

## CHAPTER 8

# Interaction Devices

أجهزة التفاعل

**Keyboard  
Layouts**

تخطيطات لوحة  
المفاتيح

**Pointing  
Devices**

أجهزة التآشير

**Novel  
devices**

الاجهزه الجديدة

**Speech and  
auditory  
interfaces**

واجهات النطق والسمع

**Displays – Small  
and Large**

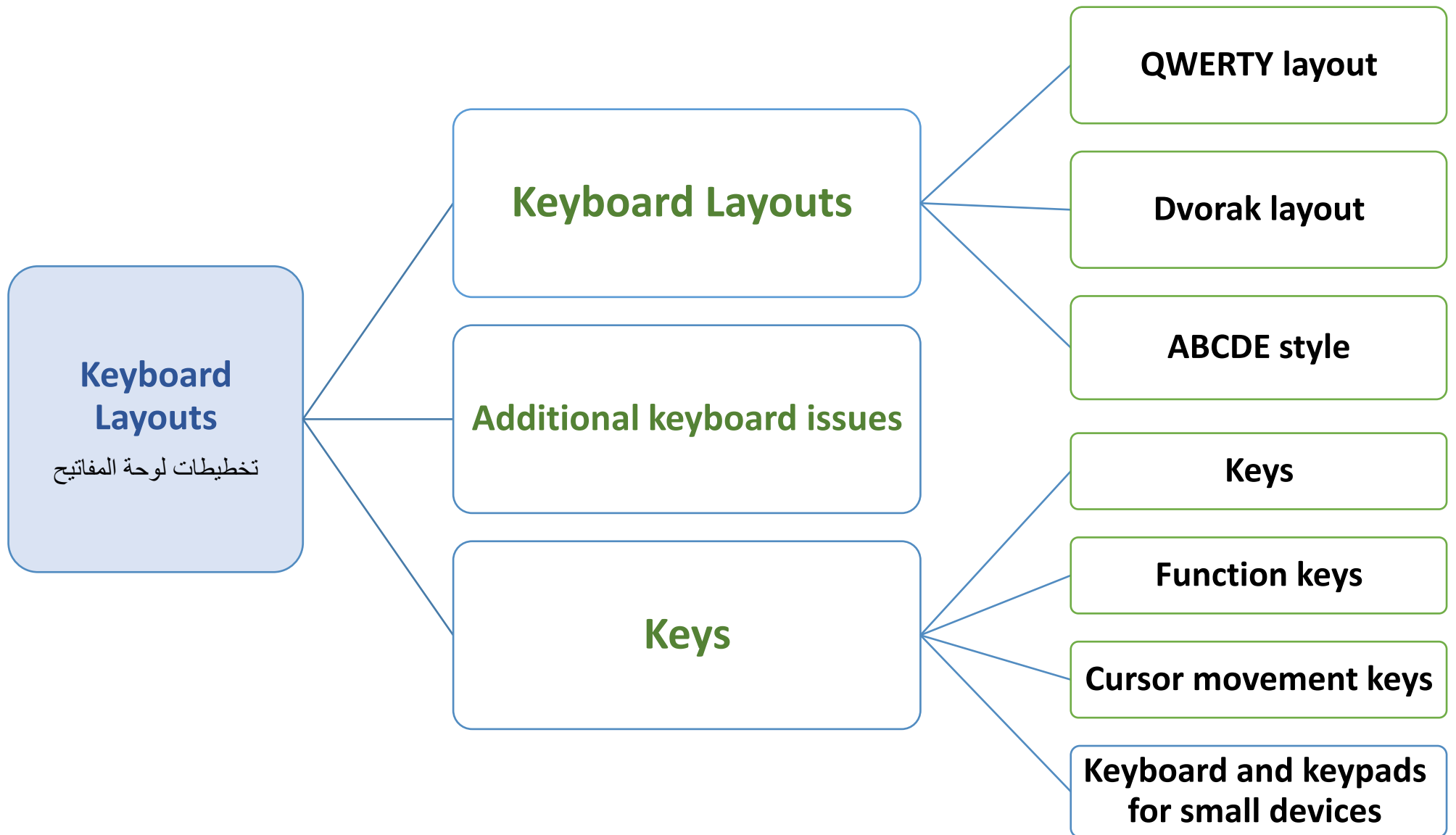
العروض الكبيرة  
والصغيرة

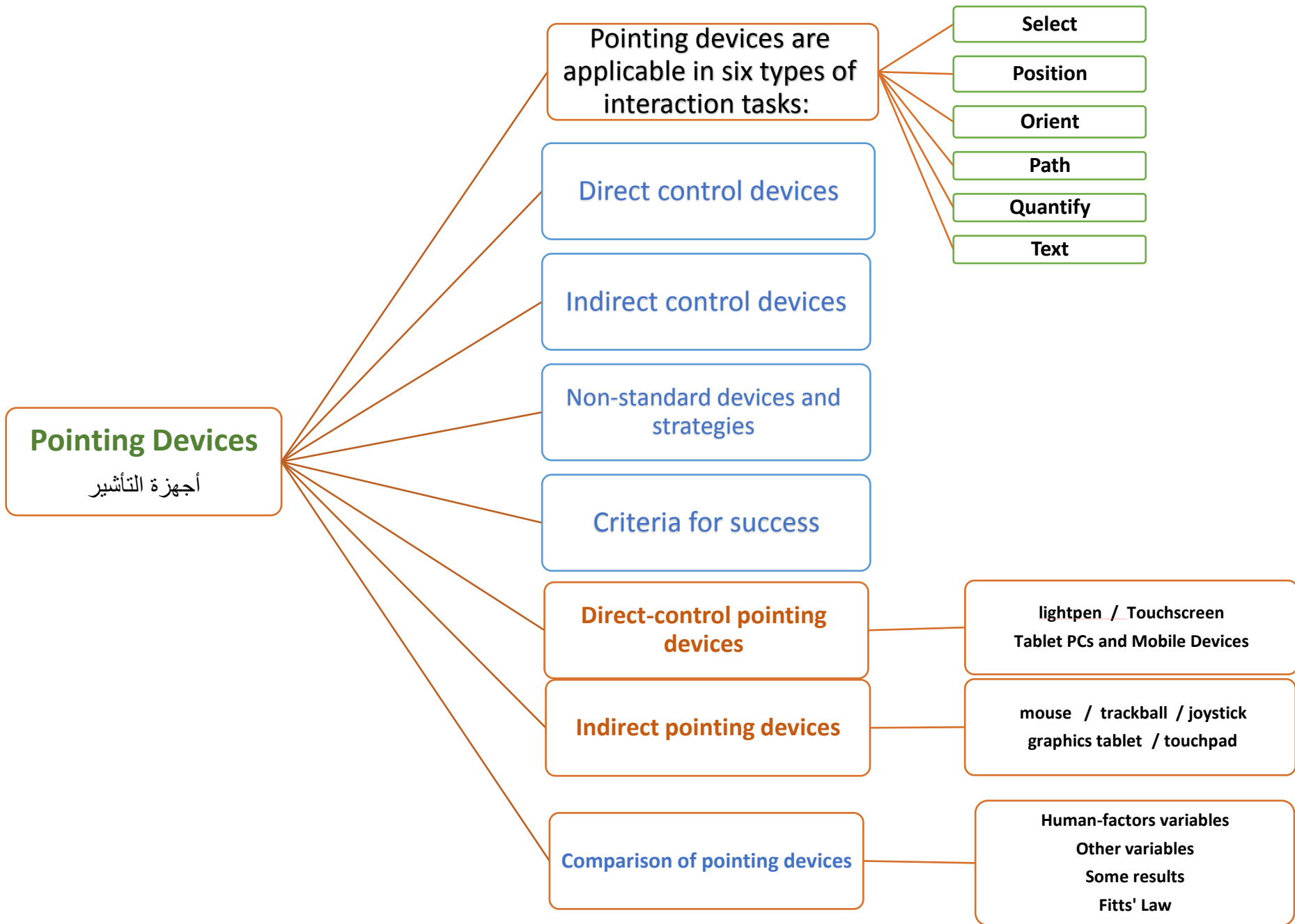
**Mobile  
device  
displays**

عروض جهاز  
النقال

**Animation,  
image, and  
video**

الرسوم المتحركة  
والصور والفيديو





**Novel devices**  
الاجهزه الجديدة

- Foot controls
- Eye-tracking
- Multiple-degrees-of-freedom devices
- DataGlove
- Haptic feedback
- Bimanual input
- Ubiquitous computing and tangible user interfaces
- Handheld devices
- Smart pens
- Table top touch screens
- Game controllers

## Speech and auditory interfaces

واجهات النطق والسمع

Speech recognition still does not match the fantasy of science fiction

Opportunities

Technologies

Obstacles to speech recognition

Obstacles to speech output

Discrete word recognition

Continuous-speech recognition

Speech store and forward

Voice information systems

Speech generation

Audio tones, audiolization, and music

Usage characteristics distinguish displays

**Portability - Privacy - Saliency - Ubiquity - Simultaneity**

**Monochrome displays**

are adequate, and are attractive because of their lower cost

**RGB shadow-mask displays**

small dots of red, green, and blue phosphors packed closely

**Raster-scan cathode-ray tube (CRT)**

electron beam sweeping out lines of dots to form letters - refresh rates 30 to 70 per second

