Smartphone
in
Medical Practice

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Questions

1) How many of you are using smartphone in your medical practice ? **Yes / No**
2) Will use of smartphone benefit in medical practice ? **Yes / No**
3) If you want to learn new things in medicine then, will you use your smartphone ? **Yes / No**

Lecture Outline

- → Definition of Smartphone
- → History of Smartphone
- → Features of Smartphone
- → Future Smartphone & Modular Smartphone
- → Uses of Smartphone in Medicine
- → Different Medical Apps for Smartphone
- → Future Uses of Smartphone in Medicine
- → Take home Message
- → References

Smartphone

A mobile phone that performs many of the functions of a computer, typically having a touch screen interface, internet access and an operating system capable of running downloaded apps.

History

Smartphone

Devices that combined telephony and computing were first conceptualized by Theodore Paraskevakos in **1971** and patented in **1974**, and were offered for sale beginning in **1993**

The term "smart phone" first appeared in print in **1995**, for describing AT&T's "Phone Writer Communicator" as a **"smart phone"**

Medicine

Early records on medicine have been discovered from ancient Egyptian medicine, Babylonian Medicine, Ayurvedic medicine Chinese medicine and Roman medicine.

In Greece, the Greek physician Hippocrates, the "father of medicine" laid the foundation for a rational approach to medicine. Hippocrates introduced the Hippocratic Oath for physicians

IBM Simon: The world's first smartphone in November 23rd 1992
$ 899 (Rs. 55,000)

Latest available smartphones in market
$ 899 (Rs. 55,000/)

Features of Smartphone

Basic Features

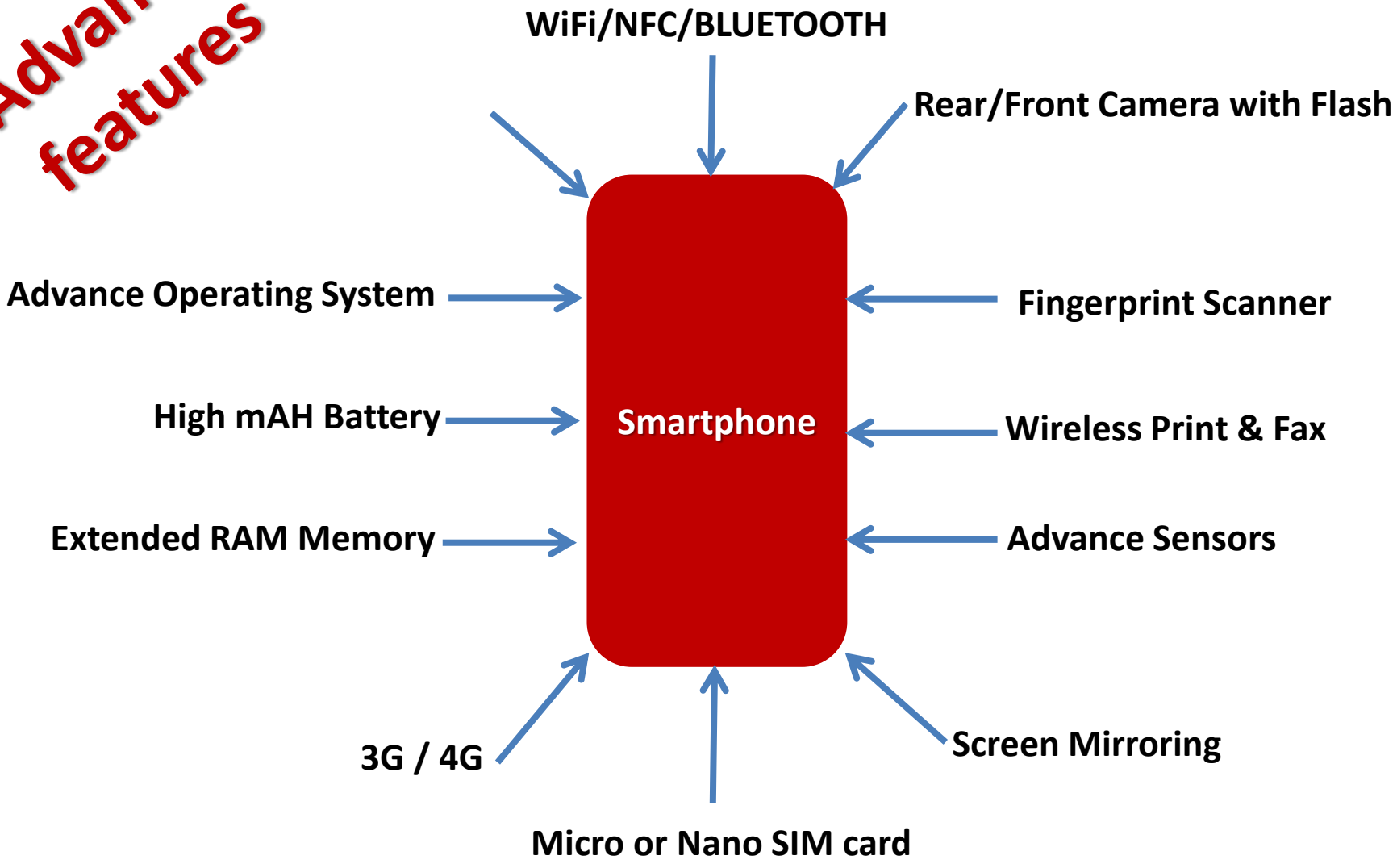
Advance Features

Future Features

Basic features of Smartphone

Smartphone act as a communication device, multimedia device, and mini application operating platform

Advance features



In all Latest available smartphones in market these features are there

Sensors in a Smartphone

- Light
- Proximity
- 2 cameras
- 3 microphones (ultrasound)
- Touch
- Position
  - GPS
  - WiFi (fingerprint)
  - Cellular (tri-lateration)
  - NFC, Bluetooth (beacons)
- Accelerometer
- Magnetometer
- Gyroscope
- Pressure
- Temperature
- Humidity

