Mid Presentation

https://www.canva.com/design/DAFMIXnuf0A/-e-23P4OB7vU2Et4KxMXrg/view?utm_content=DAFMIXnuf0A&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Final Presentation

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HCI concepts

AI
Socially effective
Context of culture, language
Design Features
Purpose of the designs
The efficiency of design decisions from HCI perspective
How the user behaviour informs the system provider's decisions
Cultural perspectives
User Perception

Buttons Vs Gestures
3-Button Vs Gesture navigation
Double Tap Vs Power Button
Screenshot evolution
Slide Vs Tap to answer
Tap Vs Gesture typing
Gesture shortcuts
Age groups' adaptation to the new gesture-based system
Additional Topics:
Trackpad Vs Mouse+Keyboard

Type of gestures - https://www.mdpi.com/1424-8220/21/4/1328/htm

Tap Vs Swipe gestures introduction- https://beconnected.esafety.gov.au/pluginfile.php/47468/mod_resource/content/7/index.html#:~:text=A%20long%20tap%20is%20when,on%20your%20phone%20or%20tablet

This is why there are two different ways to answer an iPhone call (cosmopolitan.com)

Understanding Shortcut Gestures on Mobile Touch Devices (psu.edu)

Topics to research

- Age group vs navigation system

        - (PDF) User-Age Classification Using Touch Gestures on Smartphones (researchgate.net)
- Gesture shortcuts
    - Links
        - Tap or swipe mobile gestures in iOS & Android app design - Justinmind
        - Understanding Shortcut Gestures on Mobile Touch Devices (psu.edu)
        - To Use Or Not To Use: Touch Gesture Controls For Mobile Interfaces — Smashing Magazine
        - Shortcut Gestures for Mobile Text Editing on Fully Touch Sensitive Smartphones (acm.org)
- Trackpad

Evolution of button to gestures (Gesture shortcuts)

- Zoom (magnifying glass (button), double tap, pinch to zoom)
- Refresh
- Menu open

- Scroll
- Pan
- Dismiss notifications
- Refresh
- iPhone paging swipe from left to right to go back
- Overscroll collapse
- Menu open
- Multi-select data
- Android unlock phone

Data Collection

Survey

1. Do you use 3-button or gesture-based system navigation on your smartphone?
2. What do you think is better? Tap or slide to answer or reject calls.
3. What do you use more often to wake/sleep screen? Double-tap or power button
4. Do you use personalised gesture shortcuts? Ex. Opening the camera by making a C on the screen.
5. How often do you use gesture/swipe-based typing? [Scale 0-5]
6. How often do you use a single hand to operate your smartphone? [Scale 0-5]
7. How do you take a screenshot? (Power + volume down button OR three finger swipe OR palm capture OR any other)
8. How often (or how comfortably) do you use the trackpad on your laptops? Do you use an external mouse?
9. How do you refresh a chrome tab? (swipe from above or button)

Results

Final presentation

- Introduction - what are touch screen buttons and gestures
- Motivation
- Problem statement/research question
- Articles and Literature
- Survey
- Findings
- Analysis, HCI concepts - research lens
- Conclusion/Inferences

Ideas to cover

- How do people interact with touchscreens and why do they do it that way
- Explore the design space and evolution of touch gestures on mobile devices
- Logical flow
- Context
- How is complexity in gesture design justifiable?

Topics to cover

- 3-button Vs gesture-based system navigation
- Gesture-based typing
- Adaption of different age groups to gesture-based systems
- Shortcuts gestures
    - answer a call
    - take a screenshot
    - wake/sleep screen (double tap VS power button)
    - personalised shortcuts (draw a C to open camera)
    - open menu, refresh browser tab,
- Trackpad vs mouse and keyboard - optional

Meeting Notes (1)

- What are gestures, what are buttons
- Smartphones? Not xbox
- What context?
- Everyday things, how do people interact, why do they
- 20000 vs 70000
- Don't omit a particular thing, cover everything on a particular thing you focused
- Why are you interested here, evolution?
- Tell everything in the literature review, past work, and what you read
- Tap vs gesture keyboard experiment, or something that connects the literature review
- Logical, flow

Meeting Notes (2)

