order is placed by a purchaser at a client system and received by a server system. The server system receives purchaser information including identification of the purchaser, payment information, and shipment information from the client system. The server system then assigns a client identifier to the client system and associates the assigned client identifier with the received purchaser information. The server system sends to the client system the assigned client identifier and an HTML document identifying the item and including an order button. The client system receives and stores the assigned client identifier and receives and displays the HTML document. In response to the selection of the order button, the client system sends to the server system a request to purchase the identified item. The server system receives the request and combines the purchaser information associated with the client identifier of the client system to generate an order to purchase the item in accordance with the billing and shipment information whereby the purchaser effects the ordering of the product by selection of the order button.

Inventors: Hartman; Peri (Seattle, WA), Bezos; Jeffrey P. (Seattle, WA), Kaphan; Shel (Seattle, WA), Spiegel; Joel (Seattle, WA)

Assignee: Amazon.com, Inc. (Seattle, WA)

Appl. No.: 08/928,951 Filed: September 12, 1997

A non-notable patent

United States Patent **9,514,417**
Kumar **, et al.** **December 6, 2016**

Cloud-based plagiarism detection system performing predicting based on classified feature vectors

Abstract

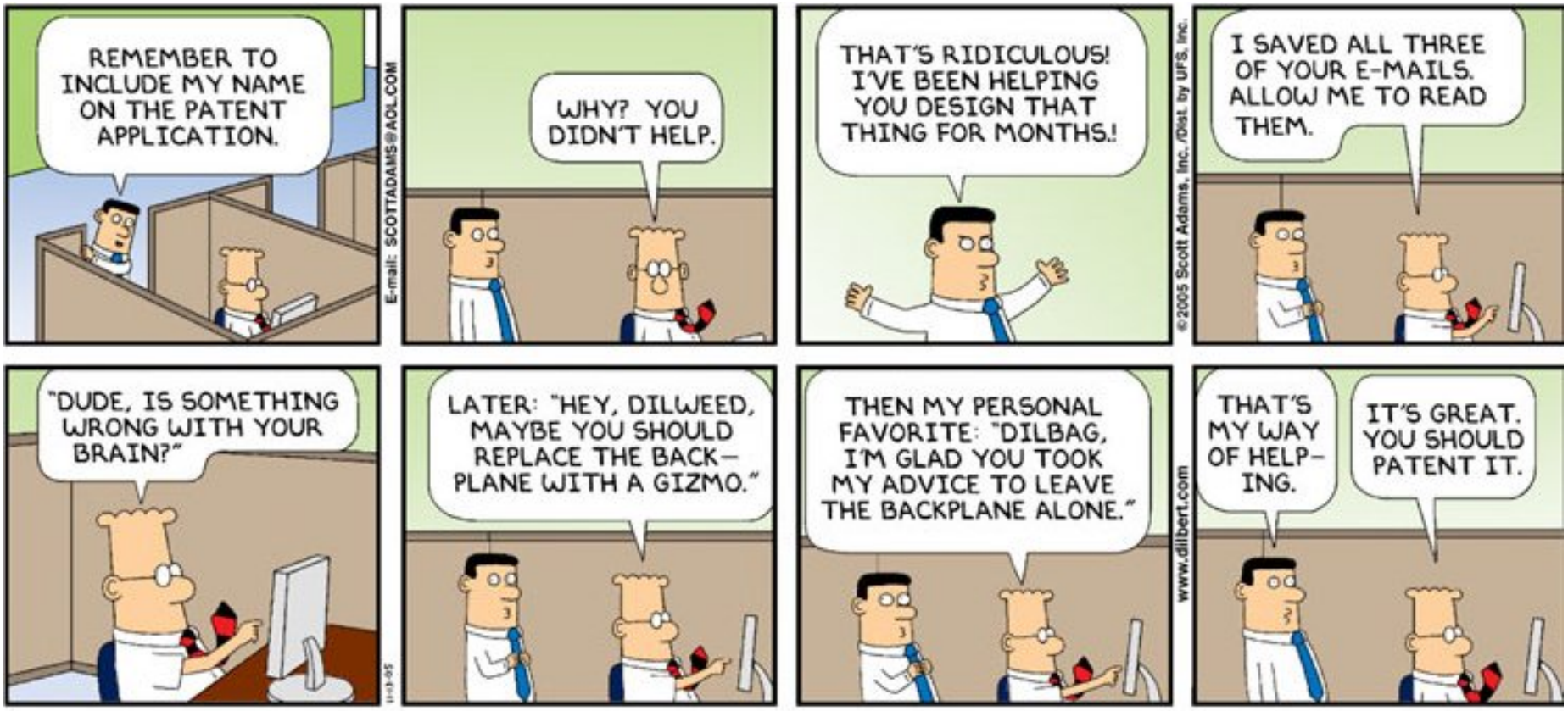
Plagiarism may be detected, as disclosed herein, utilizing a database that stores documents for one or more courses. The database may restrict sharing of content between documents. A feature extraction module may receive edits and timestamp the edits to the document. A writing pattern for a particular user or group of users may be discerned from the temporal data and the documents for the particular user or group of users. A feature vector may be generated that represents the writing pattern. A machine learning technique may be applied to the feature vector to determine whether or not a document is plagiarized.