Future feature Smartphone will be called as

Super Smartphone

Future Features of Smartphone

- **Augmented Reality (AR)** (Live search of places through GPS without internet)
- **Flexible Screens** (paper thin and able to provide large screen for viewing)
- **In-Built Projector** (Integrated, No need for TV screen, only Flat Surface)
- **Seamless Voice Control** (No Sound wave recognition, only natural language user interface)
- **Transflexive LCD displays** (Change the screen light according to sun light)
- **Future NFC** making keys to everything & no credit debit card required
- **IPS** (Indoor Positioning System)
- **Waterproof and Break proof**
- **Sixth Sense Technology**

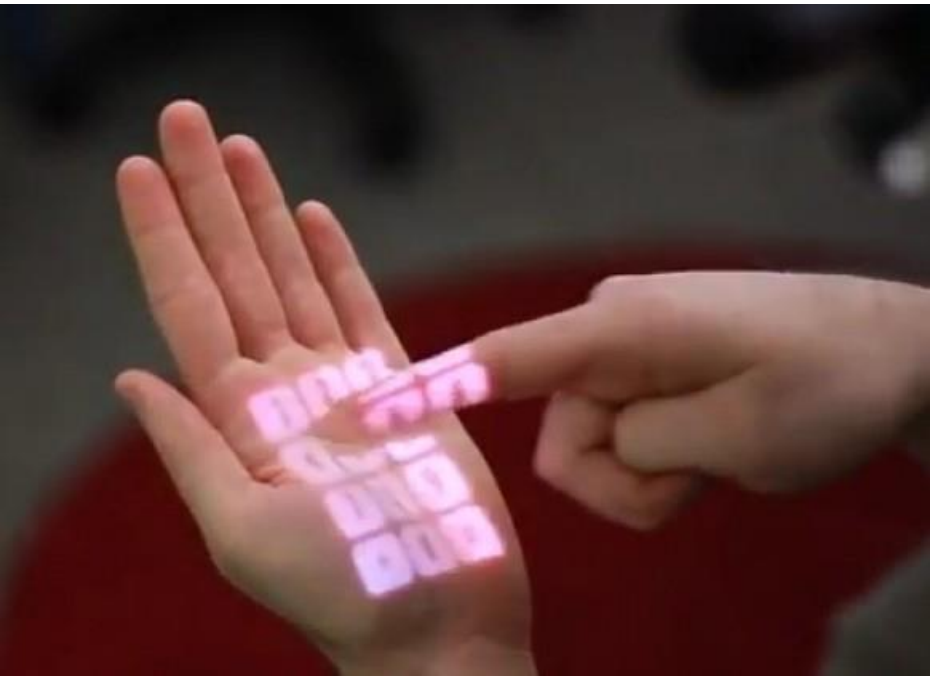
Continued…..

- **Seamless Wi-Fi** (Uninterrupted and all across globe), WiFi Passpoint (also known as Hotspot 2.0)
- **3D Screens & Holograms** (Retina Display, image will be sharper than what human eye see)
- **Prediction** (through sensors)
- **Ocular scanning** or eye vein biometrics
- **5 G** (Fastest Speed up to 50 mbps)
- **Designer Smartphone**
- **Endless Battery Life** (Solar and advance lithium ion)
- **Wireless recharging**
- Smartphone **advance sensors** (Bluetooth, NFC and others)
- **Universal Battery Charging** from Audio Jack Point

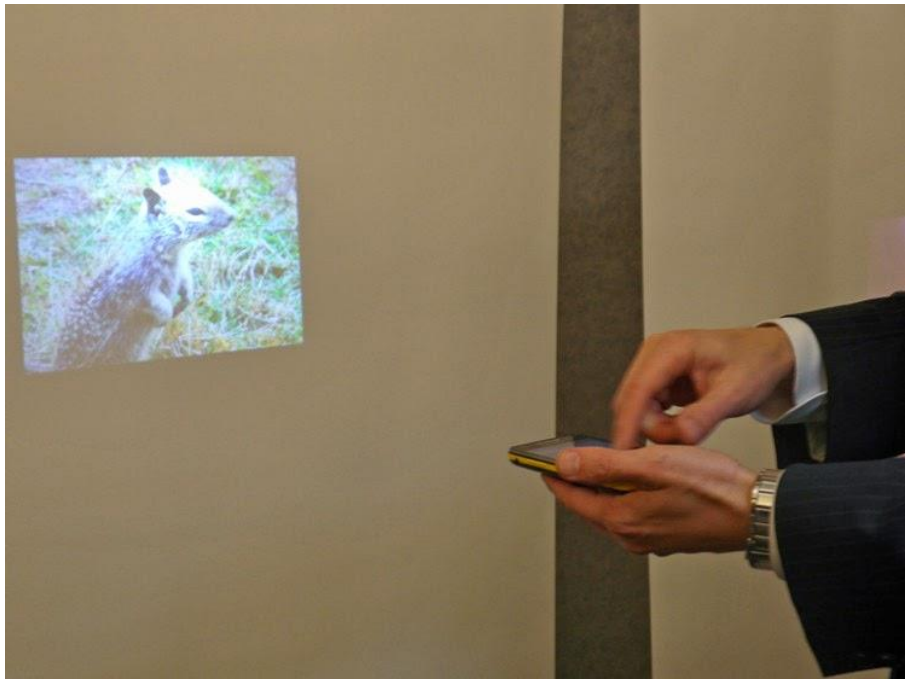
Flexible Smartphone

Wearable Smartphone

3 D Holographic Smartphone



Projector Smartphone




617
835
403
1
2
3
4
5
6
7
8
9


11 21
Today's meeting
7:40 Call Anna
Missed Call
8:11 Simon Fet
ICQ:ONLINE
Messages
2:05 Sara N
AOL:ONLINE


