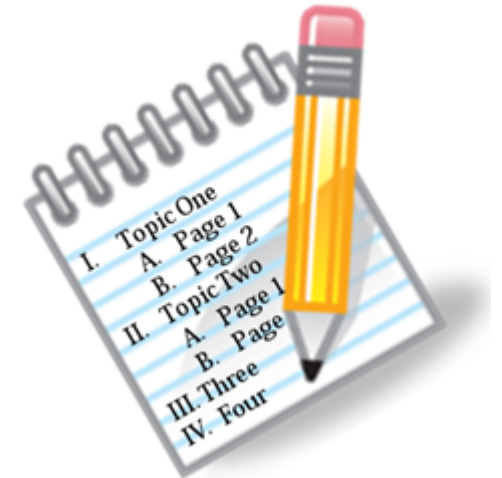


Idea Relationship Analysis in Open Innovation CrowdSourcing systems

Adam Westerski, Carlos A. Iglesias and Javier Espinosa
Grupo de Sistemas Inteligentes
Universidad Politécnica de Madrid
<http://www.gsi.dit.upm.es>

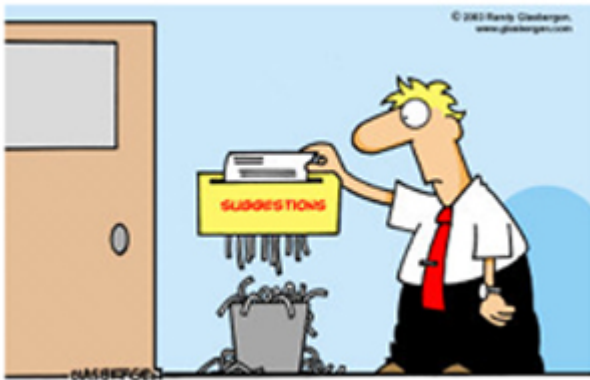
Outline

- Idea Management Systems
- The problem
 - too many similar ideas
- Our solution
 - idea relationship hierarchy
- Evaluation
 - Ubuntu brainstorm
- Conclusions



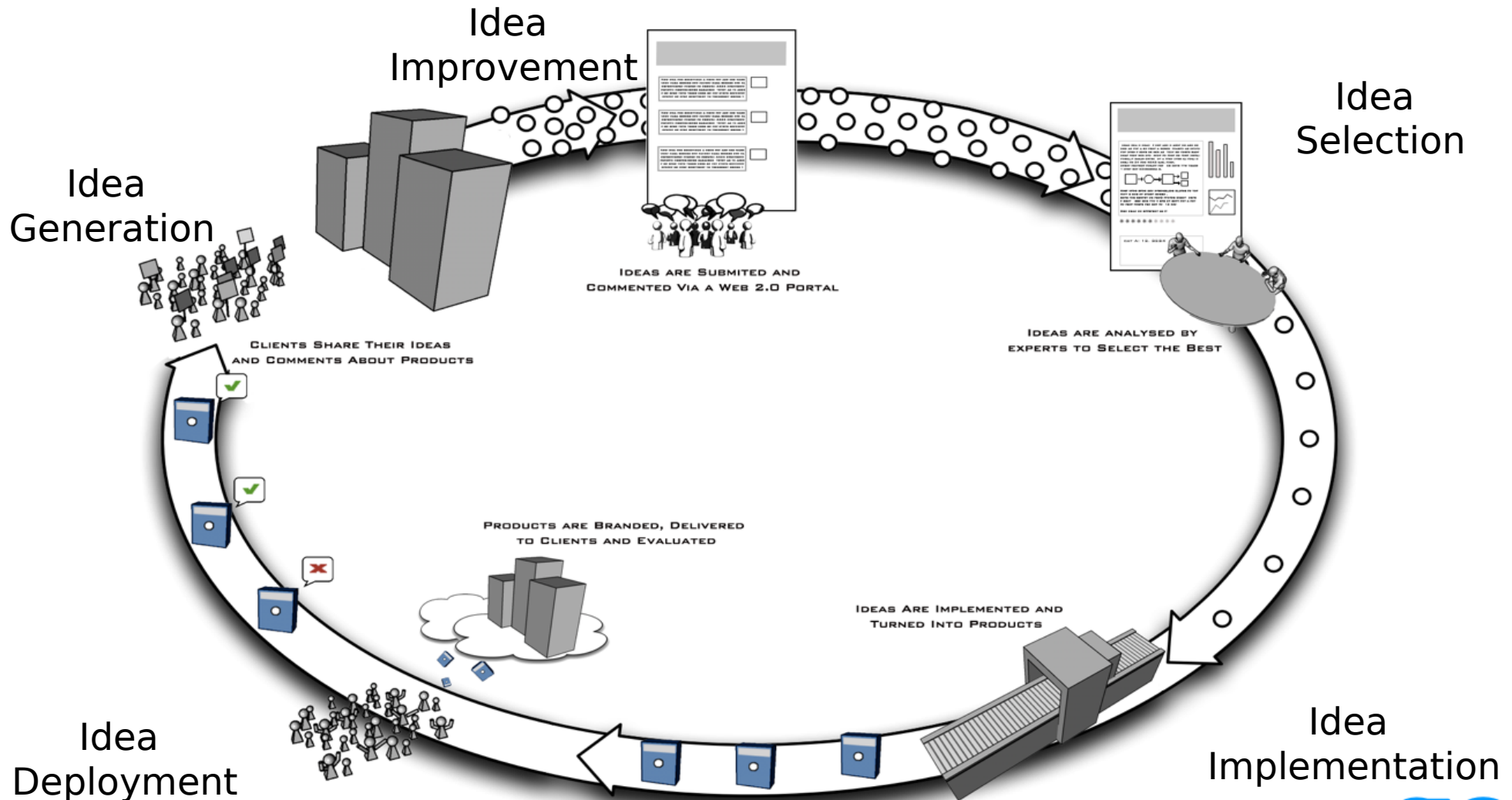
Idea Management Systems

- Evolution of suggestion boxes...



