Building User Interfaces Platform-Specific Design Mobile Design **Professor Yuhang Zhao**



What we will learn today?

- Mobile input
- Microinteractions
- Mobile design patterns

Mobile Input

Mobile devices have unique capabilities, including input and sensing, that expand possibilities for interaction.

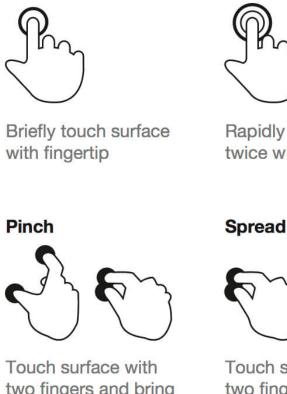
Mobile input primarily centers around the use of touch-sensitive screens that offer two capabilities: *direct manipulation input* and *multi*touch gestures.

Direct Manipulation Input: In web and desktop interfaces, direct manipulation input involves mouse or trackpad input that is mapped to the screen using a *relative* mapping. On mobile devices, this mapping is *absolute*, and the user directly interacts with screen elements.¹



¹Image source

Multi-touch Gestures: Mobile input method include a number of idiomatic gestures dedicated to specific functions.²



Double tap

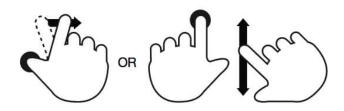
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two fingers and bring them closer together

Touch surface with two fingers and move them apart

Press and drag

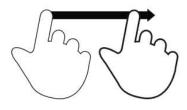
Тар



Press surface with one finger and move second finger over surface without losing contact

²Image source

Drag



Rapidly touch surface twice with fingertip

Move fingertip over surface without losing contact

Flick



Quickly brush surface with fingertip



Press

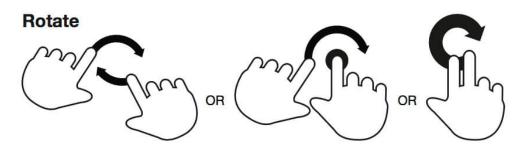


Touch surface for extended period of time





Press surface with one finger and briefly touch surface with second finger

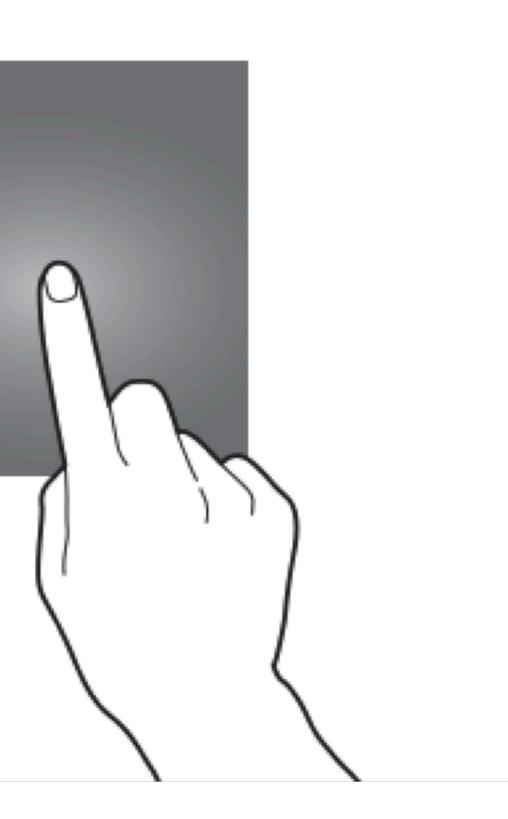


Touch surface with two fingers and move them in a clockwise or counterclockwise direction

Gestures: Tap

Usage: Maps to a "click" on the desktop computer to select objects or to activate/toggle the state of a control.³

³Image source

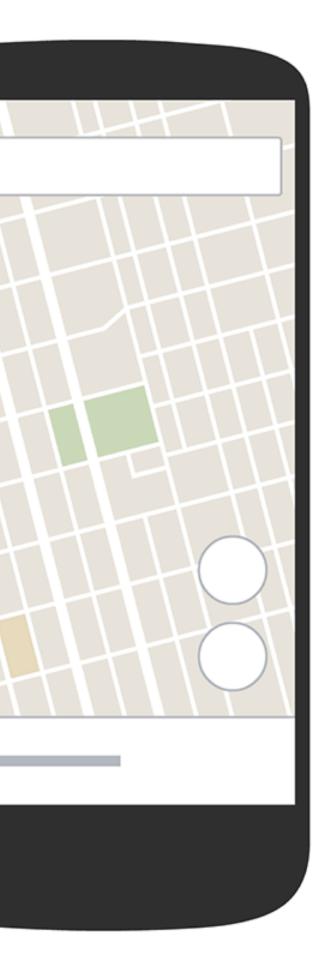


Gestures: Double-tap

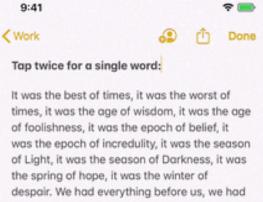
Usage: Zooming in/out content, selecting items in accessibility mode, or selecting text.⁴

⁴ Image source

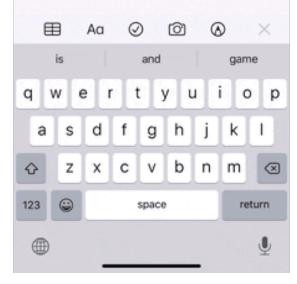
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the spring of hope, it was the winter of despair. We had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way. In short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.



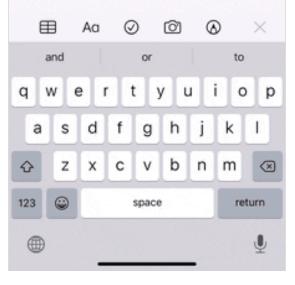
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Done

Tap three times for a sentence:

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair. We had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way. In short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.