Inventors: ***Kumar*****; Sanjiv** (White Plains, NY), ***Kernighan*****; Brian** (Princeton, NJ)

Applicant:	**Name**	**City**	**State**	**Country**	**Type**
	Google Inc.	Mountain View	CA	US	

Assignee: **Google Inc.** (Mountain View, CA)

Family ID: **53482184**
Appl. No.: **14/143,710**
Filed: **December 30, 2013**



Patent issues for software

- what is patentable? (i.e., what is statutory subject matter?)
  - software itself?
  - business methods?

    (whether implemented in software or not?)

- what's novel?
  - how new and unobvious does something have to be?
  - how is that determined?

- policy questions
  - what should be patentable?
  - what should the term be for a patent?

Copyright

- protects expression, not idea
- duration used to be 17 years + one renewal
- now life + 70 years, or 95 years for commercial works
  - (the "Mickey Mouse Protection Act", 1998)
- "fair use" permits limited copying under some circumstances
  - criticism, comment, scholarship, research, news reporting, teaching
- uncertain what fair use really is -- case by case decisions
- considerations:
  - purpose and character of the use
  - nature of the copyrighted work
  - amount and substantiality of the portion used
  - effect of the use on potential market or value of the copyrighted work
- recent copyright laws may prevent some fair uses
  - can't decrypt to make excerpt for teaching or criticism
  - can't reverse engineer to make copies in different media

DMCA: Digital Millennium Copyright Act (1998)

- US copyright law: www.copyright.gov/title17, Chapter 12

- anticircumvention: illegal to circumvent a technological measure protecting access to or copying of a copyrighted work
  - limited exceptions for reverse engineering for interoperability, encryption research, security testing

- illegal to remove or alter copyright notices and management information

- "safe harbor": protects ISPs from copyright infringement claims if they follow notice and takedown procedures

Copyright issues in software

- code
  - theft in commercial setting
  - plagiarism in academic setting
- visual appearance, "look and feel", etc., of a program
- interfaces vs implementations
- reverse engineering?
  - clean room implementation
- copyright or patent?
  - which is appropriate to protect specific piece of software?

Independent implementations of an interface

- can interfaces be owned?
- can they be copyrighted?

- company A sells something (hardware or software)
- company A publishes (widely) the API for programming it
  - with the intent that third parties will develop applications for the thing
  - and thus make it more attractive so company A will sell more

- company B uses A's interface definition to make a cheaper version of the thing that works the same
  - so all the third-party applications will run on B's cheaper version
  - thus cutting into A's market

- company A sues company B

- who should win?