- for open innovation purposes
 - Collect ideas, suggestions, from customers, employees, ...

Innovation through Idea Management Systems



ubuntu brainstorm

The Ubuntu community has contributed 22351 ideas, 136833 comments, 2623398 votes

All Projects ▾ Global categories ▾

 Idea sandbox  Popular ideas  Ideas in development  Implemented ideas

Search...
Advanced search »

 **Submit your idea**

 Here are this month's most popular ideas about Ubuntu. **New to Brainstorm?** Learn [how it works!](#)

Most popular in 30 days ▾

The viewing of app images in Software Center is inconvenient.

Written by [Vahan Harutyunyan](#) the 21 Sep 12 at 14:11. Related project: [Ubuntu Software Center](#). **New**

When we select the application and press "More Info" button we can get information about the app. A lot of applications have more than one images uploaded by developers. And it's very inconvenient if you want to zoom these images and view them. You have to select one image, zoom it (appears a window), then close the window, select next image, zoom it, etc.

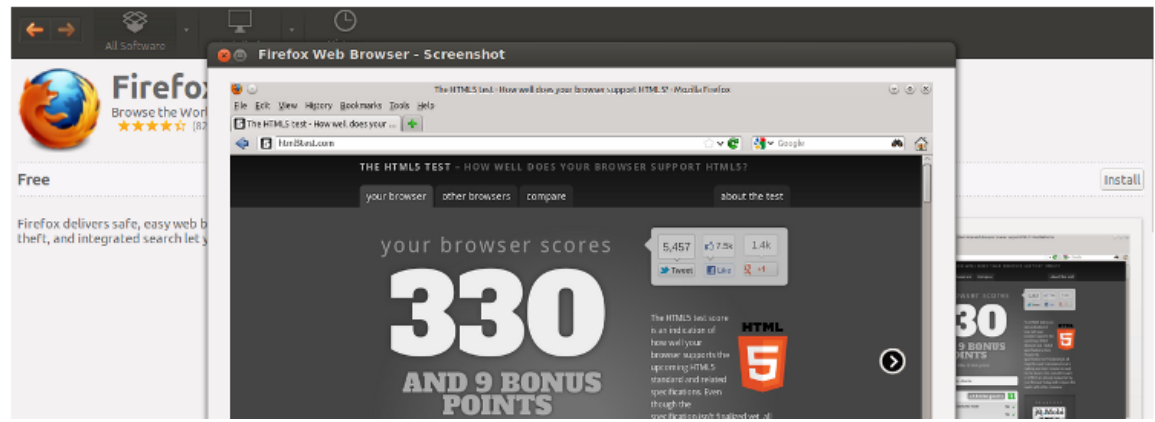
38
votes

Solution #1: Add "arrow" button on the current image.

Written by [Vahan Harutyunyan](#) the 21 Sep 12 at 14:11.

When you hover over image the "arrow" button appears and for viewing the next image you just need to press this button.



[GOT AN IDEA?](#)[VIEW IDEAS](#)[IDEAS IN ACTION](#)

Hi there, [Sign In](#) to make a comment.

