

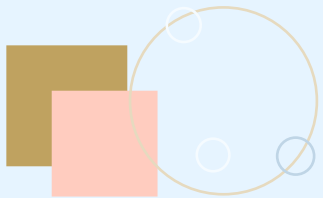


# Eyes-Free User Interaction

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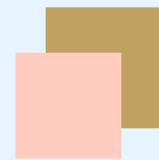
February 9, 2009





# Overview

Android Dialer Contacts Shell Conclusion



**Android**

**Dialer**

**Contacts**

**Shell**

**Conclusion**



# Android Programming



# Android: Engineer's Dream!

Android Dialer Contacts Shell Conclusion

- Smart phones — computer in your pocket.
- Open platform — liberates innovation.
- New I/O — minimize user interaction.

**Bend technology to your will!**



# Innovative User Interfaces

Android Dialer Contacts Shell Conclusion

## Create innovative end-user solutions that:

- Fit into the user's mode of working,
- Avoid one-size fits all solutions,
- Design context-aware solutions,
- Tailor solutions to user's needs.



# Eyes-Free Interaction

Android Dialer Contacts Shell Conclusion

## Not just for blind users!

- Eyes-busy environments —driving.
- One-handed use.
- Minimize explicit user interaction.

Rethink *all* assumptions about the user.



# Devices That Sense

Android Dialer Contacts Shell Conclusion

## Mobile phones make UI design exciting!

- Can capture user intent — keyboard, . . . .
- Can see — camera.
- Can hear and speak — speech I/O.
- Can sense and stimulate touch — touch screen and vibration.
- Can sense motion — accelerometer, compass.
- Can sense position — GPS, cell towers.
- ∴

## Our Android has *many* eyes and ears!



# Eyes-Free Interaction With The Touch Screen





# Using A Touch Screen

Android Dialer Contacts Shell Conclusion

## These are *atomic* tasks:

- Identifying the item to touch.
- Touching item to activate it.
- Eyes-free use requires help with the former.
- Activation should produce appropriate feedback.



# On-Screen Touchpads

Android Dialer Contacts Shell Conclusion

## Eyes-Free use of an on-screen touchpad:

- Need to *see* the buttons to know where to touch.
- Because: buttons use *absolute* positioning.
- Conclusion: (*wrong*) — you need to see to use a touch screen!
- Solution: Relax constraint of absolute positioning.

## What if we used *relative* positioning instead?



# Phone Keypad

Android Dialer Contacts Shell Conclusion

## Eyes-free phone dialer:

- Keypad centered where you touch — relative positioning.
- Users already know layout of a phone keypad.
- Can *stroke* from the center for a desired digit.

Enables eyes-free one-handed dialing!



# Dialer Feedback

Android Dialer Contacts Shell Conclusion

Enables one-handed, eyes-free use:

- Buttons *vibrate* when you move over them.
- Augmented by auditory feedback.
- Pressing buttons produces spoken and tactile feedback.
- Shake to erase input.

Synchronized auditory and haptic feedback is key.



# Text Input Via Touch Screen



# Contact Manager

Android Dialer Contacts Shell Conclusion

**No one dials phone numbers any more!**

- Browsing contacts using touch screen.
- Finding contacts.
- Managing contacts.



# Entering Text Input

Android Dialer Contacts Shell Conclusion

## Extending stroke dialer for textual input:

- Arrange letters in 4 concentric circles.
- Strokes *access* distinct circles.
- Choose desired letter by *tracing* chosen circle.

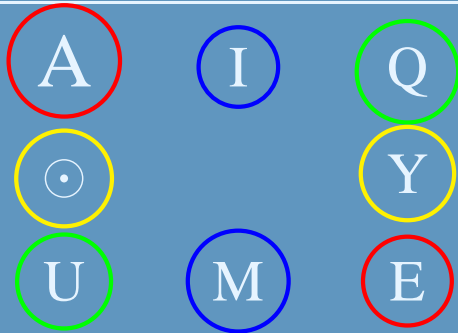
Any letter is at most 3 steps away!



# Keypad Layout

Android Dialer Contacts Shell Conclusion

**Gesture: Pick circle, and trace to desired character.**



Letter	Gesture
A	Stroke up to the left
B	Stroke A, trace right
E	Stroke down to the right





# Managing Contacts

Android Dialer **Contacts** Shell Conclusion

## Contacts live in the cloud.

- Contacts managed over the network.
- Updated automatically on the device.
- No more editing contacts with two fingers!



# Marvin: Eyes-Free Shell



# Eyes-Free Shell

Android Dialer Contacts Shell Conclusion

## Marvin: Shell for launching eyes-free interaction.

- Home screen provides one-touch access to oft-used tasks.
- Uses stroke dialer for launching tasks.
- Code is Open Source.

<http://eyes-free.googlecode.com>



# Talking Compass

Android Dialer Contacts Shell Conclusion

- Compass is one touch away on the home screen.
- Speaks current bearing.
- Provides succinct or verbose feedback.
- Augmented by auditory tones and vibration for cardinal directions.



# Weather Forecast

Android Dialer Contacts Shell Conclusion

- Android phone knows its location.
- Current weather is therefore just one touch away.
- Retrieves RSS weather forecast.
- Speaks weather headline.



# Device Status

Android Dialer Contacts Shell Conclusion

- Device status available as single touch gestures.
- Airplane mode.
- Date and time.
- Battery status.



# Conclusion



# Summary

Android Dialer Contacts Shell Conclusion

- Programmable smart phones are an engineer's dream!
- I/O peripherals open up new UI avenues.
- Provide desired information with minimal user interaction.

**Profound impact on how we work and play!**





# Watch Computing Take Off!

Android Dialer Contacts Shell Conclusion

