how applications got on your mobile:

what can you not get for your mobile?

I wish my mobile was more… mobile!
my new PC is a mobile phone
two inventions
PCs took over not only our workplaces...
but also communication...
...and even play
characterising features:
TV-size screen & typewriter keyboard
screen

keyboard
1973—again
even more personal & it supported communication
a very familiar component was missing
screens were added
screens were added
and **screens** evolved
phones took an many roles...
omnipresent phones replace omnipresent PCs—in some areas
omnipresent phones replace omnipresent PCs—in some areas
omnipresent phones replace omnipresent PCs—in some areas
yet, one class of tasks refuses adaptation to mobile:
those that require space
those that require space
Are Moore’s Law and hardware miniaturization going to fix the problem?
it is all “ability vs. mobility”
rich ecosystem of devices
this talk is about the 
(constuctive) friction at this boundary
how your desktop apps got on your mobile…

what applications can you not get?

I wish my mobile was more… mobile!
PART 1: squeezing things in
But Kirkpatrick's efforts to understand the life history of an elusive monkey with bright red lips and a smudged nose have taken him further afield than most.
fisheye

[Carpendale UIST’01]
view mode
edit mode
focus control
left hand mode
clear

[link, chi’04]
[lam & baudisch, chi'04]
Book Review: Understanding the Linux Virtual Memory Manager

Virtual memory is one of the most important subsystems of any modern operating system. Virtual memory is deeply intertwined with user processes, protection between processes and protection of the kernel from user processes, efficient shared memory, communication with IO (DMA, etc.), paging, swapping, and countless other systems. Understanding the VM subsystem greatly helps understanding how all other parts of the kernel work and interact. Because of this, "Understanding the Linux Virtual Memory Manager" is a great guide in better understanding and working with the entire kernel.

On the Future of GTK+

As GUADEC, Owen Taylor and the other GTK+ developers got to discuss the future of the toolkit.

Saving Private Java: TheTechnologist Fixes Java's Problems

Here is an 8-part editorial on Java's problems and suggested fixes.

Metisse - New Looking Glass Alternative

From Slashdot, Metisse is a special X build and window environment working with OpenGL and accelerated graphics.
Technology NewsBits - No, these are not ads

Technology

News Bits

Revolution 2.2.1 Released Fire Internet Explorer and Outlook Express The Free Groupware Killer Solution for SMBs Microsoft has released SQL Server 2005 Express Technical Preview

Unununium integrates Python CERT recommends anything but IE Windows Loses Another Customer to Sun's JDS Firefox 9.1 has been released CELF turns one, releases first Specification and Reference Design

BlueGlue = RedCarpet v2 for Java
MEGA-ABFINDUNG

Bertelsmann zahlt Ex-AOL-Managern 160 Millionen Euro

Dagegen ist die umstrittene Abfindung an den Ex-Mannesmann-Vorsitzenden Klaus Esser Klein. Bertelsmann zahlt an zwei Geschäftsführer der damaligen Tochter firmen in Deutschland insgesamt 30 Millionen Euro.
use freed space to grow remaining (relevant) content
provide visual context at all times:
placeholders
there are 4 ways to select a rectangle

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ok, so clever compression fits lots of things into smalls screens
what about the rest?

what characterizes the class of apps that have not made it to the app stores?
some tasks just **need space...**
hand-held is **not** the same, **no immersion**
some tasks just need space...
space
on demand
6th sense

[Mistry & Maes, CHI’09]
PART 2: off-screen things that are not there
chameleon

[Fitzmaurice ‘93]
peep hole
but how do we find things in that huge space off-screen?
halo

[Baudisch & Rosenholtz, CHI’03]
virtual shelves

[Li, UIST’09]
egocentric
unlike gestures...
virtual shelves

...actually spatial

[Li, UIST’09]
imaginary interfaces

watching your hands...  