Share
Follow us on

Ideas so far



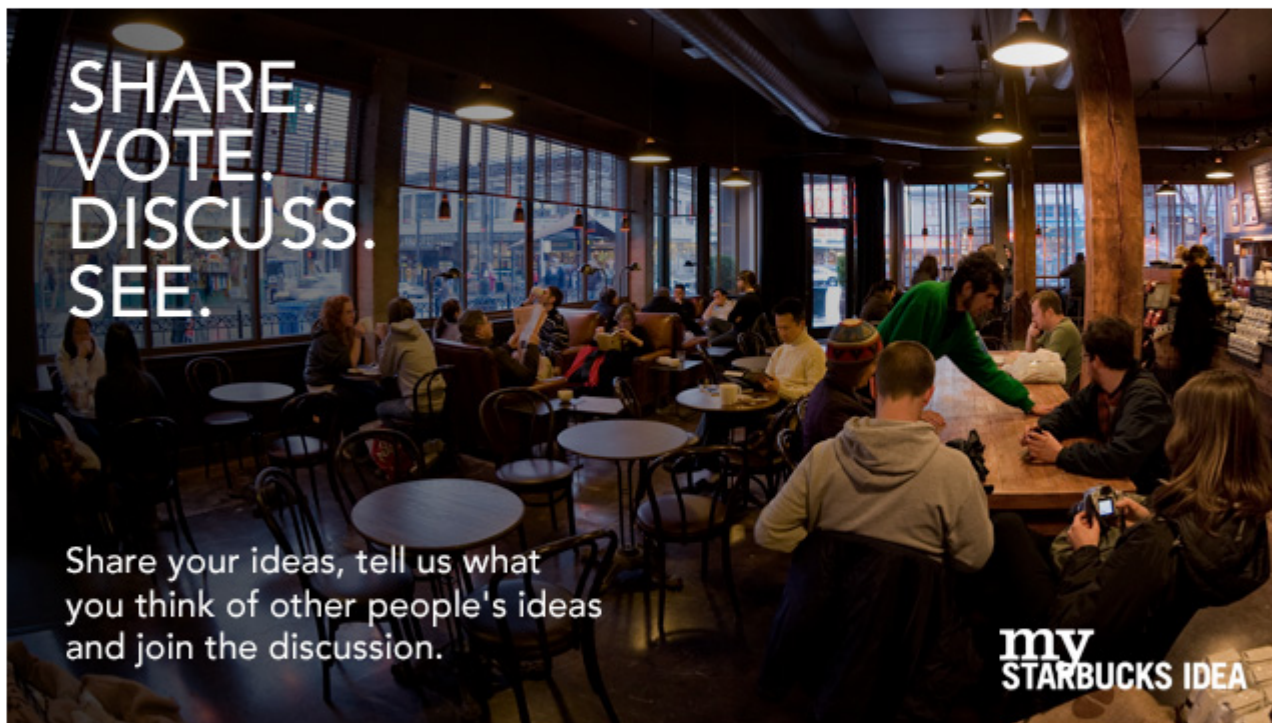
PRODUCT IDEAS

- 31,535 [Coffee & Espresso Drinks](#)
- 3,156 [Frappuccino® Beverages](#)
- 9,306 [Tea & Other Drinks](#)
- 14,469 [Food](#)
- 7,502 [Merchandise & Music](#)
- 14,868 [Starbucks Card](#)
- 2,355 [New Technology](#)
- 10,134 [Other Product Ideas](#)

EXPERIENCE IDEAS

- 7,555 [Ordering, Payment, & Pick-Up](#)
- 13,533 [Atmosphere & Locations](#)
- 10,504 [Other Experience Ideas](#)

INVOLVEMENT IDEAS



Most Recent Ideas

- 22 Min(s) Ago [Different card designs for Passbook on iPhone](#)
- 54 Min(s) Ago [Fun With Tea](#)
- 1 Hour(s) Ago [Enriching an Elders Life](#)



Shop

Support

Community

Search

Dell Inc. IdeaStorm

IdeaStorm can help take your idea and turn it into reality.

[SUBMIT YOUR IDEA](#)

OVER 17,894 IDEAS SUBMITTED. 738,876+ VOTES. 96,905+ COMMENTS. 515+ IDEAS IMPLEMENTED.

IDEAS

STORM SESSIONS

SUBMIT YOUR IDEA

[Member Login](#)

[Join IdeasStorm](#)

Featured

1 | 2 | 3 | 4 | 5

Sell ARM based systems



Posted by: [shiningarcanine](#)

Intel based systems are power hungry and with rising energy costs, many people are realizing that th ...

[Learn More](#)

6 Votes | 3 Comments



Recent Ideas

[Explore More](#)



please put android on the ARM version of the dell xps duo 12

Posted by: [bcruz111](#)

Status: *New*

Oct 4, 2012

I love the dell xps duo but i really do not like windows 8, could you please put android on the ARM version of the dell

Trending Ideas

[Explore More](#)



Design idea

Posted by: [Hto005](#)

Status: *Acknowledged*

Oct 3, 2012

Well, to be honest and all: I hate Dell computers. why? because I don't like the design. And no, I am not a prople

Top Recent Contributors

[Show More](#)



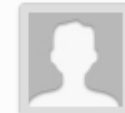
[phubert](#)

15625 Points

359 Ideas

5501 Votes

Last Activity : Aug 17, 2012



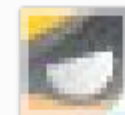
[winoffice](#)

8017 Points

108 Ideas

1175 Votes

Last Activity : Jul 9, 2012



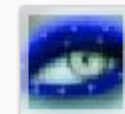
[aikiwolfie](#)

5130 Points

104 Ideas

2390 Votes

Last Activity : May 27, 2012



[sugarbear](#)

4134 Points

51 Ideas

15701 Votes

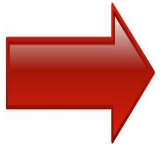
Rockstar

Goal: improve how ideas are automatically filtered



Our research so far

- Define Gi2MO ontology for formalising and interlinking idea management systems (IMS)
- Connect ideas with Enterprise systems following the Linked Data model
- Integrating Opinion Mining techniques with IMS
- Idea Classification, filtering and analysis of idea similarities independent of idea topic (this talk!)



Our research so far...

- Software released as open source, everything available at <http://www.gi2mo.org>

GIZMO
SEMANTICALLY EMPOWERED IDEA MANAGEMENT

HOME ONTOLOGY TAXONOMY MODEL APPS USE CASES DOCS BLOG ABOUT

HIGHLIGHTS

IDEA BROWSER
VISUALISE DISTRIBUTED IDEA METADATA ON DIAGRAMS

```
<rdf:Description rdf:about  
<gi2mo:primaryTopic  
<gi2mo:hasCreator rdf:resource="http://lab.gi2mo.org/apache/adam/gsidea "  
<gi2mo:content "often for
```

IDEA BROWSER
INNOVATION METRICS
OPEN-SOURCE IMS PLATFORM

GIZMO in Motion

STORYBOARD TEASER
Idea Management Systems

COMING SOON
Semantic Web & Linked Data

STORYBOARD TEASER
GIZMO Concept in Work

GIZMO is a project which goal is to setup **Semantic Web** technologies in the environment of Idea Management Systems.