E 3.5-5.6/18-55 OSS
0.25m/0.82ft

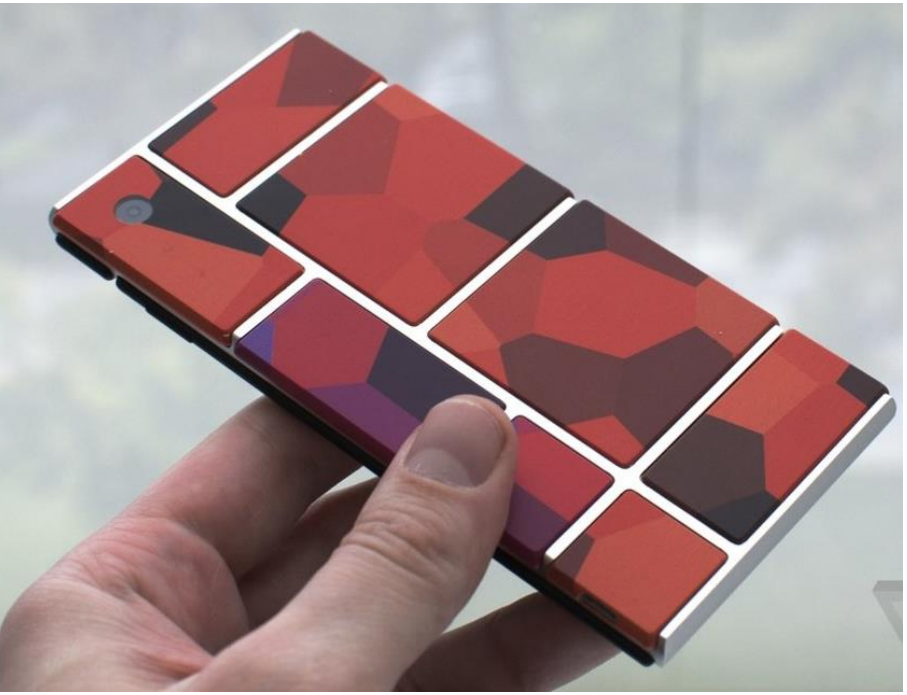
Future Sensors in Smartphone

Micro electro-mechanical systems (MEMS) sensors, that enable smartphones to **hear, see, touch, feel and smell** will create opportunities for new smartphones that profoundly affect the way we live.

Google is Developing

(Project Era)

Modular Smartphone



A **Modular Smartphone** is a Smartphone made using different components (alternatively called blocks) that can be independently upgraded or replaced.

So
My Opinion
About
Smartphone

Smartphone acts like Doctors
Doctors act like Smartphone

(Vigilant, Smart, Quick , Multitasking & Ever Demanding)

Use of Smartphone is Universal

&

Doctors are Captains in Health Practice

The Internet is integral to clinical practice

Search is the doctor's digital stethoscope

SMARTPHONE

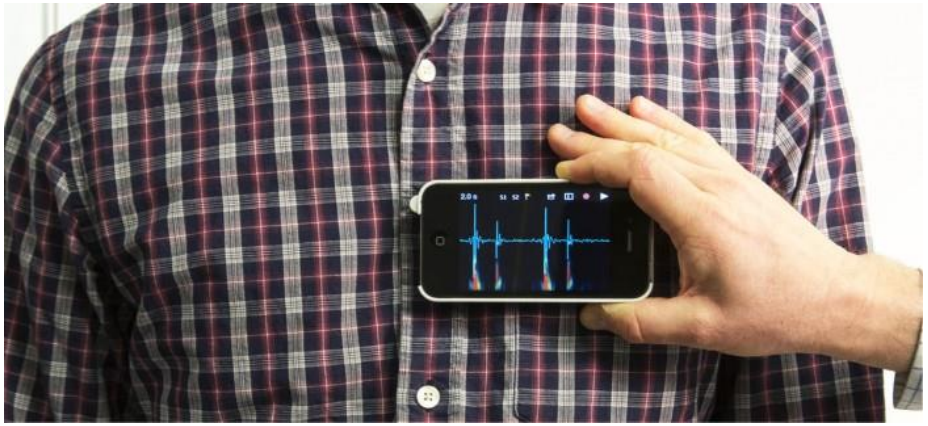
Medicine is **mobile**

Online video is an educational tool

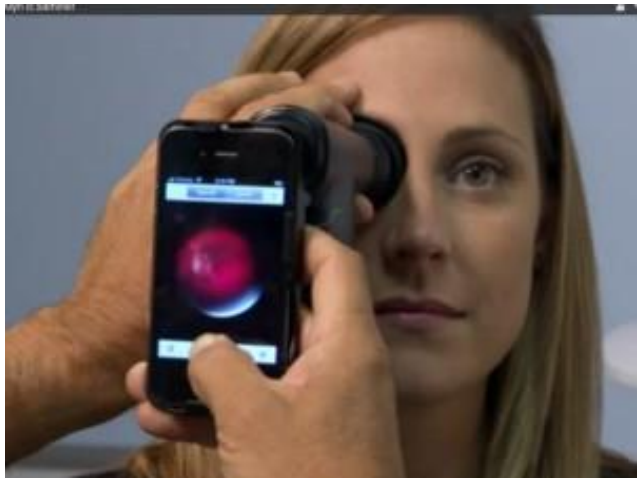
Uses of Smartphone in Medicine

(Through different apps, usb attachment, sensors & Modules)