[Gustafson, UIST’10]
Karl is meeting a friend for lunch.
draw user interface, interact with it
how to deal with sunlight?
using **space outside the screen**

= alternative to zooming and panning
how are we doing on input?
oddly, my current cell phone is the largest... I have ever had
why is this thing so... huge?
I wish my mobile was more mobile... mobile
my personal, skewed, subjective history of touch
fat finger
fat finger
the pioneers get the arrows...
fat finger
back-of-device interaction
1 gestures

[Wobbrock at al]
behind touch

2 buttons

[Hiraoka, IPSJ 2003]
2 buttons

[Scott, MSR, 2009]
2 buttons

Apple patent (filed Jan 5, 2007)
gestures + buttons select from a finite number of choices
lucidtouch
pseudo
transparency

[2002]
pseudo transparency
under-the-table

(wigdor at al 2006)

requires 4.5cm targets
borrowing from augmented reality

physical see-through

camera see-through
physical see-through

occlusion remained; fat finger problem remained
great device, but not very small...
thumb buttons
can we go *that small*?
opens up a new space of devices
front = screen

sides = buttons

back = touch
so touch is inaccurate
or is it?
it's not!
70% of the fat finger problem are a myth
users are very accurate—users and pointing situations are different
1. target here
2. hit okay
3user

participant 1

participant 2

participant 3

participant 4
humans are different
gets everything a traditional touchpad gets
+ roll, pitch, yaw, & participantID
devices that sense touch and fingerprint already exist
The graph shows the minimum button size results for simulated capacitive, fingerprint, and optical devices. The simulated capacitive device has the largest minimum button size, being 15mm, indicating it is the most accurate among the three, which is 2x more accurate than the optical device. The error bars represent the standard deviation.
How applications got on your mobile:

What can you not get for your mobile?

I wish my mobile was more… mobile!
apps you cannot find in app stores, apps that let users solve hard problems
but why would I do this—it would still be so much more **convenient on my PC**?
because I was **not fully honest** with you earlier. just for once this is not about…
Yes, you.
You control the Information Age.
Welcome to your world.
800 million PCs vs. 6 billion other people. Who are these other people?
what computers are we designing for them?
“The display on your laptop costs **roughly $10 a diagonal inch**. It may drop to $8 or $7, but it will not drop to $2.”

[Negroponte, TED Talk, Feb 2006]

(1) **cost**, (2) **adoption**, (3) **infrastructure**
if not a laptop, what is it going to be?
“According to sources, the only way the laptop could be produced so cheap was by using a small screen and keyboard in a thin, low-cost plastic casing and run by a low-power processor. The product most likely would not have a CD/DVD drive or a hard disk—it would have internet access as its main function with a capability to store data only on external devices like portable hard drives or flash cards which could cost more than the machine itself.”

[Outlook India.com, Feb 2009]
became a tablet—the sakshat

HR Development Minister Kapil Sibal  Friday, July 23 2010
“boasts of performance-grade hardware for a device of its class. It has a 10.5-inch multi-touch colour screen, ARM processor, 2 GB of memory, cloud storage, WiFi b/g and 10/100 Ethernet for connectivity with school networks, a highly-customised OS based on the Linux kernel, supporting Adobe Flash for online videos and interactive educational content, and a digital camera.

[Tech Power Up, July 23, 2010]
engadget says the project is roughly as though out as...
so who can make a robust < $30 device
“Nokia spends… $20 or less for basic models.”
[http://www.businessweek.com, Aug 2006]
the one laptop per child **is already here...**
it’s a...

phone
800 million PCs

(1) cost, (2) adoption, & (3) infrastructure

4.6 billion of them
is the hardware sufficient?
this changes the question
the whole time the question was about making new hardware… the hardware is here.

what we need is

new software
create a stand-alone mobile device
explore  
analyze and compare data (sensemaking)  
publishing, sharing...
a really **hard, multi-faceted** challenge:
software, hardware, operating systems, sociology, ethnography, security…

it is deep enough for **several PhD theses**
challenge #1:
write a good software development environment that runs and compiles on the phone*

*(ignore your dual-mon using colleagues, who say this does not work)*
thanks to my new group at
hasso plattner institute in berlin/potsdam
thanks to my old group at Microsoft Research in Redmond
Questions?
questions

how applications got on your mobile:
squeezing things in

...outlook

what can you not get for your mobile?
spatial cognition

I wish my mobile was more… mobile!
how to design very small mobile devices
my new PC is a mobile phone