

Human-Computer Interaction

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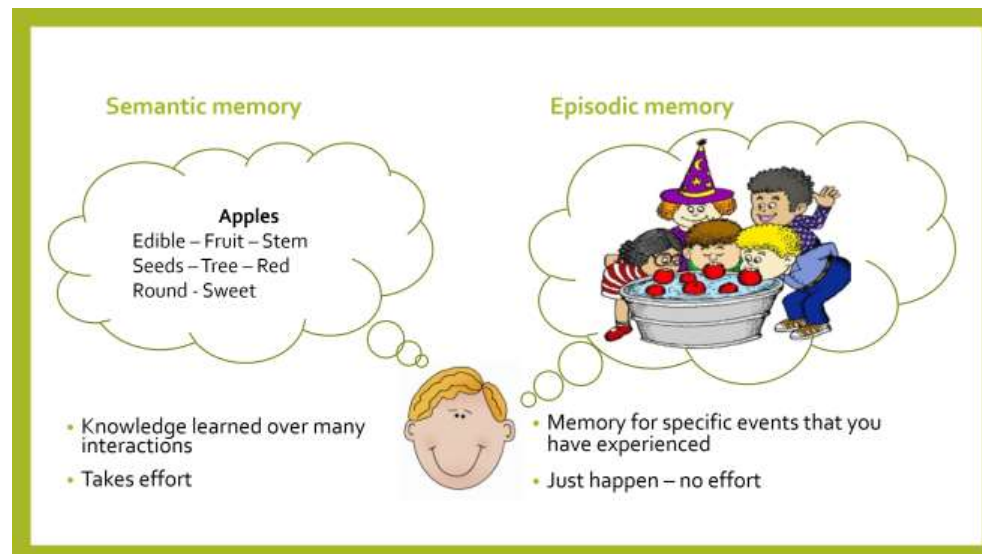
Lecture: *October 10, 2018*

Short-Term Memory

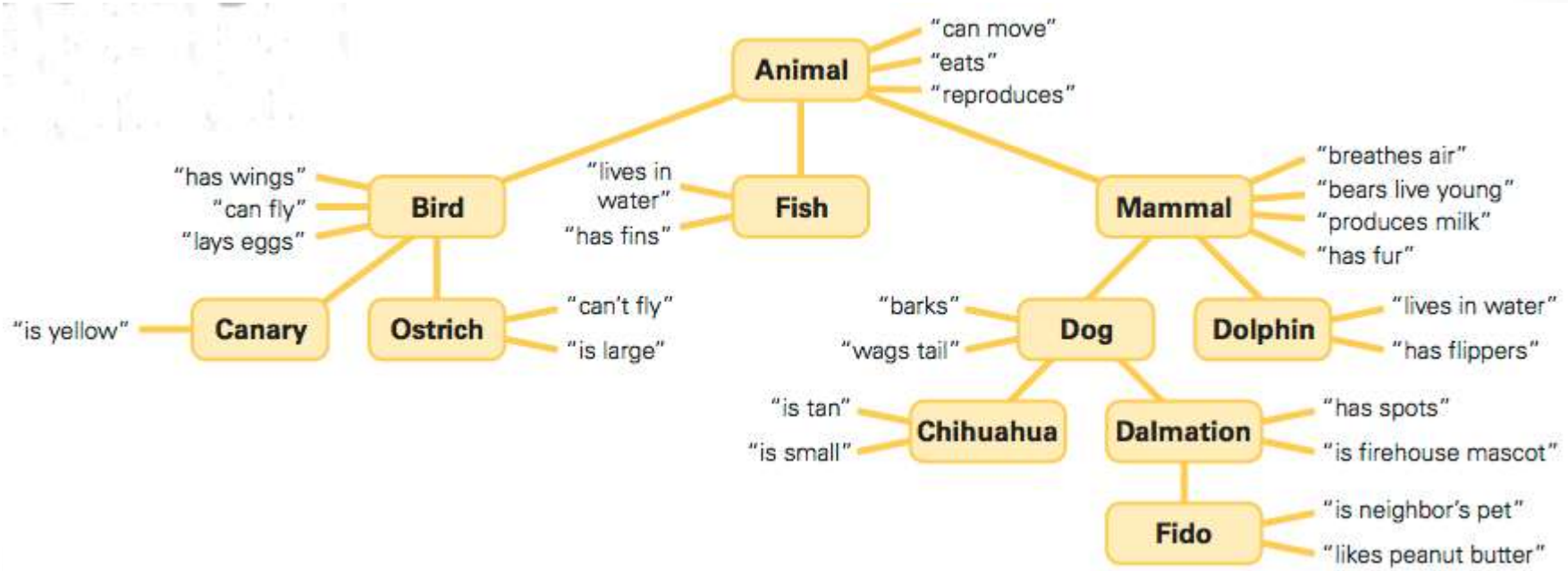
- Or “Working Memory”
- Short-term memory can be accessed rapidly, in the order of 70 ms.
- For example, calculate the multiplication 35×6 in your head.
- Short-term memory also has a limited capacity
- Average person can remember 7 ± 2 digits
- RAM of Computer