What is Idea Management ?
The term of Idea Management relates to systems dedicated to organisation and assessment of large amounts of input from various parties in form of ideas - most often textual content describing innovation related to certain products. For more details see **IMS architecture**.

What GIZMO delivers ?
The primary goal of the project is to construct an **ontology** that will model Idea Management Systems. However, we also devote to study in detail the **appliance** of the data schema onto existing systems and **exploiting** it to achieve real, measurable benefits.

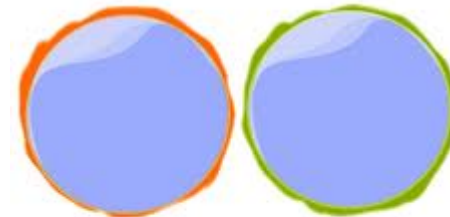
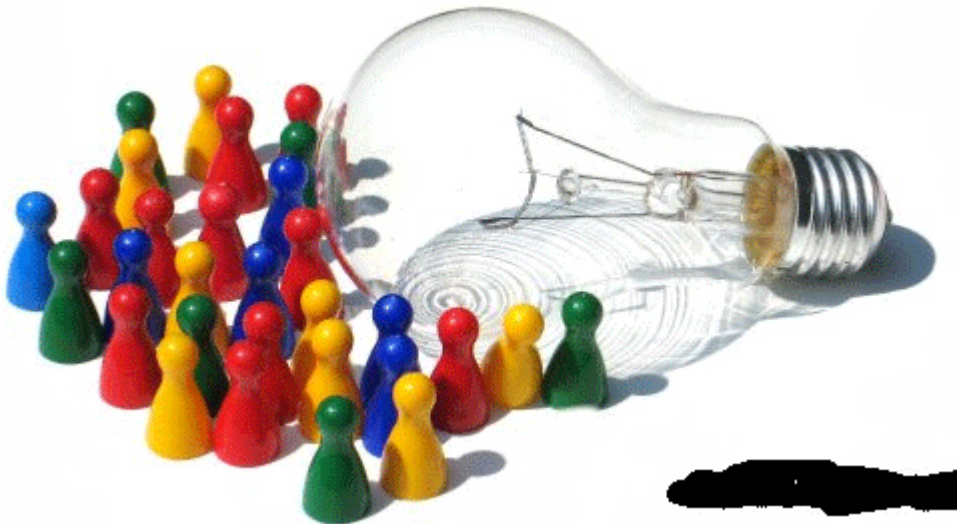
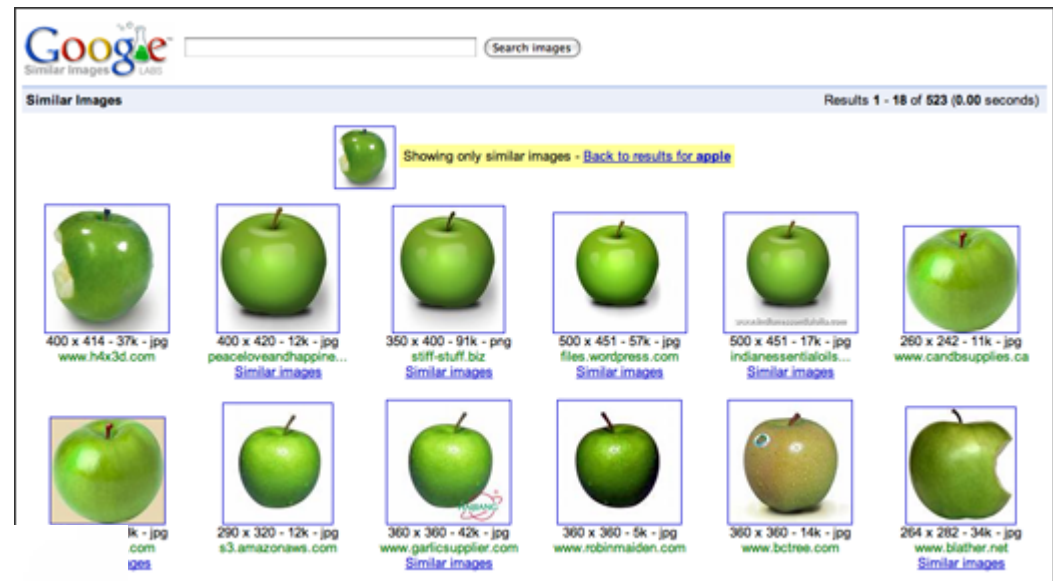
How can GIZMO help ?
GIZMO aims to improve current Idea Management Systems by providing reboost data integration capabilities and additional data analysis tools though rich metadata descriptions. Both of those features are derived from the use of **Semantic Web** technologies to interconnect data inside the Idea Management Systems with assets published by other systems and across the World Wide Web. For details on how it is possible to exploit the benefits of **Semantic Web** in Idea Management see **use cases**.

The problem

- Too many ideas to be analysed
- Many ideas are similar



Is it easy to define what is 'similar'?



Similar \neq Equal

Some examples...