⁵<u>Image source</u>

9:41

< Work

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Tap four times for a paragraph:

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair. We had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way. In short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.

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Gestures: Long-press

Usage: Opening contextual menus, previews of content, or enabling editing modes.⁶

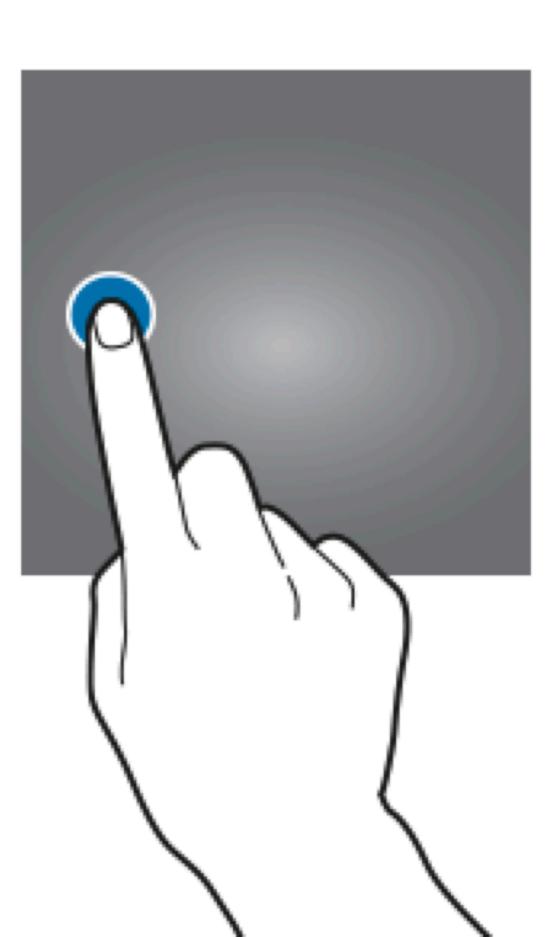
⁶Image source



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4 Spaceport John Powell						
5 Flying with Chewie						
Flying with Chewie John Powell	×					
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Play Next	<u>+=</u>					
Play Later						
Create Station	●))					

Usage: Used to scroll through content, move objects, or adjust controls. These gestures are the most commonly used gestures on mobile devices.⁷

Drag involves a swipe and hold at the same time.



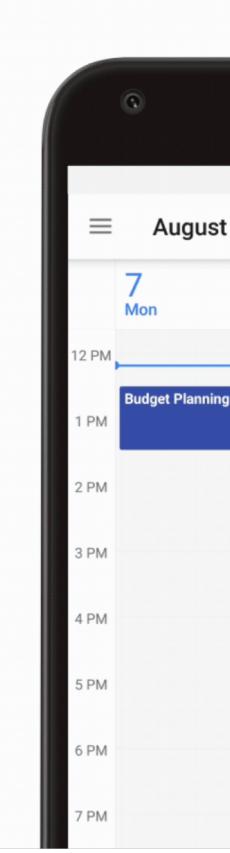
⁷Image source

In scrolling, swiping vertically scrolls through large amounts of content, and swiping horizontally scrolls through carousels, opens drawers, and navigates to the previous/next screen.⁹



⁹Image source: left, right

Dragging can also move objects, such as shapes on a canvas, or operate controls, such as knobs, switches, sliders, and virtual control pads.¹⁰



¹⁰ Image source

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	Contracts Update	

Finally, dragging or swiping with multiple fingers activate OS-level actions, e.g., switching between applications.¹¹

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¹¹Image source

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Pixar in AR, USDZ format, optimized for sharing, with animations, share it from anywhere. Place the AR objects anywhere in real world - Working with leading companies to support USDZ AR creation support in Photoshop and Dimensions etc.

NEW APP: MEASURE

Automatically detect edges

AR across iOS: Tap the AR icon interact

ARKit 2, new features. Shared experiences

LEGO Shared demo. Muti user support in AR See inside structures with AR Kit 2

Search: Powerful object and scene recognition.



Gestures: Triple-swipe

Usage: Mapped to specific OS-level activities, e.g., undo, redo.¹²

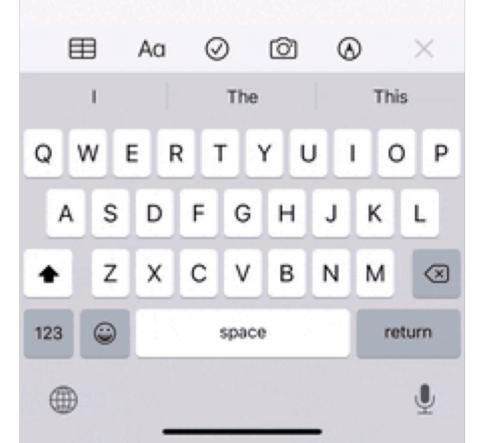
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Gestures for undo, swipe, and menu:

It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair. In short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.