- Thumb reach
- Human factor

- Posture how you hold your phone
- Is it the price of the phone
- Why people are not using gestures
- The outliers
- The extremes
- Trackpad dynamic - Apple leader
- Different designers/companies are designing different methods to take a screenshot or different gesture based systems
- Cultural aspect - use of gesture based keyboards in US and India
- Age groups cumulative
- Some 50 year olds are smarter - prefer simpler things
- Gestures don't need attention
- Relate to what you learned in class*

Introduction

In the presence of environmental distractions, gestures can offer significant performance gains and reduced attentional load, while performing as well as soft buttons when the user's attention is focused on the phone.
In fact, the speed and accuracy of gestures do not appear to be significantly affected by the environment, and some gestures could be articulated eyes-free, with one hand.
Faster performance
Therefore gestures offer a promising approach for mobile touch-screen interaction that is less demanding of the user's attention.

Hard and soft buttons

Gestures can be committed to muscle memory, which helps users focus on their tasks. Gestures also require no dedicated screen space, which is a limited resource on mobile phones.

Gesture-based keyboard

- How do People Type on Mobile Devices?
- Gesture (G):. is the event where the user continuously draws from one letter to another to input a full word. We recognize a gesture if a whole word is inserted after a space character input or after a gesture
- Scientists wanted to develop a faster typing method. Various keyboard layouts were built, but consumer stubbornness left scientists with a difficult challenge to come up with a system that worked in a similar way and could be learnt in minutes.
- By continuous use, this squiggle unique to each word becomes automatic and involuntary.
- THEORY
- RATIONALE
- DESIGN PRINCIPLES

- EXPERIMENT - training and testing of typing skills

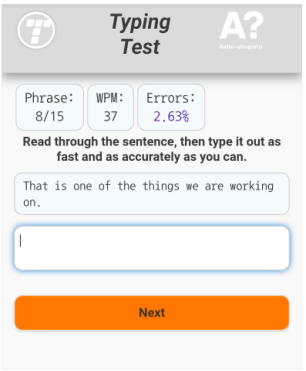


Figure 1: The web-based transcription task. One sentence was presented at a time with the progress shown at the top.

Task and Procedure

We followed the same procedure as Dhakal et al. [11]. The task was to transcribe 15 English sentences, shown one after another. Participants were shown instructions requesting they first read and memorize the sentence, then type it as quickly and accurately as possible. Breaks could be taken between the sentences. After acknowledging that they had read the instructions and giving their consent for data collection, the first sentence was displayed. Upon pressing Next or the Enter key, the user's progress, their speed and error rate were updated and the next sentence was shown. The sentence was visible at all times. The user interface is shown in Figure 1. When all sentences had been transcribed, participants were asked to fill in a questionnaire before they were shown their final result. In addition to the questions related to demographics and typing experience asked by Dhakal et al. [11], we also asked for their typing posture (1- or 2-hand, index finger(s), thumb(s) or other) the keyboard app and layout they used, and whether they used autocorrection, word prediction, or gesture typing (see below). Then, performance results were shown as a histogram over all participants with details on the fastest/slowest and most error-prone sentences (see [11] for details). Finally, participants were offered to transcribe more sentences to improve the performance assessment, which we did not include in the following analysis.

REFERENCES

- https://www.thenationalnews.com/arts/what-is-gesture-typing-the-time-saving-texting-technique-we-might-soon-all-be-using-1.874986
- The word-gesture keyboard: reimagining keyboard interaction (googleusercontent.com)
- https://userinterfaces.aalto.fi/typing37k/resources/Mobile_typing_study.pdf

Button Vs Gesture navigation system

research on how users interact with their phones, how they hold them, speed-of-use, and ergonomics, and studied "how quickly users learned the system, how quickly users got used to the system, how users felt about it."

not every user is comfortable will gestures "especially those with more limited dexterity and mobility

Gestures are harder to learn and can take some adjustment. Gestures can interfere with an app's navigation pattern.

