

Interaction controls & methods - UX and IxD Research

Introduction

In this research paper we'll take a look at possible ways of letting a user interact with the interface. This includes the most common interactions like swiping, tapping and dragging, but also more recent, innovative controls like voice control/assistance.

Goal

The goal is to find out in what ways users can control interfaces.

Motivation

Once we've found out what ways there are to control interfaces, we can figure out what controls fits the best for the use cases.

Main research question

In what ways can users control interfaces?

Research questions

- What types of interaction controls are available?
- What are the pros and cons of each different type of interaction control?
- In what context are each type of interaction control used? (real world examples)
- What devices/wearables can be used in combination with the interaction controls?

Plan of action

Desktop research; information of reliable and well-known UX resources will be used e.g. by reading articles and watching videos. Users that share their experiences on forums is information that could potentially also be used.

Results

Touch gestures

Examples of touch gestures are swiping, tapping, dragging and dropping. Touch gestures are performed on a touchable interface for example the touchscreen of a phone.



Pros

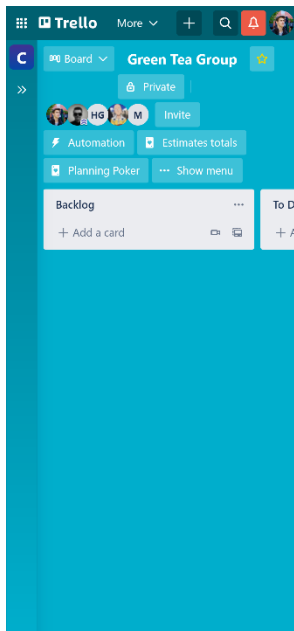
- Users are used to these type of control interactions since pretty much every app uses them. This makes it easy for users to view, edit and add content

Cons

- Since these controls are standard and already present in the Zenya app, it will be hard to improve the workflow of users

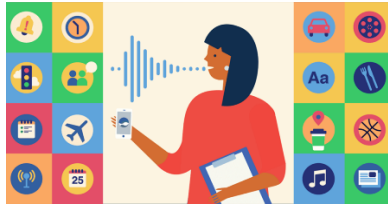
Context

- CMS apps or apps like Adobe XD and Trello use touch gestures in order to allow the user to view, edit and add content.



Voice Control/Assistance

With voice assistance users can command their phone to perform an action and they can get output back.



Pros

- It can short-circuit the physical interface and simply allow users to formulate their goal in natural language. Although speaking does involve an interaction cost, in theory this cost is smaller than learning a new UI, pressing buttons, and making selections.
- It can infer users' goals and be proactive about them by offering appropriate suggestions based on contextual information or prior user behavior. This second aspect is in fact closer to "reading our minds."
- Voice input; Most of the input is correctly transcribed, with the occasional exception of names. This improves usability.

Cons

- Bad integration; the assistants don't work well with other available apps on the device
- Voice output; except for a few tasks (e.g., navigation, weather), the assistants are not able to consistently produce a satisfactory vocal response to queries. This affects the usability negatively.
- The voice assistants perform poorly for nonnative English speakers. This is frustrating for the nonnative users.

Context

- Google Assistant parses email and adds flights or restaurant reservations to calendars; and both Siri and Google Assistant warn users of the time it takes to get to a frequent destination once they leave a location.
- A user can ask what day it is and will get their answer.
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Rotating device

With the help of the accelerometer and gyroscope hardware the user can control an interface.

Pros

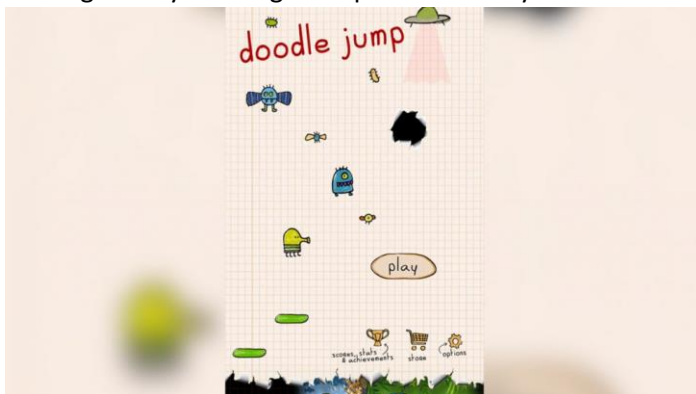
- Good for games, can be fun to use for a user if the interaction is designed in the right way
- Goes hand in hand with the camera of a smartphone

