

PROGRAMMING HANDHELD SYSTEMS

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HANDHELD SYSTEMS & THEIR APPLICATIONS

SOME STATISTICS

MORE PEOPLE OWN HANDHELD DEVICES THAN
OWN TOOTHBRUSHES

10X MORE PHONES THAN PCs SOLD EACH
YEAR

MORE PEOPLE ACCESS INTERNET VIA PHONE
THAN VIA PC

VIEWPOINT #1

HANDHELD DEVICE = SMALL COMPUTER

COMPUTERS KEEP GETTING FASTER, LIGHTER,
CHEAPER & MORE POWERFUL

HANDHELD DEVICES ARE JUST ANOTHER POINT
IN THIS EVOLUTION

1960's : MAINFRAMES



1970's : MINICOMPUTERS



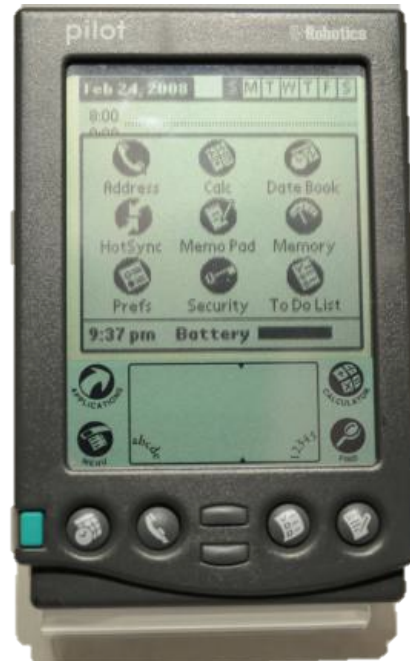
1980's : PC's



EARLY-1990's : LAPTOPS



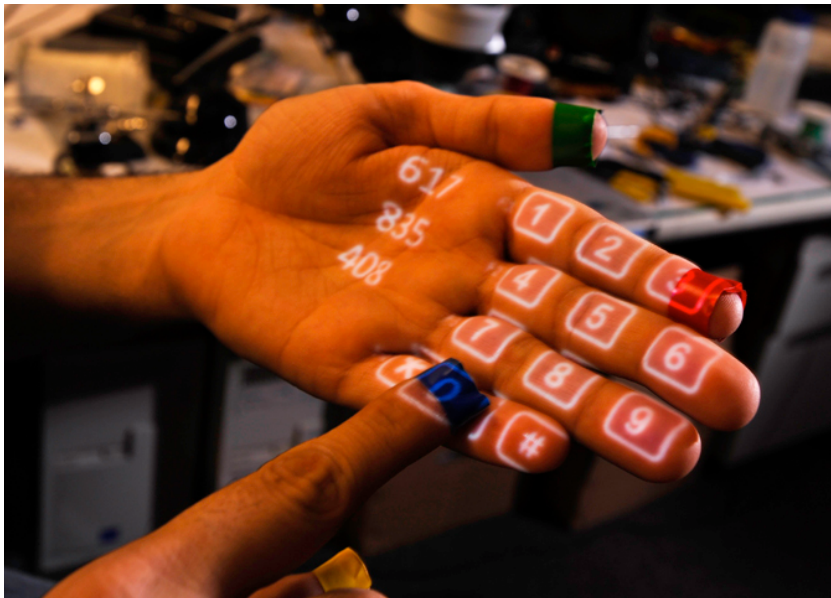
MID-1990's : PDA's



TODAY: SMARTPHONES/TABLETS



TOMORROW?



MAINFRAME



POWER



MINI-
COMPUTER



PERSONAL
COMPUTER



NOTEBOOK
COMPUTER



PDA



PHONE/
TABLET



SIZE



BUT...