Android Q - standard gesture interface

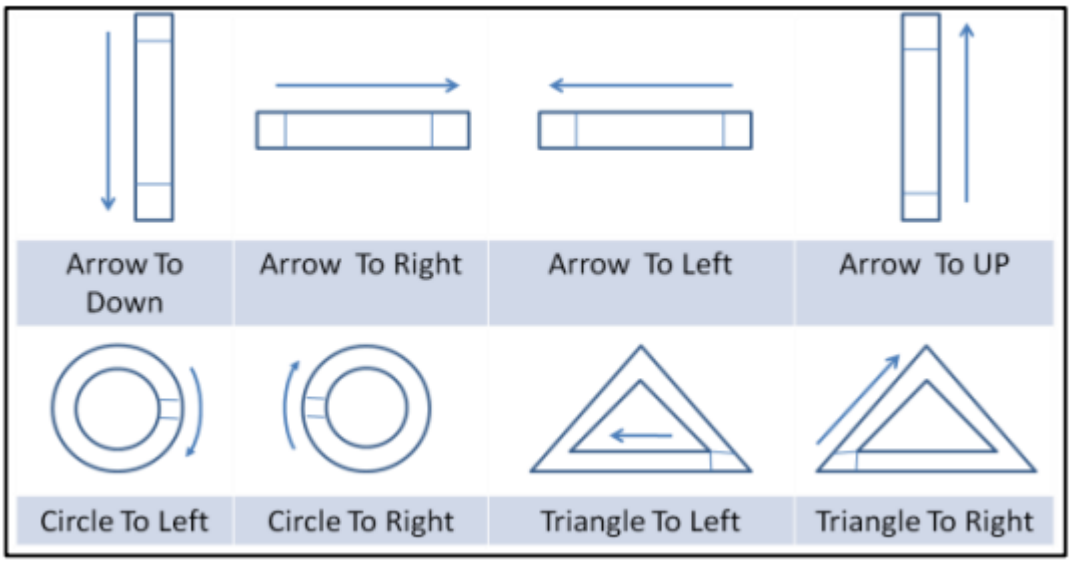
REFERENCES

- https://www.androidpolice.com/weekend-poll-do-you-prefer-gestures-or-buttons-for-navigation-on-android/
- https://mobilepains.com/which-is-better-buttons-or-gestures-android/

- *https://indianexpress.com/article/technology/mobile-tabs/google-android-q-release-navigation-gestures-vs-three-standard-buttons-5890905/*
- https://android-developers.googleblog.com/2019/08/gesture-navigation-backstory.html?m=1
- https://medium.com/androiddevelopers/gesture-navigation-going-edge-to-edge-812f62e4e83e
- https://medium.com/androiddevelopers/gesture-navigation-handling-gesture-conflicts-8ee9c2665c69
- https://www.xda-developers.com/android-q-gestures-back-button/
- The Impact of Gesture Navigation on Mobile Usage (diva-portal.org)

Age Group and Gesture based systems

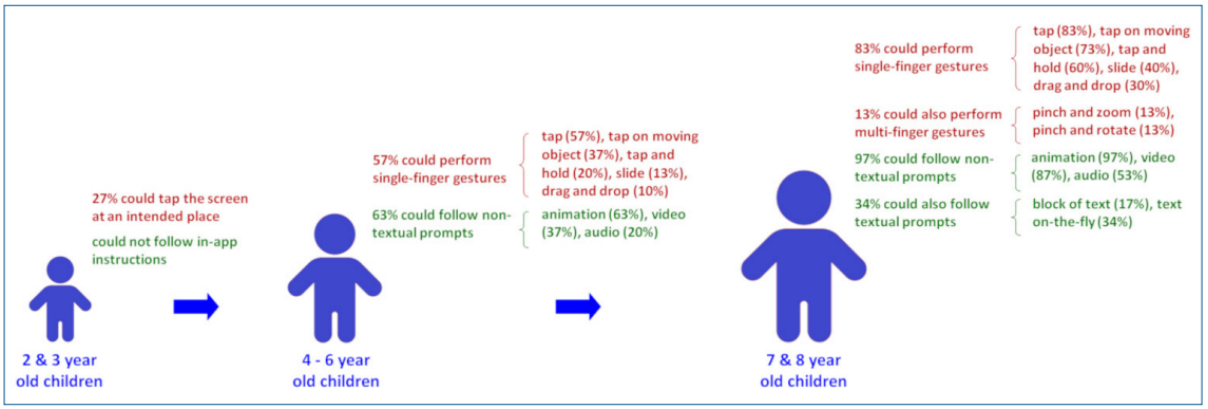
- choosing the right gesture for your mobile UI design really depends on your user base. To design intuitively, designers must rely on previous experience and behavior. User testing and sticking to industry standards is essential to creating an intuitive mobile UI, no matter which gestures are involved.
- Gesture accuracy 39.20% ↓ 92.80%