Smartphone Stethoscope



As Ophthalmoscope

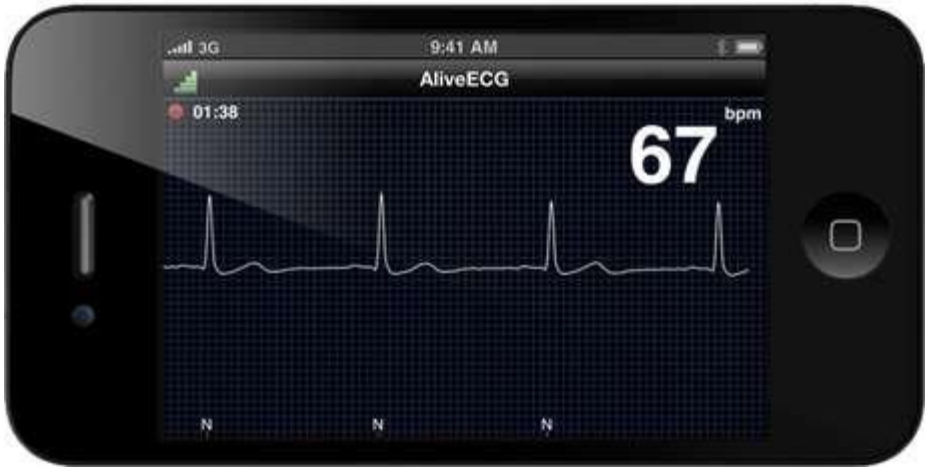


As Thermometer

As Pulse Oximeter

As Otoscope

AliveCor as Portable ECG



As a Microscope

As Glucometer IBGStar

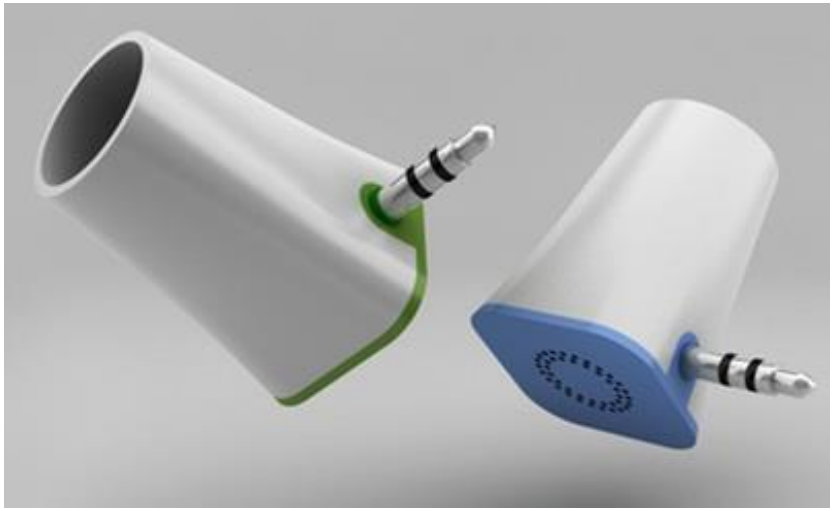
As Dermatoscope

The Smartphone Ultrasound

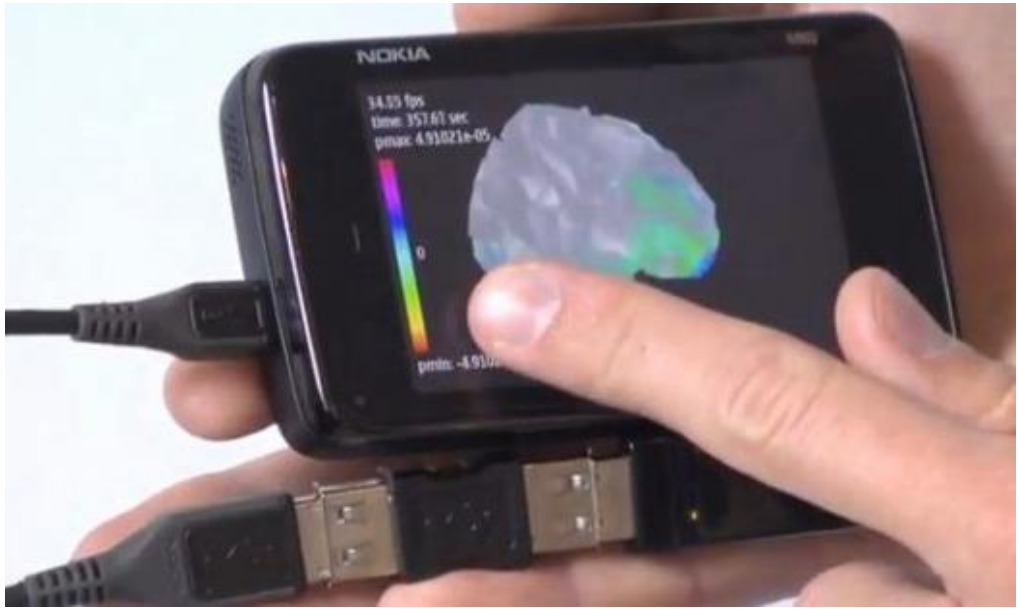
As Video Laryngoscope

To Measure BLOOD PRESSURE

As Spiro meter