HANDHELD DEVICE CHARACTERISTICS

SMALL, PORTABLE, BATTERY-POWERED

ACCEPT TOUCH, AUDIO, LIGHT & RADIO INPUT

SENSOR-ENABLED

LOCATION, DIRECTION, MOTION, LIGHT & PROXIMITY

CHARACTERISTICS

NETWORKED

WIFI, CELLULAR & BLUETOOTH

TRULY PERSONAL

RARELY SHARED (EVEN AMONG FAMILY MEMBERS)

STUDY REPORTED THAT 7/10 PEOPLE SLEEP WITH
THEIR PHONE WITHIN ARM'S REACH

CHALLENGES

LIMITED RESOURCES

CPU, MEMORY, BATTERY, I/O BANDWIDTH

LIMITED SCREEN SPACE / VARIED FORM FACTORS

DIVERSE CONTEXT OF USE

DIFFERENT ACTIVITIES & USAGE PATTERNS

LIMITED USER ATTENTION

LIMITED SCREEN SPACE

TRADITIONAL WEBPAGES HAVE
ASSUMED A LARGE SCREEN

ON MOBILE DEVICE DISPLAYS
OPERATIONS ARE MORE DIFFICULT

HARD TO SELECT SMALL OBJECTS

TYPING IS SLOW & DIFFICULT

MAY NEED TO SPREAD CONTENT
OVER MULTIPLE SCREENS



Summary Thumbnails
[Lam et al., 2005]

VARYING FORM FACTORS



DIVERSE USAGE CONTEXT

SPECIALIZED VS.
GENERAL DEVICES



INDOOR VS. OUTDOOR

LIGHT & CLIMATE

PRIVATE VS. PUBLIC
SETTINGS

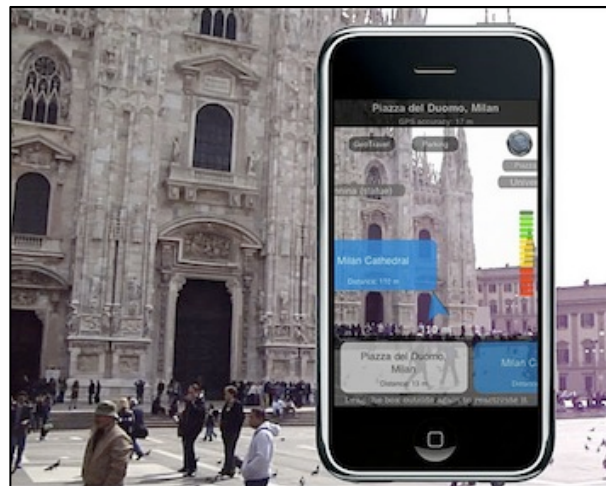


DIFFERENT USAGE PATTERNS

HANDHELD DEVICES DO DIFFERENT THINGS IN DIFFERENT WAYS

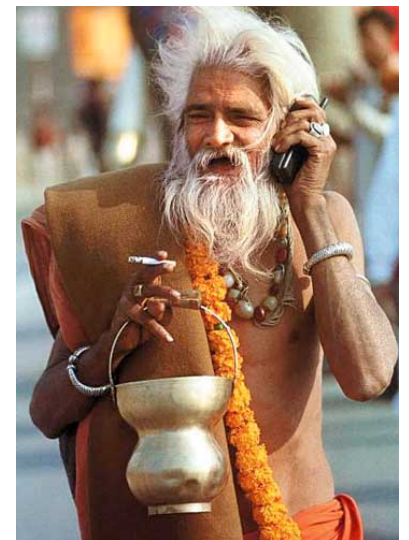
HIGHLY CONTEXT-DEPENDENT

BURSTY USAGE PATTERNS – FROM SECONDS TO MINUTES



LIMITED ATTENTION

MOBILE USAGE IMPLIES MULTI-TASKING
APPS COMPETE FOR LIMITED MENTAL &
PHYSICAL RESOURCES



SUMMARY

HANDHELD DEVICES ARE JUST COMPUTERS,
BUT...

THEY ARE RESOURCE-CHALLENGED, PORTABLE,
NETWORKED, SENSOR-ENABLED, & TRULY PERSONAL

THEIR APPS MUST BE DESIGNED FOR:

LIMITED RESOURCES, UNRELIABLE NETWORKS, LESS
THAN IDEAL USAGE ENVIRONMENTS, PRIVACY &
SECURITY CONCERNS

NEXT TIME

INTRODUCTION TO THE ANDROID PLATFORM