¹²Image source

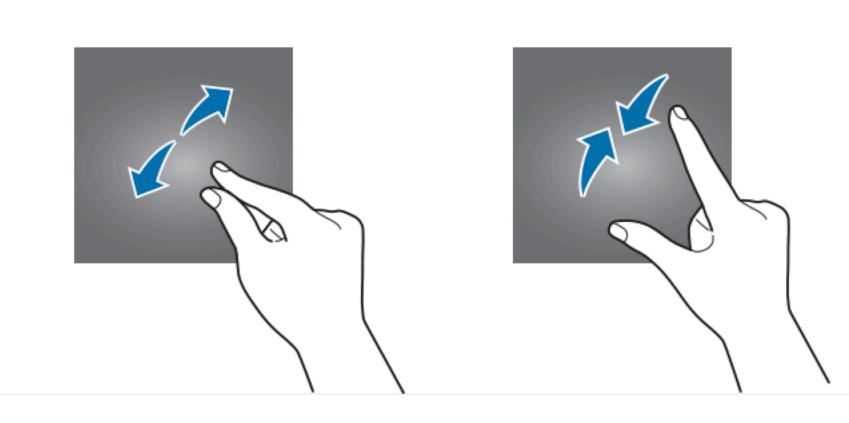
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🕄 🖞 Done

August 27, 2019 at 10:28 AM

Usage: Used to shrink or expand visual elements, e.g., changing the scale of a map.¹³



¹³Image source



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¹⁴ Image source



Usage: Mapped to OS-level actions, such as copy, cut, and paste.¹⁵

¹⁵Image source

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It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair. We had everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way. In short, the period was so far like the present period, that some of its noisiest authorities insisted on its being received, for good or for evil, in the superlative degree of comparison only.





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Gestures for copy, cut, and paste:

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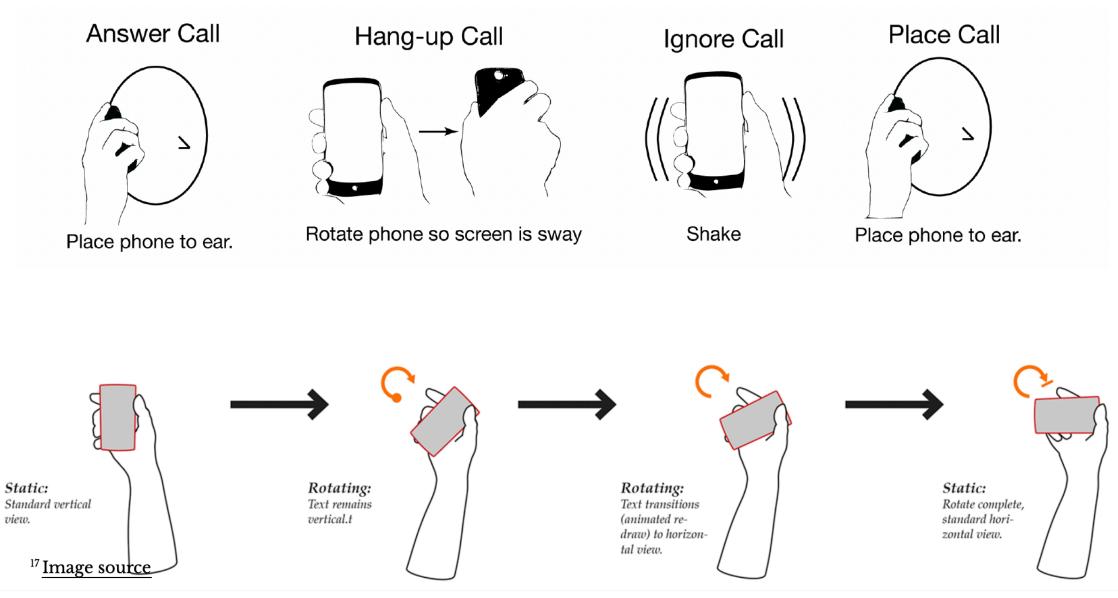
Pro Tip: In choosing which gestures to use, consider the context of use, e.g., how people hold their devices, how large the device is, what we are expecting to do.¹⁶



¹⁶<u>Image source</u>

Motion Gestures

Definition: Gestures that involve moving the mobile devide in specific ways, e.g., shaking to enable/disable silent mode. These gestures are usually application specific or customizable at the OS level.



¹⁷<u>Image source, Ruiz et al. 2011</u>.

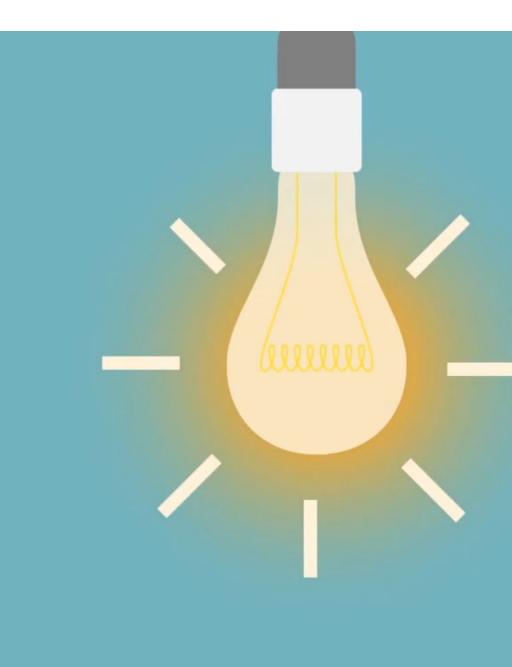
Microinteractions

Definition: *Microinteractions* are contained product moments that revolve around a single use case.¹⁸

E.g., Facebook like button, pull-torefresh action, flicking a notification to dismiss it, etc.