**Liquid-crystal displays (LCDs)**

voltage changes influence the polarization of tiny capsules of liquid crystals - flicker-free  
size of the capsules limits the resolution

**Plasma panel**

rows of horizontal wires are slightly separated from vertical wires by small glass-enclosed capsules of neon-based gases

**Light-emitting diodes (LEDs)**

certain diodes emit light when a voltage is applied  
arrays of these small diodes can be assembled to display characters

**Electronic ink**

Paper like resolution - Tiny capsules with negatively and positively charged particles

**Braille displays**

Pins provide output for the blind

**Large displays**

Informational wall displays - Interactive wall displays - Multiple desktop displays

**Heads-up and helmet mounted displays**

A heads-up display can, for instance, project information on a partially silvered widescreen of an airplane or car  
A helmet/head mounted display (HMD) moves the image with the user - 3D images

The display has many important features ( 8 )

Display technology

**Displays**

**Small and Large**

العروض الكبيرة والصغيرة

## Mobile device displays

عروض جهاز النقل

Currently mobile devices used for brief tasks, except for game playing

Optimize for repetitive tasks

Custom designs to take advantage of every pixel

DataLens allows compact overviews

Web browsing difficult

Okay for linear reading, but making comparisons can be difficult

## Animation, image, and video

الرسوم المتحركة والصور والفيديو

Accelerated graphics hardware

More information shared and downloaded on the web

Scanning of images and OCR

Digital video

CD-ROMs and DVDs

Compression and decompression through MPEG

Computer-based video conferencing