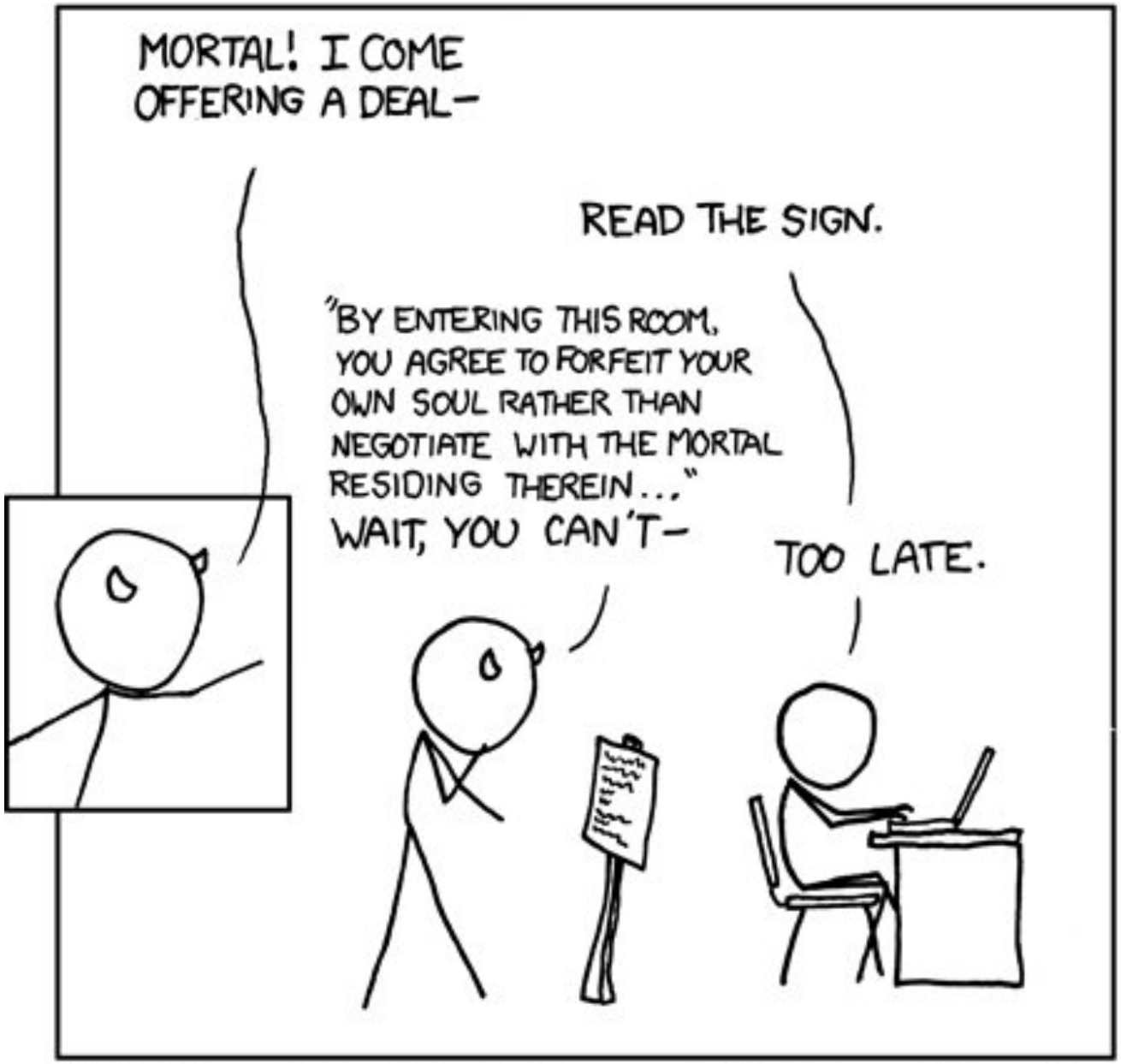
Licenses

- an agreement (e.g., contract) that allows a particular use of some software
  - that might otherwise be a violation of copyright, patent, etc.

- are shrinkwrap and clickwrap licenses valid and enforceable?

- is licensing replacing purchase?

- are warranty and liability disclaimers for software valid?



MEPHISTOPHELES ENCOUNTERS THE E.U.L.A.

xkcd.com/501

Standards and standardization

- **standard: technical specification sufficiently precise that it ensures independent implementation, uniformity, interoperability, ...**
  - physical measurements: length, weight, time, chemical composition, ...
  - mechanical properties: plugs & sockets, CD/DVD dimensions, …
  - electrical properties: voltage, frequency, …
  - software: character sets, programming languages, operating system interfaces, data formats, information exchange protocols, ...
- **standardization: process of establishing a specification**
  - usually involves competing entities, so tradeoffs are needed between mutual benefit and competitive advantage
  - often international (e.g., ISO: International Organization for Standardization)
- **de facto vs de jure standards**
  - de facto: Windows, Office, Flash, PDF, ...
  - de jure: ASCII, Unicode, some programming languages, ...

Data formats

- many data formats are proprietary
  - can only be produced and interpreted by proprietary software
  - e.g., Microsoft Office (Word, Excel, ...), Flash, ...
  - if available at all, may require royalty payment to owner
  - can be used to control markets, maintain competitive advantage
    e.g., by incompatible upgrades or incomplete disclosure
- some formats involve patent protection, usually because the algorithm is patented
  - patent owner may require payment
  - e.g., (in theory) JPEG, GIF, MP3, FAT
- "open" formats are non-proprietary
  - can be produced and interpreted by anyone for free
  - e.g., HTML, PNG (portable network graphics), ODF (open document format), PDF (as of 2008)

Open source / free software

- source code: instructions in a readable programming language
  - usually has significant commercial value
    e.g., Windows, Office, TurboTax, Photoshop, …
  - usually proprietary, secret, not revealed
    even if compiled version is given away (e.g., iTunes, Internet Explorer)

- "open source": source code is available, can be copied and used
  - a reaction to restrictions on proprietary code
  - promoted by Free Software Foundation, other open source projects & groups
- various kinds of licenses determine what can be done with it
  - mainly concerned with keeping source code open enough that others can continue to build on it and improve it
  - prevents anyone from taking it private / proprietary
- a viable alternative to proprietary software in important areas

Free Software Foundation (Richard Stallman, MIT, ~1985)

- plan to build an operating system and all supporting software
  - "GNU" -- "GNU's not Unix"
- started non-profit organization called the Free Software Foundation
- wanted source code to be released so that it could not be made proprietary, would remain free forever
  - "free" as in "free speech", not "free beer"
    ok to charge for distribution, support, etc.

- source released under copyright agreement that requires that any subsequent distribution be covered by the same agreement
- GNU GPL (General Public License): "copyleft"
  - full permission to use, copy, modify, and distribute modifications
  - copies, derivative works, etc., must have the same terms if distributed
  - copies, etc., must have the same license attached to them
  - NO permission to add further restrictions; explicitly forbidden
- source code has to be freely available
  - can't "take it private"