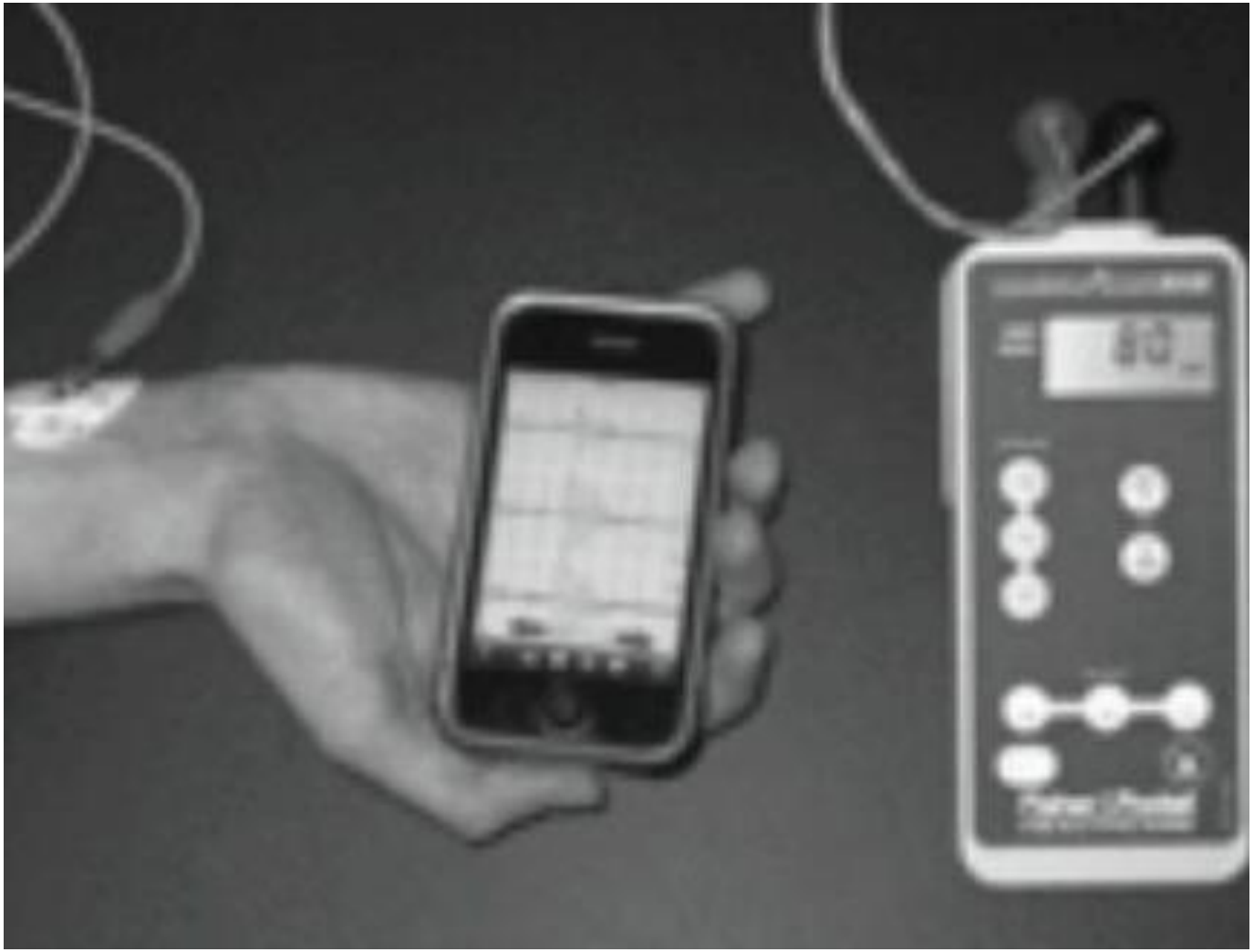


SMARTPHONE AS A BRAIN SCANNER

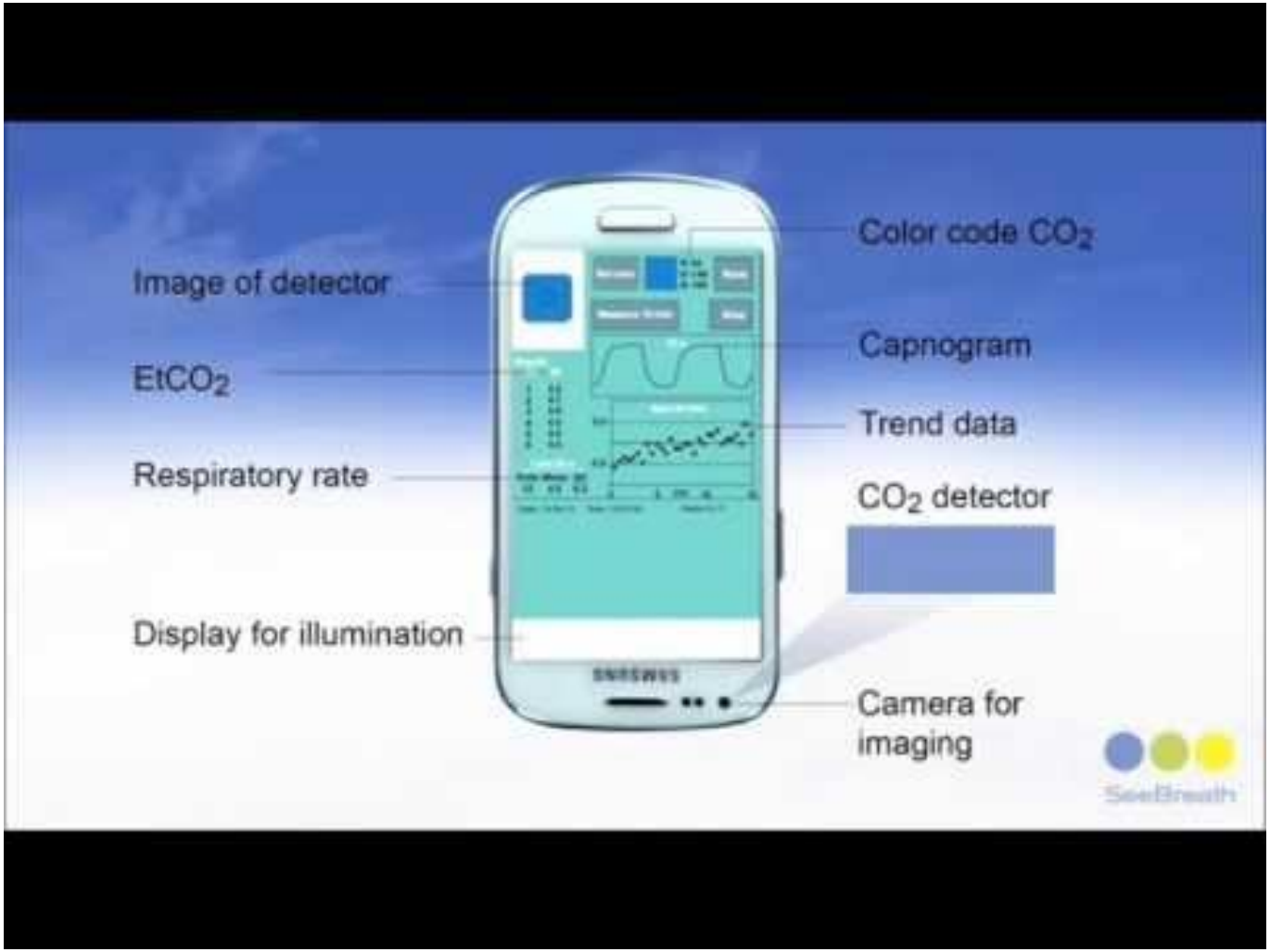


As SPECTROMETER

Smartphone as Neuromuscular Junction Monitor



Colorimetric Smartphone Capnography (CSC)



Portable endoscopy

How It Works

(1)
Carefully place your smartphone in the smartphone case. It should fit snugly and can remain on your phone, even when you are not using the adapter.