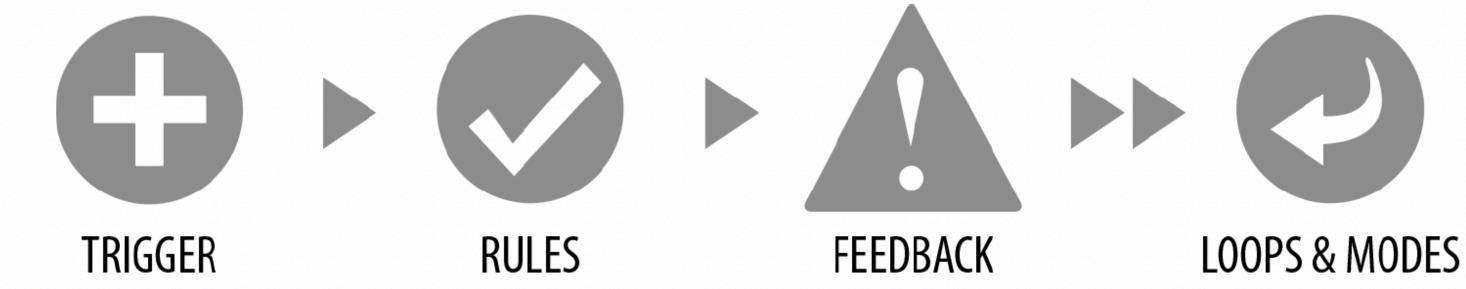


¹⁸ Dan Saffer, 2014, Microinteractions Image source: <u>Nick Babich</u>



How microinteractions work²⁰

Each micro interaction has four parts:

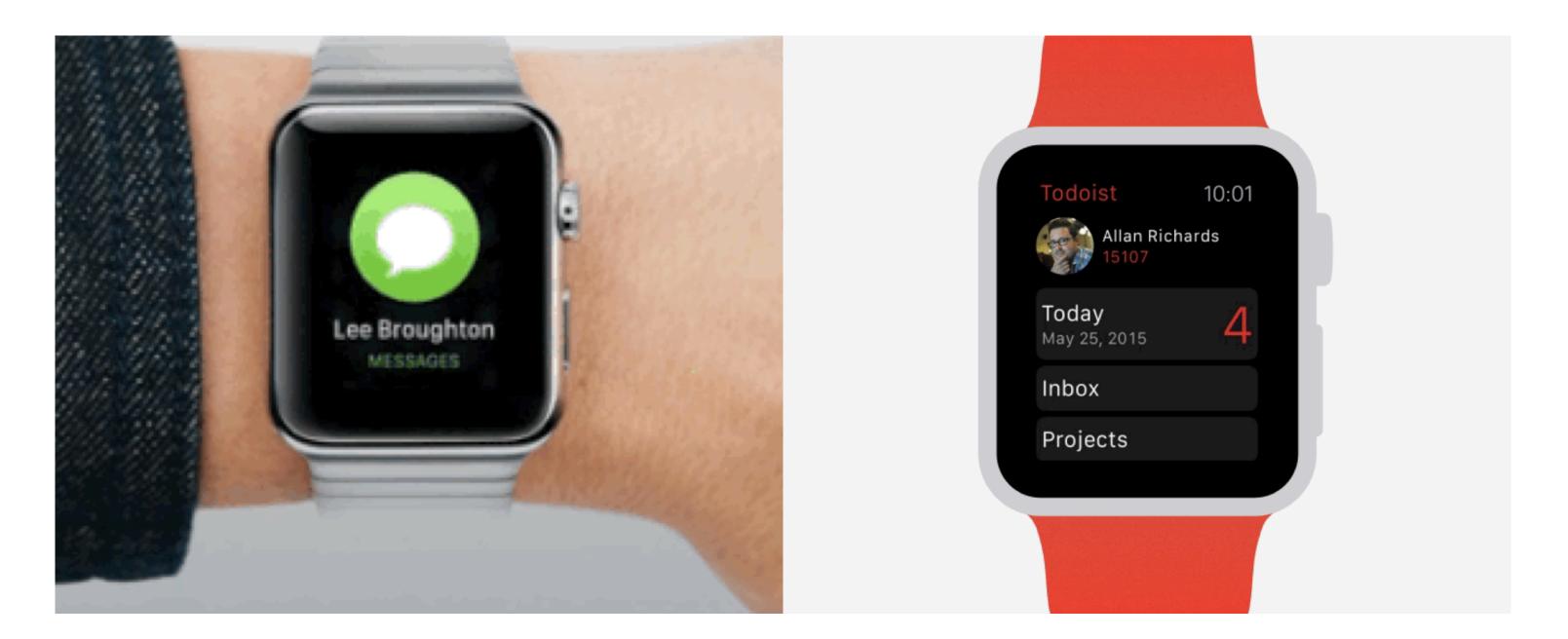


²⁰ Image source

Definition: Events that initiate the microinteractions. Triggers can be manual/user-initiated or automatic/system-initiated.

Manual triggers involve intentional and explicit interaction with the system, e.g., by flipping a switch, pressing a button, speaking to the system.

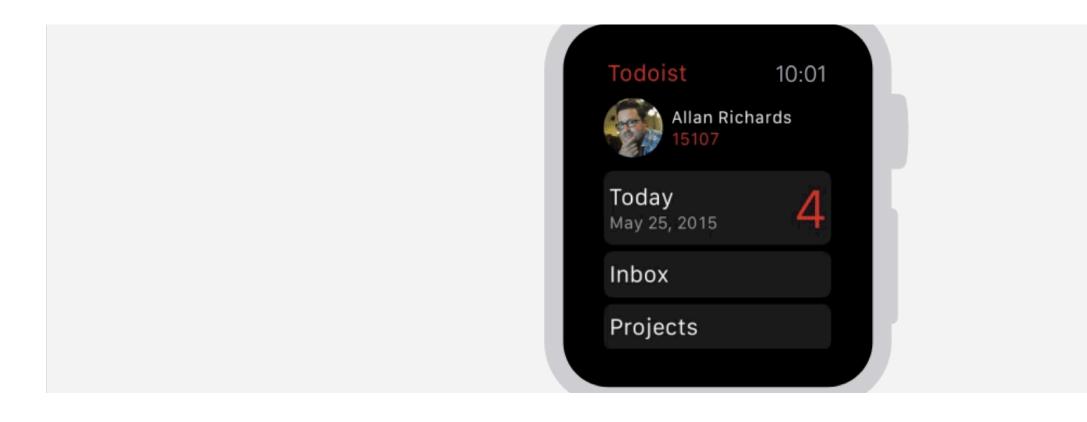
Automatic triggers occur when certain conditions are met, e.g., chime when a new text message arrives, silence the phone after 10 pm.