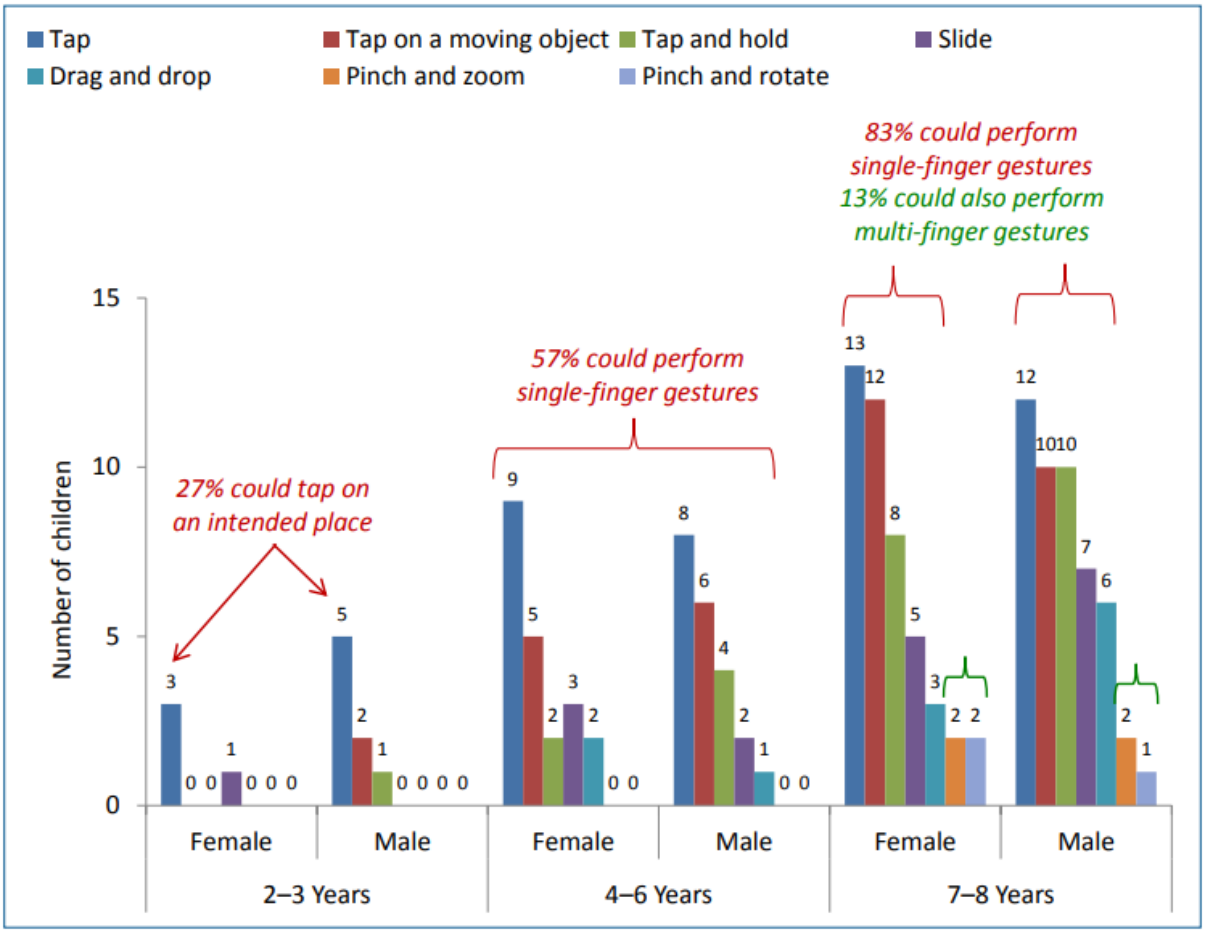


- As people age, their cognitive and/or physical abilities start to degrade and could prevent them from properly using a tablet. For this reason is important to study what kind of skills have the elderly people when they use multi-touch superficies such as smartphones, tablets and netbooks

- About the question “What multi-touch gestures are the people between 61 and 92 years of age able to use?” we found that they are capable of performing all gestures. We showed that not all the tasks are equally feasible but elderly people are able to execute with different levels of complexity. Current applications for elderly people might be missing the opportunity to provide richer gestures within elderly people

abilities, and could be using a gesture that is notoriously difficult for them (e.g., double tap, tap, long pressed). The special elderly people skills that we found in this test, was that elderly people can perform easily scale down (99 % success) and scale up (98 % success) gestures. Consequently, interaction designers have an opportunity to broaden the scope of their interfaces when creating future applications using these especial abilities. The quantitative results also show that there are still challenging gestures for elderly people (double tap, tap, long pressed) with relative's low success rates ranging. These gestures have to be discussed in the context of the interaction aids or design guidelines that application designers should take into account if these touch interactions are included in future applications. Designers would be improve the way to execute these gestures in to do easily to use or execute these tasks for this special segment of population. For example, increasing the time between the first tap and the second (for the double tap gesture), so that they have time to react and this fit their actual motor abilities.