SIMILAR = DUPLICATE

Include Search String in Brainstorm Results Page

[View](#) [Voting details](#) [Edit](#) [Workflow](#) [Access control](#) [Reviews](#) **[Similar Ideas](#)** [Devel](#)

[Alt_idea Ideas \(0\)](#)	[Alt_solution Ideas \(0\)](#)	[Complements Ideas \(0\)](#)	[Details Ideas \(0\)](#)
[Disjoint Ideas \(0\)](#)	[Duplicates Ideas \(1\)](#)	[Excludes Ideas \(0\)](#)	[Extends Ideas \(0\)](#)
[Generalizes Ideas \(0\)](#)	[Iss_duplicated Ideas \(0\)](#)	[Iss_extended Ideas \(0\)](#)	[Related_topic Ideas \(0\)](#)
[Similar Ideas \(0\)](#)			

Duplicates Ideas:

[Brainstorm](#)  :

Brainstorm

When you search for some words in Brainstorm - you get the result, but nowhere on the page you can see what you were searching for. Sometimes I have two or three tabs open with searches, and I don't r(...)

... examples

Ubuntu LIVE CD Instructions / Marketing Info For Potential User

Category

Uncategorised

DRAFT

0

votes

Sent by on 11/19/2008 - 05:38

Status: Draft

Tags:

Categories:



Same topic, CD, but different ideas (disjoint)

potential user

Reviews

Similar Ideas

Make available a downloadable printable properly formatted document for inclusion with a freshly burned (md5sum checked, and verified) Ubuntu LIVE CD to be given to a potential new Ubuntu user (who may not even know what Ubuntu or Linux even is.) Following is what I folded up with a LIVE CD. I gave to a coworker who is frustrated with windows and is considering purchasing a Mac. This makes it gentle encouraging with no preaching needed (best chance I would bet): This is an Ubuntu Linux "LIVE" CD meaning that the linux operating system and all of the included software runs strictly off the CD. This gives the user the opportunity to "test drive" linux without modifying their existing system in any manner whatsoever. To use it, first make sure that the BIOS is set

Ideas (0) | Details Ideas (0) |
(0) | Extends Ideas (0) |
Ideas (0) | Related_topic Ideas (0)

Ubuntu LIVE CD instru

[Restoring the bootloader by Ubuntu installation CD](#)



--Change Relationship--

Save

Restoring the bootloader by Ubuntu installation CD

If I install Windows after Ubuntu, it's impossible to boot Ubuntu until I install again GRUB following several instructions. My idea is adding the option "Restore bootloader" in the list which appears(...)

Author:

Proposal: similarity relationships

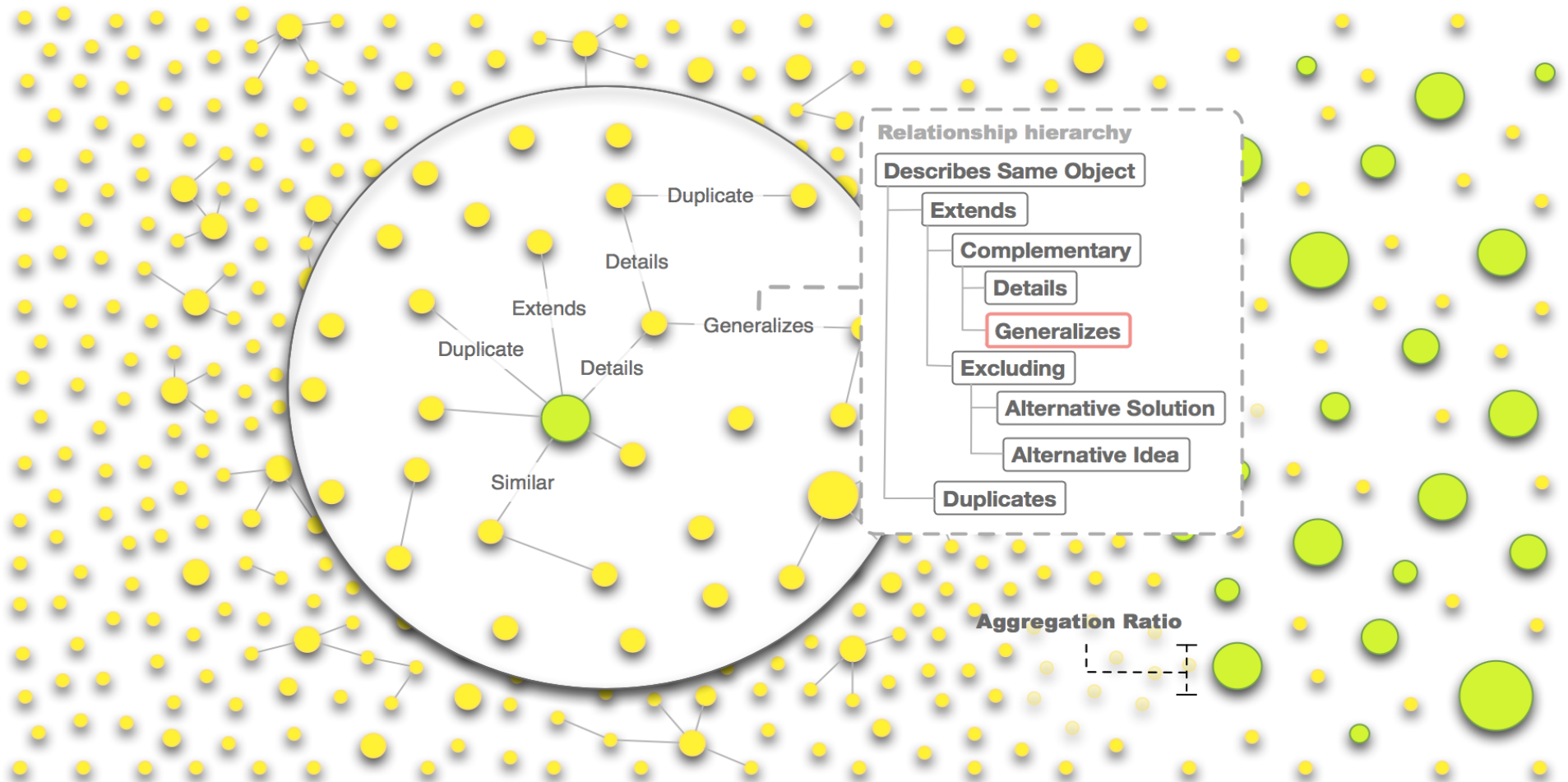
A Based on knowledge	Relationship existing between knowledge content of ideas created independently
A1 Similar	Ideas similar to each other
A1.1 Describes Same Object	Ideas that propose a similar innovation for the same item
A1.1.1 Extends	One idea extends other
A1.1.1.1 Complementary	Ideas that can work together
A1.1.1.1.1 Details	One idea focuses on part that other neglects
A1.1.1.1.2 Generalizes	One idea describes a more broad vision of other
A1.1.1.2 Excluding	Implementations of ideas exclude each other
A1.1.1.2.1 Alternative Solution	Ideas refer to the same object and problem but solved in different ways
A1.1.1.2.1 Alternative Idea	Two completely distinct ideas that in effect are impossible to implement together
A1.1.2 Duplicates	Ideas describe exactly the same innovation
A1.2 Describes Related Object	Ideas that propose innovation for different objects that are somehow related to each other
A2 Disjoint	Ideas not having any meaningful similarities
B Based on Action	The relationship is created by an action operating on both ideas by a user of the system
B1 Based on Moderator Action	Action taken by moderator of the system in reaction to submitted ideas and relationship annotations
B1.1 Follows	Implementation of an idea should follow some other idea
B1.2 Proceeds	Implementation of an idea should proceed some other idea
B1.3 Merged	Two ideas merged into a single one
B2 Based on Innovator Action	Relationships created based on user interaction with ideas
B2.1 Originates	Ideas created by extending some other idea
B2.2 Is version	Created by updating an idea (e.g. in reaction to community feedback)
B2.3 References	One idea referencing other idea (or resource from outside the system)