²¹Image source: <u>left</u>, <u>right</u>

Rules

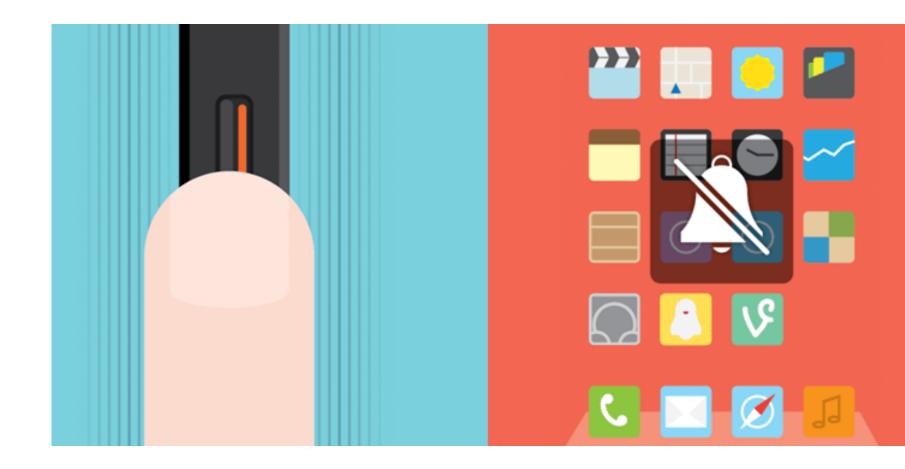
Definition: Rules determine what happens (and doesn't happen) in the system when a microinteraction is triggered.²²



²² Image source

Feedback

Definition: Information that the user sees, hears, or feels to reflect what is happening. Feedback can take many forms: visual, aural, haptic, etc. ²³



²³ Image source

Definition: Meta-rules that, depending on *context*, change microinteraction rules and feedback (e.g., "snoozing" a reminder; chime/vibration feedback when silent mode is off/on).

Loops determine the length of the micro interaction and whether the interaction repeats (e.g., related beeping when you leave the fridge door open) or changes over time (e.g., microwave oven reminder to pick up food changing over time).

Modes switch the functioning or operation of the system. E.g., "do not disturb" mode that changes system behavior.

•••• M1 奈 5:06 PM ④ 96%) < Settings NOTIFICATION SNOOZE Option 1 +3 hrs Option 2* 10:30 AM Option 3* 10:30 PM Directly snooze a reminder from its notification with these options. * Only available on the Apple Watch or with Alerts-style notifications. From Now At Time 2 minutes 3 hours 4 days weeks 5



²⁴ Image source

Pro Tips: Minimize the scope of the microinteraction and make sure that it doesn't turn into a feature. Best microinteractions support single task, single action.

Simpler way of thinking about microinteractions is *action-feedback* pairs for a single purpose.

In-class Activity

Mobile Microinteractions

On your mobile device or tablet, identify a microinteraction and describe its four elements.

Assignment template

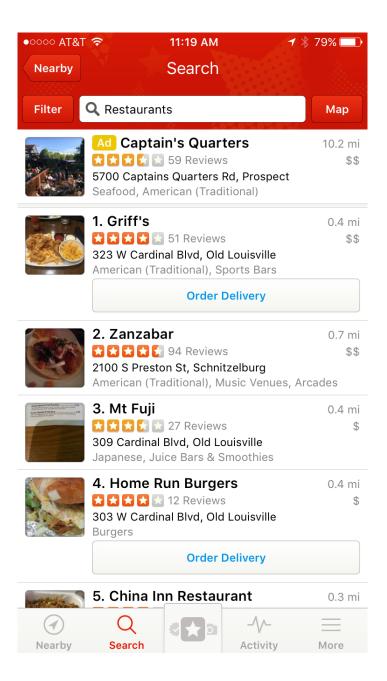
Mobile Design Patterns

Why mobile design patterns?

Mobile platforms are highly constrained design environments. Mobile design patterns help designers overcome these limitations by expanding capabilities for input, display, and navigation.

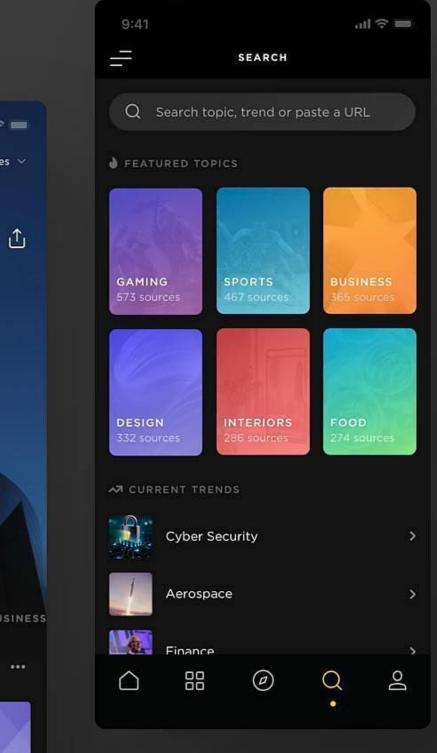
Patterns: Stacks

Usage: Used to vertically organize design elements such as a toolbar, content panes, and a navigation bar to maximally utilize the vertical space in mobile devices.