(2)
Holding onto the lens portion of the adapter, slide the tab into the tracks on the case until it clicks.

(3)
Retract the spring loaded collar, which exposes the blue clamping pieces. Place the endoscope eyepiece within the collar and release the spring.

(4)
Use your smartphone camera and video as you would normally to view. For best picture quality maximize screen brightness and the brightness of the lightsource.

http://www.vitadock.com

ThermoDock

GlucoDock

CardioDock

Each attachment cost Rs. 2500/-

LifeWatch Technologies a first Medical Smartphone that renders independently measure seven medical indexes: **ECG, Heart Rate, Body Temperature, Blood Sugar levels, Body Fat Percentages, Blood Oxygen Saturation and an Index Measuring Stress**

Seven components in all

- Air quality sensor
- CO_2 monitor
- Light sensor
- EKG node that measures heart activity
- Glucometer for glucose tracking
- Breathalyzer
- Temperature

Lapka x Project Ara Medical Modular Smartphone

Uses of Smartphone in Medical Practice

- As Pulse Meter
- As Stethoscope
- As Pulse Oxymeter
- As ECG Monitor
- As Glucometer
- As USG Machine
- As Thermometer
- As Multi Para Monitor Screen
- As light source in failure of laryngoscope light
- As Spiro meter
- As Capnograph
- As Monitor for Video Laryngoscope and Fiber Optic Scope
- As Wireless Monitor Via Bluetooth, NFC, Wi-Fi
- As Wireless alarms during Anesthesia
- As Neuromuscular Junction Monitor
- In all medical Specialty

(Through USB port, Sensors and Different Apps)

Use of Smartphone As a Whole

(Through Different Apps)

- For Assessment of Patient (paperless medical records)
- To Refer Different Medical Textbooks
- Instant reference for Journal Articles
- To Refer medical Drugs Online (Everything)
- For Information about Conferences, Seminars and different Medical Departments
- To refer Videos of New Medical Gazettes and Techniques
- For residency programe in Medicine

Continued….

- Online Shopping of Medical Products and Textbooks
- To Create Global Friendship with Consultants and Departments
- Instant Ready Information in Crisis Management
- Use as Dictaphone, as Voice Recorder, For Shooting Videos, To Click Photos (in different situation during medical Practice for CME and References)
- Practically from Consulting to IPD to Discharge
- Lastly in free time to play dedicated Medical games, puzzles and quiz

Practical Use of Smartphone in Medicine

- For alzheimer patient monitoring through GPS
- Tele monitoring of Heart patients through heart rate, SpO2 and ECG
- In Sleep apnea study in OSA patient
- In recent stoke patient to follow the activities though shoes fitted with sensors
- Garments sensors
- Intra-hospital communication for doctors and staff through apps
- Dibates apps for DM to collect all informations
- In poor countries smartphone tele-consulting
- Weight loss and Fitness apps by laypersons
- Apps for Doctors e.g PubMed, Medscape, Dynamed,QxMD
- Medical Calculators and Dictionary

What are the benefits

Patient's information available immediately on-line.
Easy access to **low-cost medical devices** that we can connect to our smartphones .
If something is wrong – you can check/test/monitor it by yourself and your patient has access to the data.
Increase **medical care quality**.
No more waiting for patient – you don't have to go to see your patient every time because you can run some test on smartphone.
Clinical trials – help to monitor patients remotely (access to health information, support, check-up).
Doctor (or Caregiver) – Patient **efficiency**. Virtual visits.
Available anytime, anywhere.
Faster – Smaller – Cheaper – Better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DOCTOR.. I LOCKED UP MY SYMPTOMS ON THE INTERNET ... AND I THINK I MIGHT BE DEAD!
search ID: form101
DON'T BELIEVE EVERYTHING YOU READ ON THE NET


I'VE ALREADY GOT A DIAGNOSIS FROM HOMEDOC.COM... BUT I THOUGHT I'D SEE YOU FOR A SECOND OPINION!
FRAN
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Android and IOS Apps

Commonly Smartphone Medical Apps are divided in Four Groups

- Patient Care and Monitoring apps
- Health apps for the Laypersons
- Communication, Research and Educational apps
- Physician or Student Reference apps

Different Medical Apps

- For Assessment of Pt.
- Emergency Rx
- Journals Reference
- Pediatric
- Geriatric
- Logbook and Records
- Guidelines
- Drug Reference
- Gazettes Software
- All Medical Specialty Apps
- Different Score & Scale
- Pathology & Radiology
- Medical Books
- Ready Dose of Drugs
- Disease Reference & Rx
- Flashcards, Quiz & Games
- Paramedical Apps
- Social Apps e.g. Google, Whatsapp, Twitter, Face book, You Tube etc.

Free and Paid

Most Common used Apps in Medicine

- PUBMED Mobile
- MEDSCAPE
- Drugs.com Medication Guide
- Pediatric On call
- DOCPHIN
- Disease Dictionary
- SlideShare Presentation

Questions to ask before downloading an app

Visser & Bouman. There's a medical app for that. Student BMJ 2012;20:e2162

Clinical decision making

- Is it produced by a medical publisher?
- Is it regularly updated?
- Is it properly referenced?
- Are the authors listed?
- Is it possible to give feedback?
- Has it been recommended by your tutor, university or healthcare institution?
- Is the app's primary purpose to inform the health professional (and not the patients)?

Patients' privacy

- Does the app require you to input patient specific data, and could this compromise patients' privacy?

Conflicts of Interest

- Do you know where the app is from? Is it produced by a drug company or a non-commercial organization?