Proposal Similarity Relationships

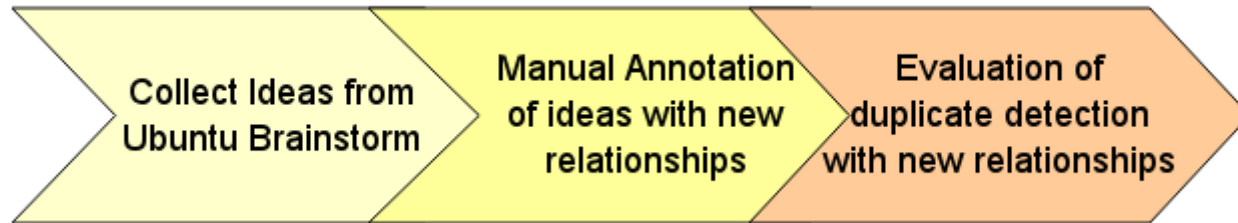
IDEA GENERATION

RELATIONSHIP ANALYSIS & ASSESSMENT

IDEA CLUSTERING



Evaluation methodology



Metric	Metric Value
Idea number	21690
Comments number	133090
Users number	10062
Implemented Ideas number	576
Amount of Votes cast	2608917

Semantic scrapper, available at
<http://www.gsi.dit.upm.es/index.php/en/software/details/1/2/software-scrappy.html>

Manual annotation



CREATE NEW IDEAS AND COLLABORATE WITH US TO MAKE SEMANTICALLY EMPOWERED INNOVATION COME TRUE

Browse: IDEAS | IDEA CONTESTS

Search Ideas...

Filter Status: ALL | DRAFT | UNDER REVIEW | EXISTS | ACCEPTED | REJECTED | IMPLEMENTED

Idea title: User always confused about software update

[Full-text Search | Taxonomy dist=1 Search]

Similar Idea by Title:

Enter similar Idea title

Suggestions:

Instead of typing Idea title, choose a related Idea from the suggestions list.

- The update process becomes exhausting.** --Select Relationship--
- update open arena in the repository.** --Select Relationship--
- Improve update process.** --Select Relationship--
- Ask for application restart after security update.** --Select Relationship--
- update the blog.** --Select Relationship--

Add Relationships

Cancel

- ✓ --Select Relationship--
- Alt_idea
- Alt_solution
- Complements
- Details
- Disjoint
- Duplicates
- Excludes
- Extends
- Generalizes
- Iss_duplicated
- Iss_extended
- Related_topic
- Similar

Relationship Type:

--Select Relationship--



Create New Idea

Idea Categories

Ideas Comments

- o Uncategorized (10821)
- o System (3102)
- o Others (2036)
- o LookAndFeel (2035)
- o Usability (1449)
- o Internet & Networking (1024)
- o Multimedia (971)
- o Installation (903)
- o HardwareSupport (716)
- o Accessibility (683)
- o Graphics (401)
- o Office (375)
- o Marketing (371)
- o Security (341)
- o Gaming (258)
- o Programming (228)
- o Server (196)
- o Documentation (111)
- o Quality (107)
- o Education (90)
- o Ideas/commentsModeration (90)
- o IdeaStructure (67)
- o WebsiteStructure (57)
- o WebsiteNavigation (51)
- o AdditionalSoftware (25)
- o DeveloperFeedback (23)
- o Brainstorm (1)
- o Scientific_methodHttp://en (1)
- o Free_web_browsersSuchAsMidori,Epiphany
- o Strange-----
- o SomeIdeasAreVeryStrange (1)