²⁵Image source: <u>left</u>, <u>right</u>





Usage: Full-screen content panes that can be placed on a horizontal array to display different instances of the same kind of information, such as weather information for different cities.²⁶

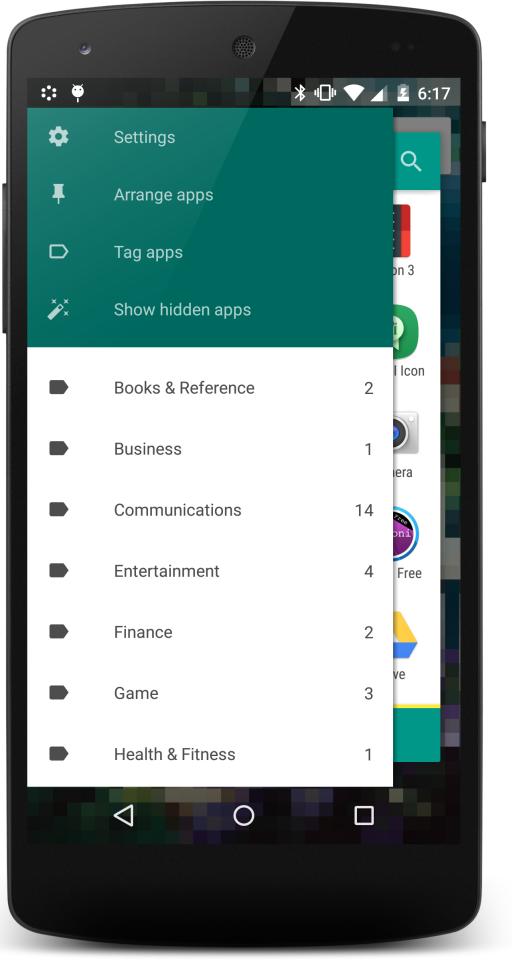
²⁶ Image source



Patterns: Drawers

Usage: Drawers provide links for navigation or controls for the various settings of the application.²⁷

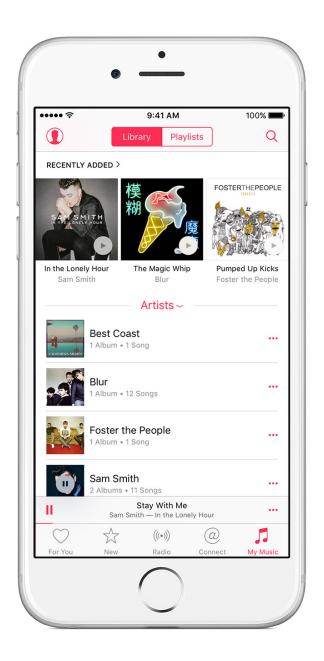
²⁷Image source



Usage: Lists involve vertically stacking a large number of items, including text, controls, and thumbnails, and supporting navigation through vertical scrolling.

Grids involve a large continuous grid or multiple panes of grids that users can scroll through vertically or horizontally.

Grids are more commonly used for information with more visual content, such as media thumbnails, icons, and photos.



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²⁸ Image source: <u>left</u>, <u>right</u>

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Patterns: Carousels

Usage: Content carousels provide a row of content items including images or textual cards that users can navigate through by swiping left and right.³⁰

³⁰ Image source

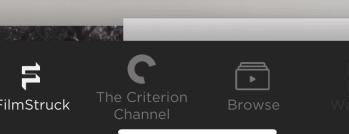
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Iconic Films from the Golden Age of ...





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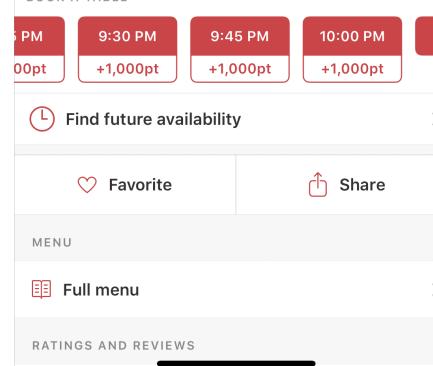


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288 Castro Street, Mountain View, CA 94041

Party of 2, now

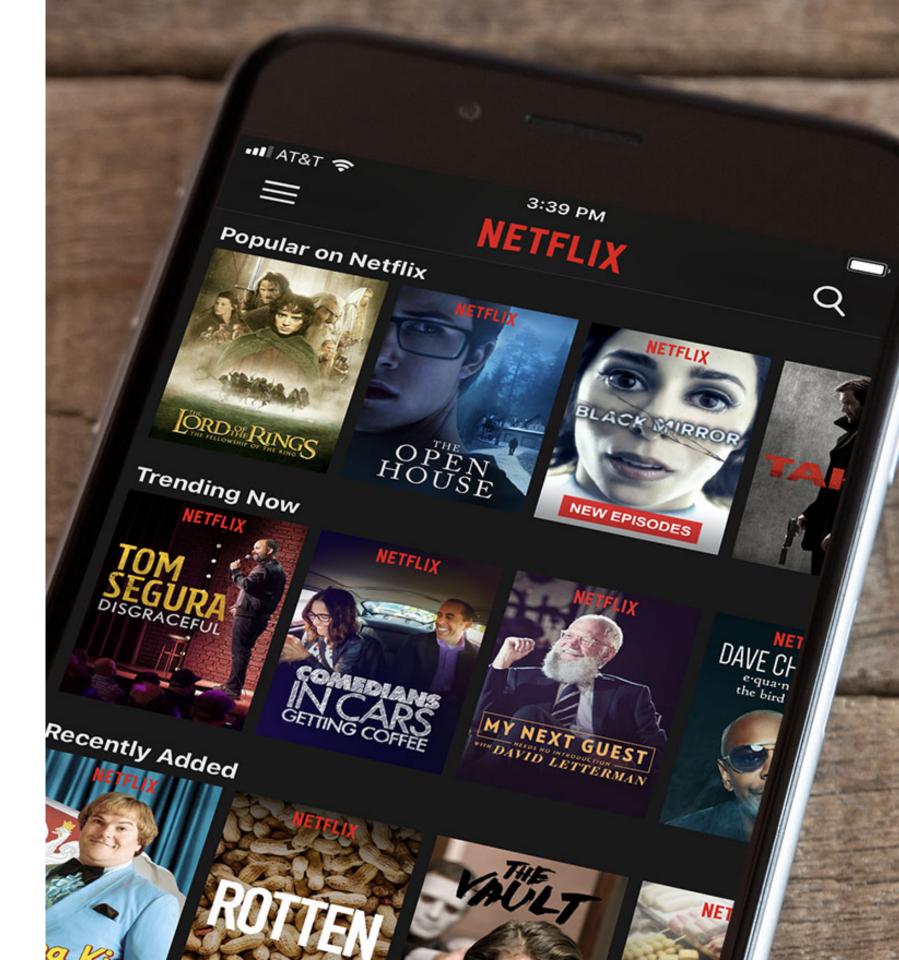
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Patterns: Swimlanes