Cons

- Can cause interaction errors if the sensitivity of the sensors is high. For example, a user can accidentally trigger an action if they rotate their phone a bit too much.
- The hardware isn't very accurate/reliable.
- The user has to learn how fast they have to rotate or shake in some use cases.

Context

- Sleep mode of a smartphone turns on when the user puts down their phone in order to save battery
- Camera on smartphones use the gyroscope for the orientation of the device
- Doodle jump is a published app that makes use of the accelerometer. The user can move around in the game by rotating their phone sideways



- Can be used to measure the height of buildings

Motion tracking - Air Gestures



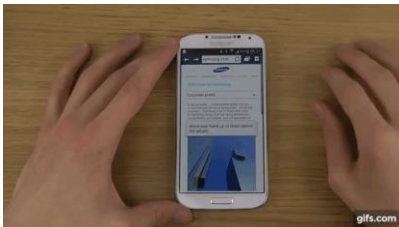
With motion tracking, gestures of users can be used as commands for handling an interface. So-called air gestures for instance.

Pros

- Since you don't have to touch your screen with air gestures, you can still use it when your hands are dirty

Cons

- Air gestures are slower than the standard touch gestures

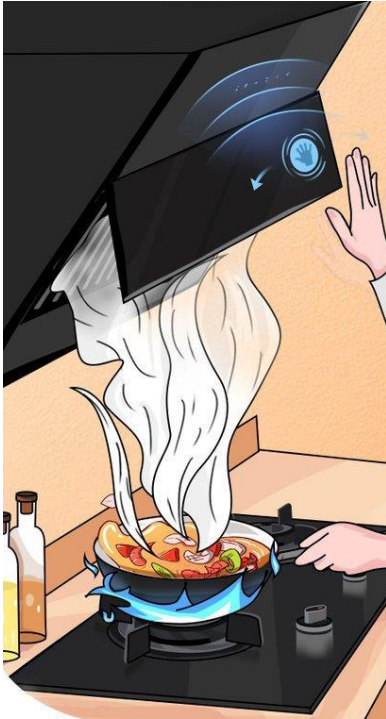


- With air gestures a user has to move their finger(s) over their phone's camera which can feel unnatural and is prone to interaction errors from the user for example forgetting to perform the gestures above their camera.
- Air gestures cost the user more effort since they have to hold their hand and fingers in a certain way.



Context

- recipes app; your hands are covered in food and you need to scroll back to the previous step to see how many eggs you had to use



- swiping away notifications distracting you from the navigation app during driving.



- Games; FitFlap is a motion fitness game aimed at getting people on the move. In this game you for instance need to flap your arms in order to keep a bird flying on the screen.



Motion tracking – Eye control

With motion tracking, movement of users can be used as commands for handling an interface. Controlling an interface with your eyes is an example of this that is currently being explored.



Pros

- Quicker way to perform an action than the standard gestures like swiping

Cons

- Prone to user interactions errors. What if the user accidentally blinks? Or absent mindedly stares at something which triggers a zoom-in?
- It's a technology that's barely supported because the concept is still in development

Context

- With phone or AR glasses; if you need to take a closer look at something, staring at it for a few seconds might automatically trigger a zoomed-in view. This might be useful if you have trouble reading something (a traffic sign for instance) from far away.



Conclusions & Recommendations

To answer the research question: "In what ways can users control interfaces?".

Users can control an interface through voice control, touch gestures, eye control, air gestures and rotating a device.

Once a use case for the use of Zenya is chosen, this research can be used to pick suitable controls so that a prototype can be designed and developed. With a prototype the interaction can be tested to see if it the user has problems using the prototype.

Sources

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