Experiment I

- Goal: determine if all the relationships are useful, apart from duplicate relationship
- We compare our manual annotation with the annotation of duplicate available in Ubuntu Brainstorm



Results Experiment I



- 76.7% new relationships compared with the original IMS

COMPARISON OF RELATIONSHIP COUNT ACROSS DIFFERENT EXPERIMENTS (200 IDEAS ANNOTATED, 5 RELATIONSHIPS MAX. PER EACH, NO INHERITANCE OR TRANSITIVE RELATIONSHIPS REASONING)

Ubuntu Brainstorm			
Duplicate	249		
Gi2MO Relationships			
total 440 (328 without duplicates)			
similar	4	disjoint	558
related object	111	extends	2
is extended	3	complements	0
details	136	generalizes	27
excludes	0	alternative solution	19
alternative idea	26	duplicates	112
is duplicated	0		

Experiment II



- Goal: new relationships help to identify duplicates and reduce the data set
- We compare
 - Detected duplicates in Ubuntu
 - Detected duplicates in our dataset based on the new relationships
 - 200 ideas with 5 manual annotations suggested by Lucene
 - Same as before but taking into account the hierarchy

Results II



- Ubuntu: 1.13% of duplicate ideas of entire dataset
- Data set with relationships: 0.5%
- Data set with relationships + hierarchy: 1.95%

Relationship	No Inheritance		Inheritance	
	No Transitivity	Transitivity	No Transitivity	Transitivity
Similar	0.02	0.02	2.85	3.37
Related Object	0.72	0.75	0.72	0.75
Extends	0.01	0.01	1.39	1.52
Complements	0	0	1.06	1.18
Details	0.87	0.90	0.87	0.90
Generalizes	0.18	0.21	0.20	0.21
Excludes	0	0	0.29	0.30
Alternative Solution	0.12	0.12	0.12	0.12
Alternative Idea	0.17	0.18	0.17	0.18
Duplicates	0.71	0.71	0.71	0.73

Experiment III

- 558 out of 1000 ideas are not related each other (so, they are not similar)
- Analyse similarity based on other annotations:
 - Trigger type
 - Innovation type
 - Proposal type
 - Object type



Gi2MO Types

Idea Title: More buttons on the tablet.

Idea Summary:

I would like to propose adding more physical buttons on the 9 inch tablet that is currently available in your offer. When using the tablet I feel that the single 'home' button is not enough for many activities that the tablet is advertised for making the experience bad.

For example, for reading ebooks, it would be very useful to have "back" and "forward" buttons for scrolling pages of the book. I own a e-paper reader and I think those buttons could be also used for different activities (for example web browsing or games).

Trigger

Observation Type **Faulty Experience**

Creativity Origin **Object Interaction**

Associated Object **Other Object** **Object Relation** **Competitive**

Associated Object **Other Object** **Offering Placement** **Other Party**

Innovation

Target Audience **Existing Audience**

Originality **Incremental** **Additive**

Relative to **Current State** **Organisation** **Product Line**

Proposal Type

Request

Object

History Relationship **Evolutionary**

Structure **Element**

Type **Product** **Specific Product**

Offering Placement **Existing** **Additive**

Results Experiment III



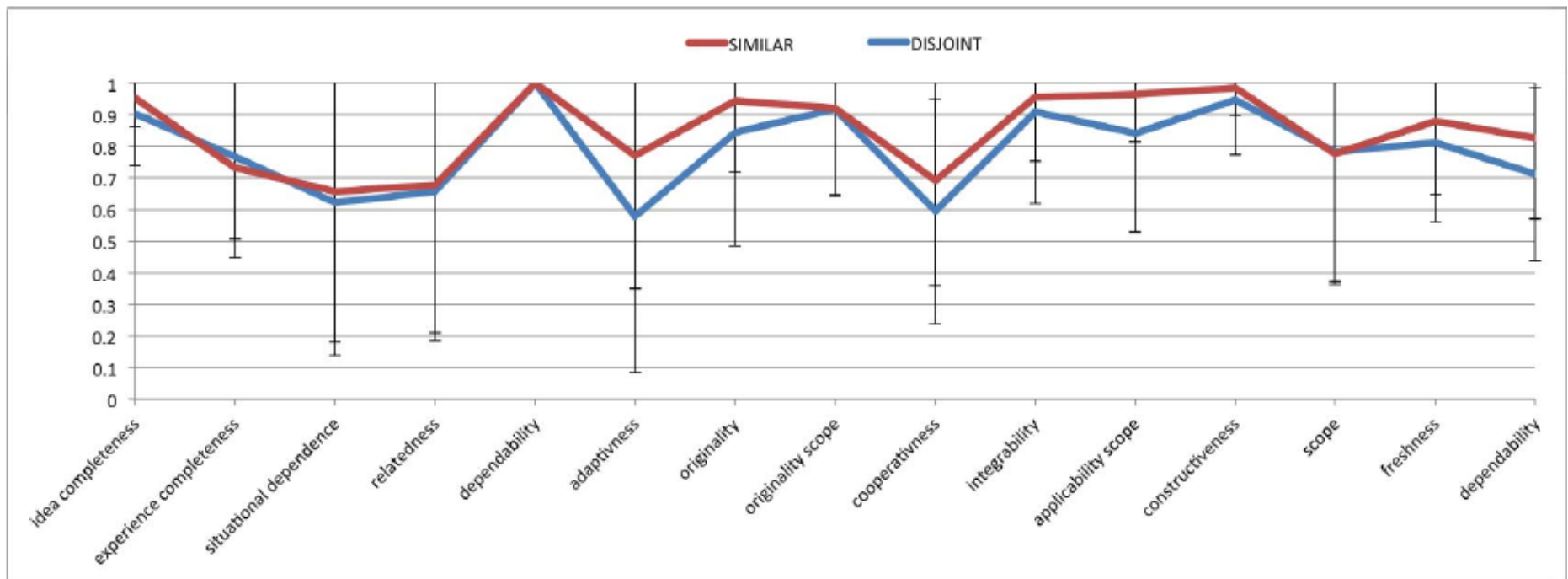
- Calculated similarity S between two related ideas (i_A, i_B) for 50 ideas for Metric M_x