- The task was more difficult for them was the double tap, as it is well known that motor skills at their age can be somewhat severed, and possibly are not flexible enough to perform two taps in a short time interval. The task they preferred, according to the data collected and the final questionnaire, was to scale up and scale down, possibly because in this task they can use both hands on the tablet and this gives them security and firmness.
- 



- Children aged 2 and 3 years could hardly perform any touchscreen gesture (Fig. 2). Only 27% children in this age group could tap on an intended place on the touchscreen. Alternatively, children aged 4 to 6 years were more proficient in using smartphones. A majority of children in this age group were able to perform simple touchscreen gestures. Among the children in this age group, 57% could tap on an intended place on the touchscreen, 37% could tap on an object moving across the screen and 20% could tap and hold at an intended place on the touchscreen. It was observed that most children learn to perform single-finger touchscreen gestures by the age of 7 years. Children aged 7 and 8 years could perform tap (83%), tap on a moving object (73%), tap and hold (60%), slide (40%), and drag and drop (30%). However, only a few children in this age group could perform 2-finger touchscreen gestures like pinch and zoom (13%) and pinch and rotate (10%).
- Children aged 2 and 3 years could not typically follow any in-app prompting technique (Fig. 3). They can use an app only if someone explained it to them in person. However, children typically develop skills to follow in-app prompting techniques by the age of 4 years. A majority of children aged 4 to 6 years (63%) could follow one or more in-app prompting techniques. The most difficult prompting technique that children in this age group could follow was instructions in audio format (17%), instructions in video format (17%) and instructions using animation (37%). Almost all children (97%) aged 7 and 8 years could follow one or more in-app prompting techniques. The most difficult prompting technique that the children in this age group were able to follow was textual instructions (17%), textual instructions on-the-fly (17%), instructions in audio format (20%), instructions in video format

(33%) and instructions using animation (10%). We observed a significant difference between the number of touchscreen gestures that the children could perform and the number of prompting techniques that they could follow ($F= 544.0407$, $P<0.05$). However, we did not observe a significant ($P>0.05$) difference in the number of touchscreen gestures that could be performed by female and male children in any of the 3 age groups (Table 1). Similarly, we did not observe a significant ($P>0.05$) difference in the number of prompting techniques that could be followed by female and male children in any of the 3 age groups (Table 1).

Shortcuts gestures

- Oddly enough, with all of the futuristic appeal and hype paid to gestural controls, the trend isn't universally beloved. In fact, there's a sizeable camp in the design world that considers gestural controls to be a step back in usability.
- The swipe doesn't require the user to interact with any particular element on-screen.
- The downside of the tap is that if user movements aren't precise enough, it can easily be worthless. This is one of the more time-consuming gestures to perform. In order for taps to be executed successfully, the user needs to be focused.
- If the tap doesn't land in the correct location on-screen, the user's tap will be misinterpreted by the system (either ignoring or reacting differently to the user's request). This may not seem too grave, but actually an erroneous gesture can cause frustration and affect the user experience.

The tap gesture is essentially a brief touch of the mobile screen surface with the fingertip. Common uses of this gesture in iOS and Android devices include: Select or submit, Activate, iPhone toggle on/off, Cancel or escape, Enable or disable, Zoom in/out, Zoom in to fit
In contrast, the swipe gesture is a brush of the screen surface with the fingertip. Common interactions with the swipe gesture include: Scroll, Pan, Dismiss notifications, Refresh, iPhone paging swipe from left to right to go back, Overscroll collapse, Menu open, Multi-select data, Android unlock phone

- **GESTURES ARE EASY TO LEARN**
- **TOUCH UIS FREE UP SCREEN SPACE**
- **THOUGHTLESS GESTICULATION**

6/82 button
4/16 button