SmartBot: Smartphone Robot

SmartBot is a programmable Smartphone robot for entertainment, education and **health** that uses your Smartphone (Android, iPhone, or Windows Phone) or a programmable development board as its brain, sensors and interfaces

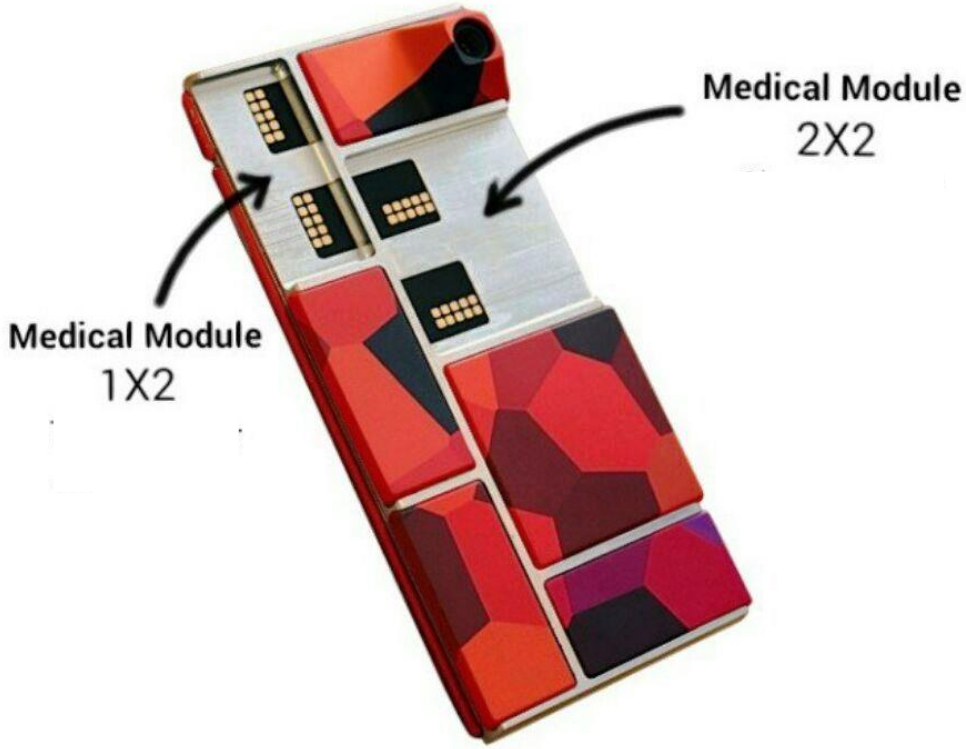
Useful in future Medical Practice

Future use of Smartphone in Medicine

- In Pathology, all investigations will be done by Smartphone through apps and gazettes
- In Radiology, all controls of imaging through Smartphone
- In all medical branches where scopes are required, Smartphone will work as a monitor for endoscopes through camera
- In Robotic medicine control of Robots through Smartphone
- Future prediction of some systemic Diseases e.g. DM, HT, Thyroid, Metabolic Disorders and others. Even Cancer and leukemia can be predicted by apps and sensors of Smartphone
- Most communicable diseases can be diagnosed with a Smartphone
- Most useful use of Smartphone will be to diagnose any genetic abnormalities in fetus through special apps and predictor sensors
- In Anesthesia, practically anesthesia will be given by Smartphone and it is becoming reality in Montreal, Canada
- Even with your Smartphone doctors will come to know that there patient are happy, depressed or satisfied with the treatment and weather treatment is right or wrong

Modular Smartphone for Medicine

In future different Medical modules will be available with specific requirement of Doctors in the market



Take Home Message

In near future Smartphone will help and act as good companion to Doctors

Smartphone will reduce health problems, morbidity and mortality rates due to precise and meticulous planning of each patient's case through advanced technology and dedicated medical apps

All Doctors will treat patients through their Smartness and Smartphone

But

Increasingly future Smartphone technology and sophisticated medical practice with newer medical gazettes are inevitable

They are great when everything works well, but understanding enough about those technology and systems to know what to do when things go wrong is a significant challenge

Doctors should ensure that they are familiar with this before they first time use them