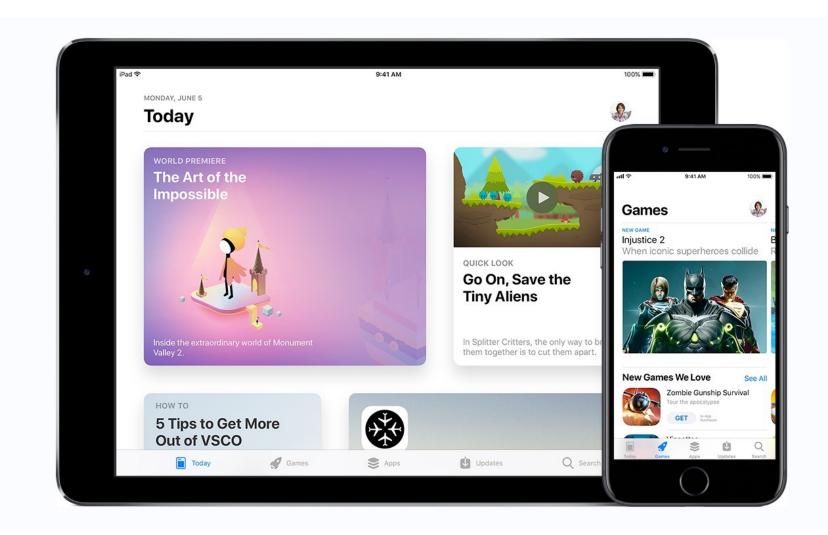
Usage: Swimlanes are stacked content carousels that each show a row of items, enabling visual browsing through several different lists with minimal navigation.³¹

³¹Image source



Patterns: Card

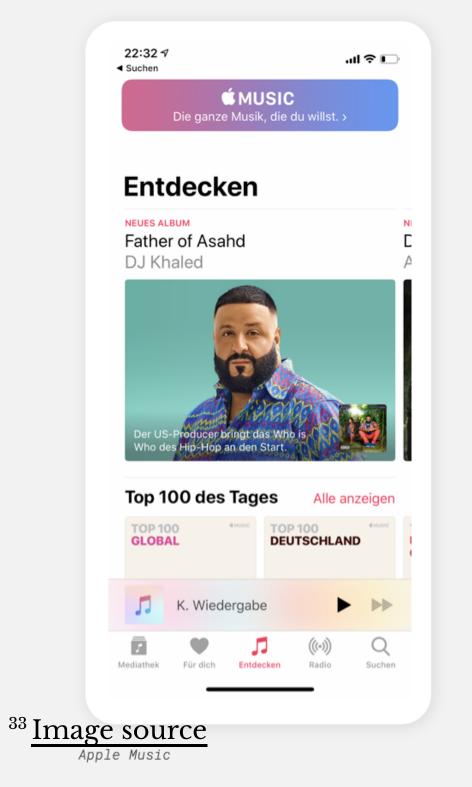
Usage: Cards are little rectangles full of images and text that serve as entry points to more detailed information. They can be organized by lists and grids, but they put together different compositions of multimedia content, including images, text, and links, on a column, row, or grid that users navigate through by swiping horizontally and vertically.³²

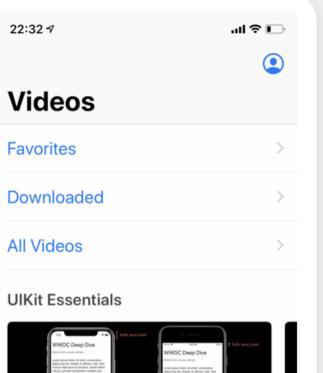


³² Image source

Usage: These are vertical or horizontal strips containing buttons or tabs dedicated to different components or tools.

- Tab bars that are placed at the top, bottom, or the side of the 1. screen enable navigation between different components.
- 2. Bars can also serve as *toolbars* to activate various application or operating-system-level functions.
- 3. Bars help *navigation* by linking to previously viewed content or to view the previous/next item among multiple screens.





