Attacking information overload in software development

Gail Murphy

University of British Columbia
Tasktop Technologies

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sumerian language
clay tablet
2400-2200 BC

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gang capital
Globe and Mail - 1 hour ago
VANCOUVER - Another shooting rocked Vancouver
on Tuesday, leaving one man dead and adding to a
grim tally that includes a young mother gunned down Monday as she
drove with her four-year-old son in the back seat.

Vancouver mayor calls for metro police force
Vancouver mayor wants Metro Vancouver police force

GM, Chrysler seek nearly $22 billion more
US loans
Reuters - 4 hours ago
By Kevin Krolicki and Poornima Gupta
DETROIT (Reuters) - General Motors Corp and Chrysler LLC
requested nearly $22 billion in additional US government loans and
said they had reached tentative deals with the United Auto Workers
union to reduce labor...

CRTC fields proposals to regulate the
Internet
Globe and Mail - 1 hour ago - all 117 articles »

Calgary Transit users can now plan trips
using Google tool
CBC.ca - 7 hours ago - all 13 articles »

Rodriguez’s Timeline Reveals Inconsistencies
New York Times - 1 hour ago -
all 2,223 articles »

Salma says ‘I do’
Toronto Star - 18 hours ago - all 761 articles »

Doctors call for weight loss Industry
regulation
CBC.ca - 12 hours ago - all 31 articles »

Parents not told Alfie was dad-to-be
The Sun - 2 hours ago - all 1,440 articles »

Glass in hamburger sold at Kelowna store
from broken clock...
Edmonton Sun - 16 Feb 2009 - all 28 articles »
Struggling to Evade the E-Mail Tsunami

By RANDALL STROSS
Published: April 20, 2008

Digital Domain

Declare Email Bankruptcy

Copyright wonk (and Wired columnist) Lawrence Lessig hit upon a novel tactic after spending 80 hours trying to clear out his backlogged inbox: surrender. "Bankruptcy is now my only option," he wrote in a mass message to his correspondence creditors. Here's how Lessig erased his debts and turned over a new leaf.

Social Network Exhaustion (or Facebook Bankruptcy Redux)

14 million people interacted with Facebook Applications in August

Written by Max Freiert (contact - e-mail) -- September 14th, 2007 | Share - Save - E-mail

GM, Chrysler seek nearly $22 billion more US loans

GM, Chrysler ask for more US loans

GM, Chrysler seek nearly $22 billion more US loans

Doctors call for weight loss Industry regulation

Doctors recommend weight loss industry regulation

New York Times - 1 hour ago - all 2,300 articles

Salma Hayek

Toronto Star - 16 hours ago - all 761 articles

Doctors call for weight loss Industry regulation

CBC.ca - 12 hours ago - all 31 articles

GM, Chrysler ask for more US loans

GM, Chrysler seek nearly $22 billion more US loans

GM, Chrysler seek nearly $22 billion more US loans

Doctors call for weight loss Industry regulation

Doctors recommend weight loss industry regulation

Doctors call for weight loss Industry regulation

Doctors call for weight loss Industry regulation
information explosion
information overload
indecision
repetition
from

anywhere, anytime, anyone

to

the right information at the right time, in the right place, in the right way
to the right person

G. Fischer, Int’l Workshop Series on RFID, 2004
challenge: weak structure

some explicit connections

many inferred connections
Bugzilla – Bug 246929

SWT_AWT.new_Shell not working in Cocoa

Summary: SWT_AWT.new_Shell not working in Cocoa

[Eclipse] Bug#: 246929
Product: Platform
Component: SWT
Status: ASSIGNED
Resolution:

Hardware: Macintosh
OS: Mac OS X - Cocoa
Version: 3.5
Priority: P3
Severity: normal
Target Milestone: ---

URL:
Whiteboard:
Keywords:
Depends on:
Blocks:

Show dependency tree

People
Reporter: Scott Kovatch <skovatch@adobe.com>
Assigned To: Scott Kovatch <skovatch@adobe.com>
QA Contact:
CC: el451@pobox.com
    antoine@lunar-ocean.com
    c.hauser@active.ch
    codex69@gmail.com
    eclipse@gerdcastan.de

Attachments
Add an attachment (proposed patch, tociacao, etc.)
software development: a subset with stronger structure
right information  right time
right place  right way
right person
group memory

episodic memory

Hipikat

Myllyn
group memory: Hipikat

across time and space, developers leave a digital trail of information about a project

form an implicit group memory from the digital trail

enable a developer to query the group memory for pertinent information

joint work with Davor Cubranic
information retrieval

Person writes Message
Person posts Message
Message writes File revision
Message works on Change/Bug
Message reply to Document
Document similar to Change/Bug
Document similar to Message
File revision implements Document
File revision >356,000
Message >56,000
Change/Bug >69,000
Person writes Message, which works on posts. Message can reply to similar to Change/Bug, which implements Document. File revision has >356,000 documents similar to Change/Bug, with >69,000 posts and >56,000 comments about Change/Bug.
does it work?