It is not a magic in future

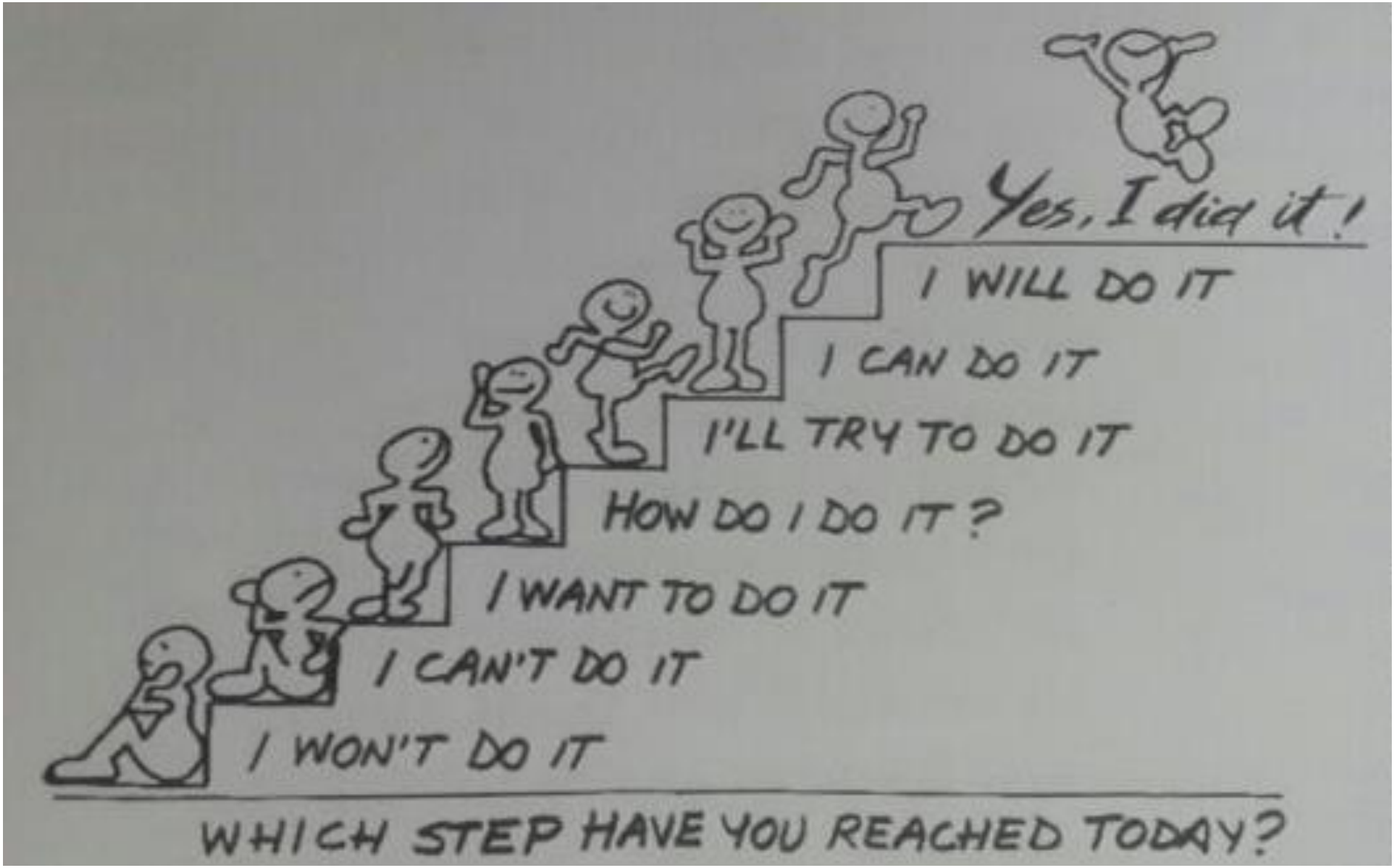
Finally, I will say that

Doctor saves the life of Patient
but
Smartphone will save the lives of Patient & Doctor

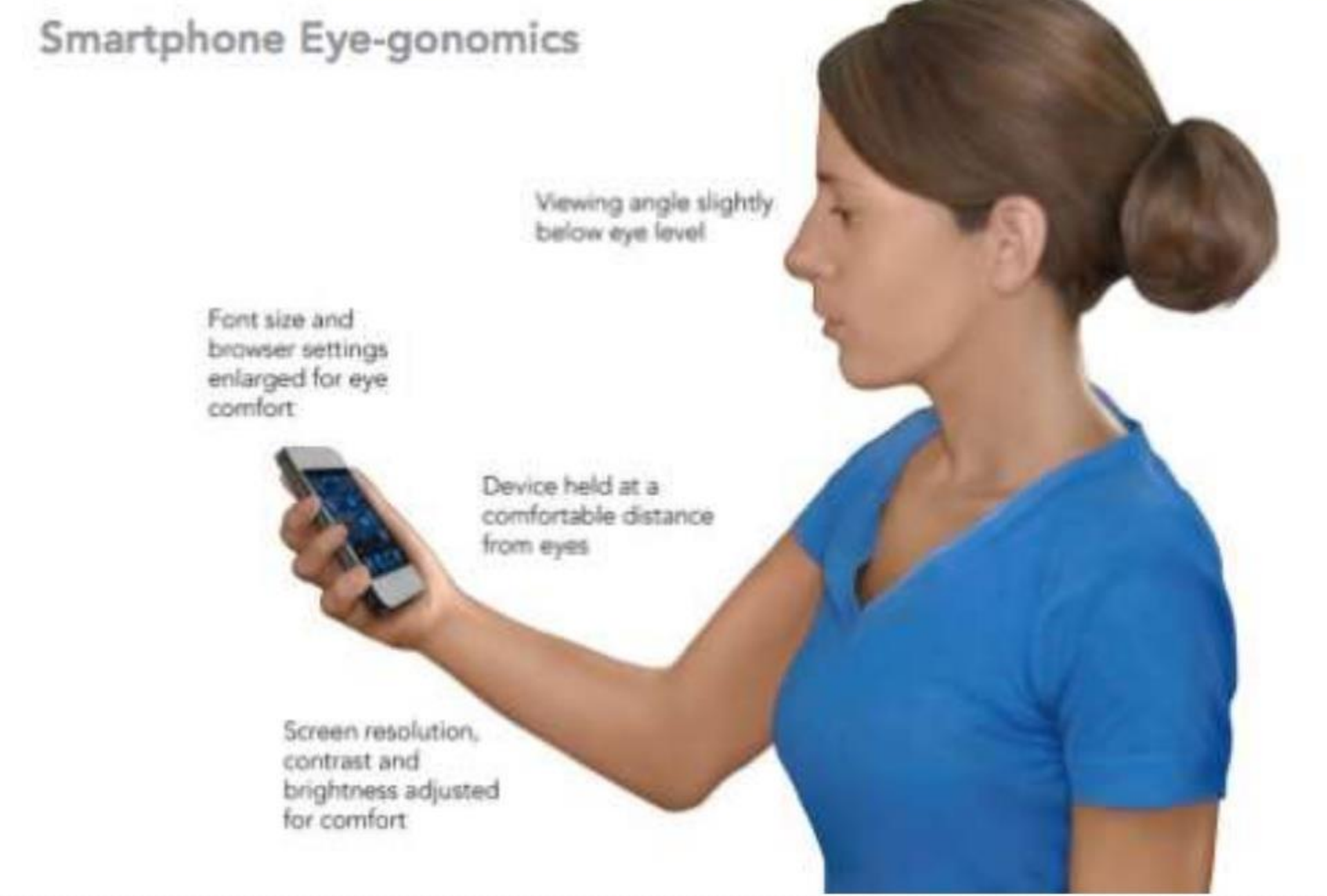
if it makes you

Happy

What is your opinion of using Smartphone in your practice ?



Smartphone Eye-gonomics




thank you
tenki
ขอขอบคุณคุณ
takk
спасибо
kam sah hamnida
dank je
hvala
dhanyavadagalu
tack
дзякуй
gracias
bedankt
dziękuję
הדות
blagodaram
mèsi
xièxie
tanemirt
rahmet
enkosi
mochchakkeram
trugarez
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danke
kop khun krap
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taiku
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rahmat
sukriya
obrigado
dakujem
misaotra
welalin
najis tuke
terima kasih
mercé
köszönöm
شكرا
asante
grazie
mersi
sobodi
nandri
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mauruuru
merci
nanni
vinaka
matondo
cảm ơn bạn
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paldies
ngiyabonga