UIKit: Apps for Every Size and Sha... > H WWDC 2018 W **Best of Design**







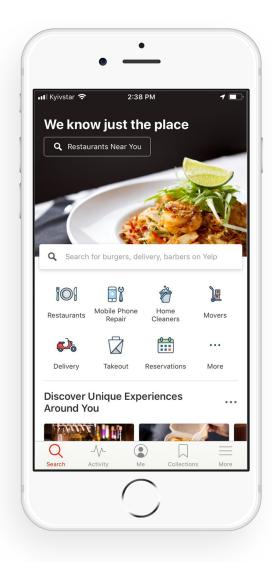
³⁴ Image sources: <u>left</u>, <u>right</u>

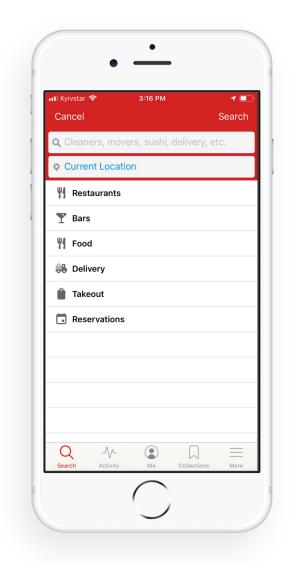
Usage: Used to enable search and filtering to navigate through a large body of content that may be distributed across the entire navigation structure of the application.

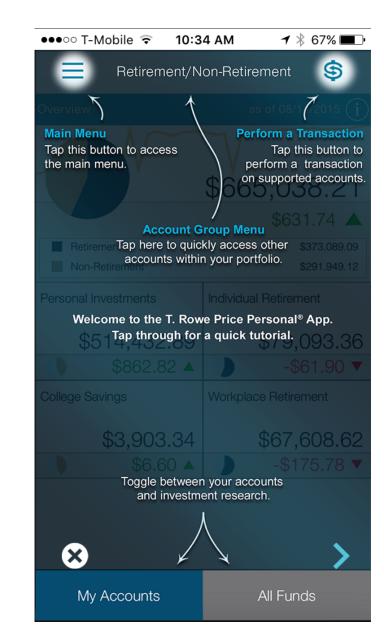
These patterns usually provide a search box to enter a search query either by typing text, voice input, or selecting from among a history of searches.

Usage: Includes a landing, welcome, or home screen that can serve as a portal to the most frequently used functions or as a guide to the next action in the task.

This pattern can also serve as *guided tours* for new users or serve as help screens by overlaying instructions or tooltips on the screen.







³⁵ Image source: <u>left</u>, <u>right</u>

Usage: Applications, such as image editors, drawing or presentation tools, or media players, enable direct-manipulation-based controls for content creation or editing.

These patterns provide customized user-input methods, such as control handles for object manipulation or scrollbars to navigate through video content.

³⁶ Image source



Patterns: Panes and panels

Usage: Multi-pane structures and popup panels and tools are commonly used in tablets to provide secondary application windows in a way that's similar to desktop applications.³⁷

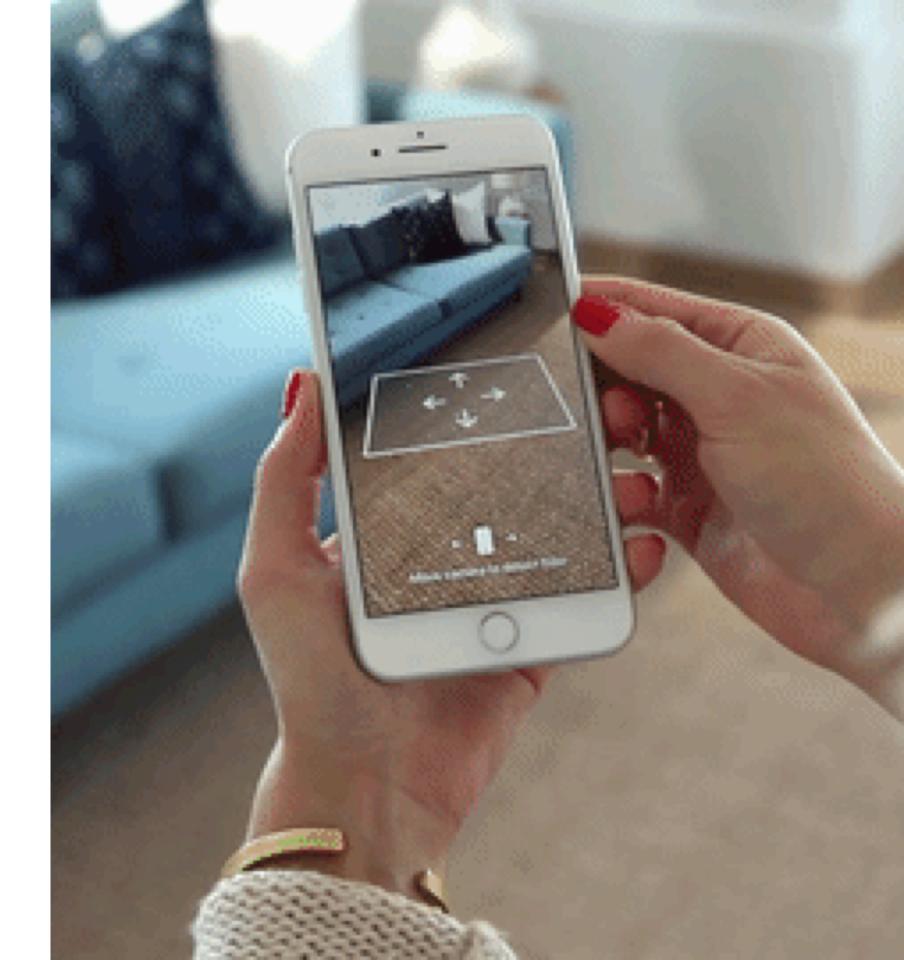


³⁷Image source

Patterns: AR/VR

Usage: Augmented and virtual reality, a.k.a. *mixed reality*, are used to overlay objects or information on images or video of the user's real environment that is captured using the mobile device's camera.³⁸

³⁸ Image source



What did we learn today?

- Mobile input
- Microinteractions
- Mobile design patterns