20 random bugs from Eclipse; assess files recommended
precision: 0 to 0.56; recall: 0 to 1

---

easy task

- 75% of newcomers handled special cases correctly compared to only 25% of experts

---

difficult task

- 50% of newcomers met basic req. compared to 75% of experts
right information? right time?
right place? right way?
right person?
right way?
right way?

weak rationale for recommendations

significant cognitive effort to apply information overload

cognitive overload
episodic memory: Mylyn

as a developer works, build a task context that includes a degree-of-interest (DOI) for each item of information interacted with

focus the display of information using a task’s context

support collaboration through sharing of task contexts

joint work with Mik Kersten
public IInteractionElement processInteractionEvent(final InteractionContextManagerEvent event, boolean notifyListeners) {

    boolean alreadyNotified = false;
    if (isContextActive()) {
        List<InteractionElement> interestDelta = internalInteractionContextManager.getEventDelta(event);
        if (notifyListeners) {
            notifyInterestDelta(interestDelta);
        }
    }
    return processInteractionEvent(event, notifyListeners);
}
task (bug) #1

task (bug) #2
public static InteractionEvent makePreference(String kind) {
    return new InteractionEvent(InteractionEvent.Kind.KIND_PREFERENCE,
    // contribution
    /* */
    *
    * For parameter description see this class's getter.
    */
    public InteractionEvent(Kind kind, String structureKind, String handle, String originId, String detail, String delta, float interestContribution) {
        this(kind, structureKind, handle, originId, "null",
        // contribution
        /* */
        *
        * For parameter description see this class's getter.
        */
        this.kind = kind;
        this.structureKind = structureKind;
    }
<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Description</th>
<th>Applies to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filtering</td>
<td>Exclude display of elements with DOI below a threshold</td>
<td>List, tree, graphical views</td>
</tr>
<tr>
<td>Ranking</td>
<td>Display elements sorted by DOI values</td>
<td>List views, children within tree nodes</td>
</tr>
<tr>
<td>Decoration</td>
<td>Indicate DOI values with foreground or background colour</td>
<td>Any view</td>
</tr>
<tr>
<td>Expansion management</td>
<td>Expand tree nodes to show elements with certain properties</td>
<td>Any tree view</td>
</tr>
</tbody>
</table>
task (bug) #1

task (bug) #2
does it work?

field study with 16 industry participants

edit ratio = # edits / # selections
right information?  right time?
right place?  right way?
right person?
instead of
500,000 programmers are working like this.
development tasks have emergent structure
an anchor for other recommendations

run unit tests related to task context

+ enables easier running of more cases
an anchor for other recommendations

active search
- difficult to scope
an anchor for other recommendations

Hipikat-like
yet to be built!
right way?

- reduces friction
- encourages flow
- information overload
- cognitive overload
what about other knowledge workers?

interaction
relatively agnostic
to target
### knowledge worker field study (early Mylyn)

<table>
<thead>
<tr>
<th>average path length</th>
<th>average directory density</th>
<th>scattering</th>
<th>tagging ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5</td>
<td>0.1</td>
<td>1.5</td>
<td>0.3</td>
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<tr>
<td>2.7</td>
<td>0.2</td>
<td>1.1</td>
<td>0.9</td>
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<tr>
<td>3</td>
<td>0.1</td>
<td>1.4</td>
<td>0.4</td>
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<tr>
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<td>0.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>0.01</td>
<td>1</td>
<td>0.4</td>
</tr>
</tbody>
</table>
Tasktop (extend Mylyn beyond programming)
SO...

I’ve tried to tell Stuart he’s over-loading himself with too much information but …..
overload leads to

indecision

repetition

memory-model inspired attacks

Hipikat and Mylyn
recommendations can be about less and not just about more

www.cs.ubc.ca/~murphy
www.tasktop.com