$$S(i_A, i_B, M_x) = 1 - |M_x(i_A) - M_x(i_B)|$$

Metric/Relationship	Similar	Disjoint	Duplicate	Related Object	Extends	Complements	Excludes
Completeness	0.18	-0.19	0.08	0.03	0.11	0.08	0.07
Experience Completeness	-0.04	0.06	0.07	0.01	-0.09	-0.07	-0.04
Situational Dependence	0.01	-0.03	0.02	0.05	-0.04	-0.05	0.01
Relatedness	0.01	-0.02	0.11	-0.04	-0.07	-0.02	-0.08
Adaptiveness	0.18	-0.20	0.01	0.01	0.18	0.12	0.11
Originality	0.15	-0.17	0.06	0.05	0.09	0.05	0.07
Originality Scope	0.06	-0.01	0.08	-0.14	0.13	0.06	-0.05
Cooperativeness	0.14	-0.14	0.12	0.03	0.04	0.06	-0.02
Freshness	0.09	-0.09	0.01	-0.11	0.15	0.10	0.09
Integrability	0.24	-0.25	0.08	0.02	0.19	0.16	0.07
Applicability Scope	0.14	-0.14	-0.01	0.01	0.10	-0.06	0.08
Constructiveness	-0.02	-0.01	0.01	-0.05	0.00	0.14	0.08
Scope	0.11	0.13	-0.01	0.09	0.07	0.09	-0.02
Object Dependability	0.24	-0.21	-0.01	0.01	0.25	0.21	0.11

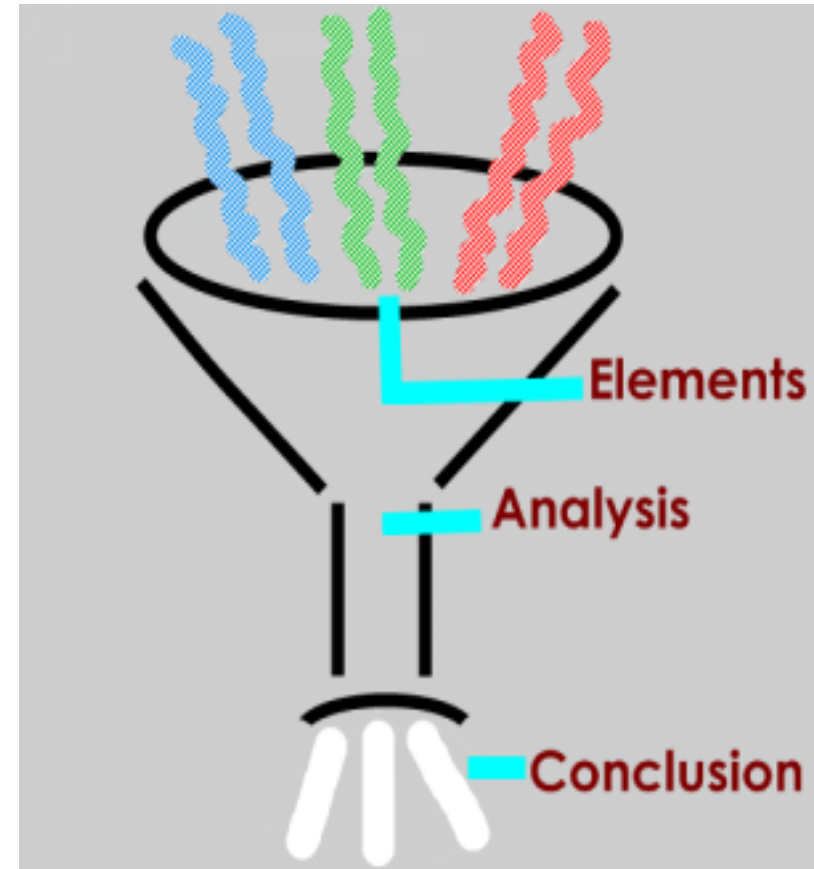
Analysis

- Same correlation in similar and disjoint idea subsets with the analysed metrics



Conclusions

- Semantic relationship can improve the detection of similar ideas
- Relationship hierarchy and transitivity improve similarity detection
- Other annotations (Gi2MO types) and associated metrics do not help for detecting similar ideas



Questions?



It's QUESTION TIME !!