Long-Term Memory

- Episodic memory represents our memory of events and experiences in a serial form.
 - Memory of autobiographical events (times, places, associated emotions, and other contextual who, what, when, where, why knowledge)
- Semantic memory, on the other hand, is a structured record of facts, concepts and skills that we have acquired
- Hard disk/ROM of Computer



Semantic network



PACT

People, Activities, Contexts, Technologies

Framework for designing interactive systems

- It should be human-centered
- People use technologies to undertake activities in contexts
 - Teenagers use mobile to send message while sitting on a bus
 - People use FB to make contact with other people when sitting in an Internet Café
- It is variety of each of these elements to make designing interactive system

Activity technology loops

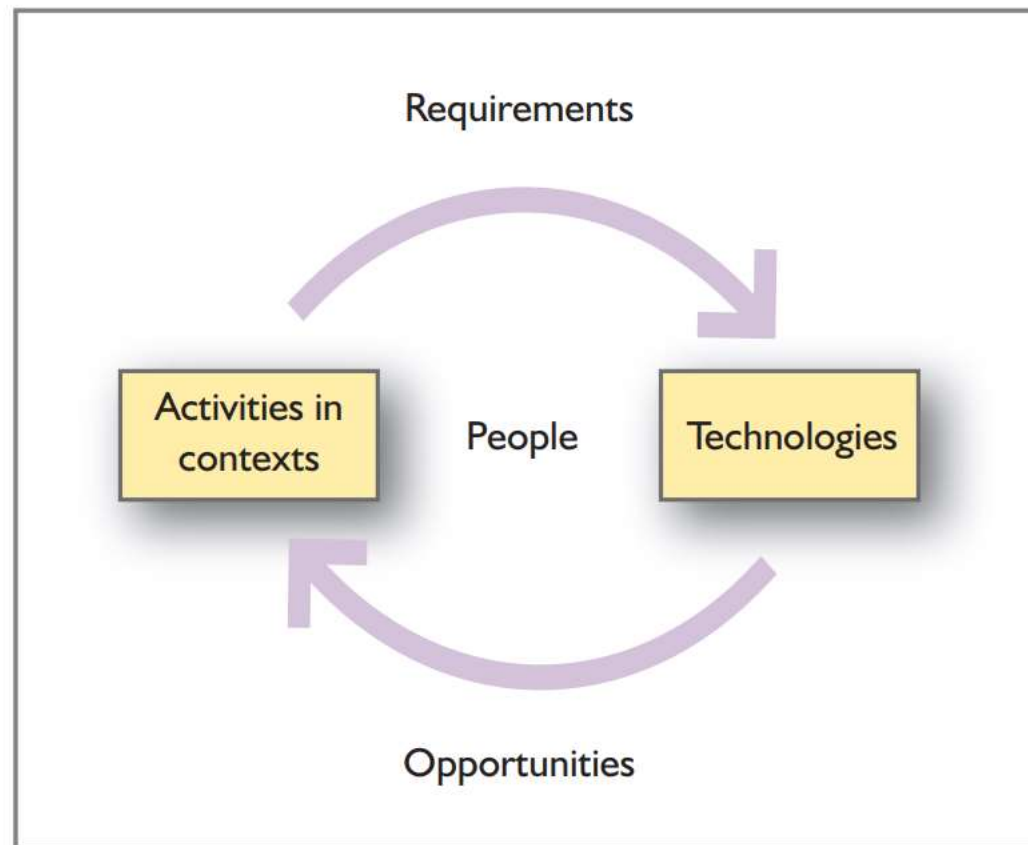


Figure 2.1 Activities and technologies

(Source: after Carroll (2002), Figure 3.1, p.68)

Activity technology loops

- Activities (and the contexts in which they occur) establish requirements for technologies
- Technologies offer opportunities to undertake activities in different ways
- Designers try to design technologies within some domain (a 'sphere of activity') to meet people's requirements
- But in designing some technology (which may be hardware, or software, or both), they change people's activities.

Technology change activity



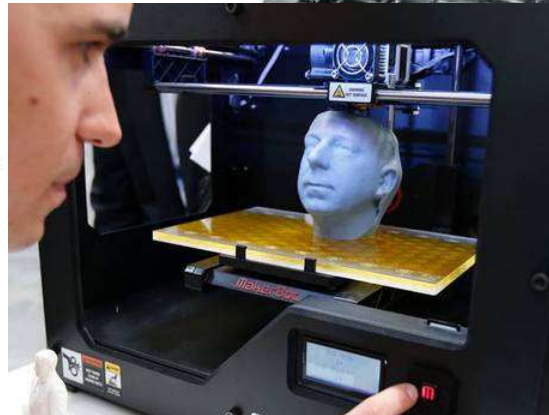
Source: courtesy of Gavin Payne.



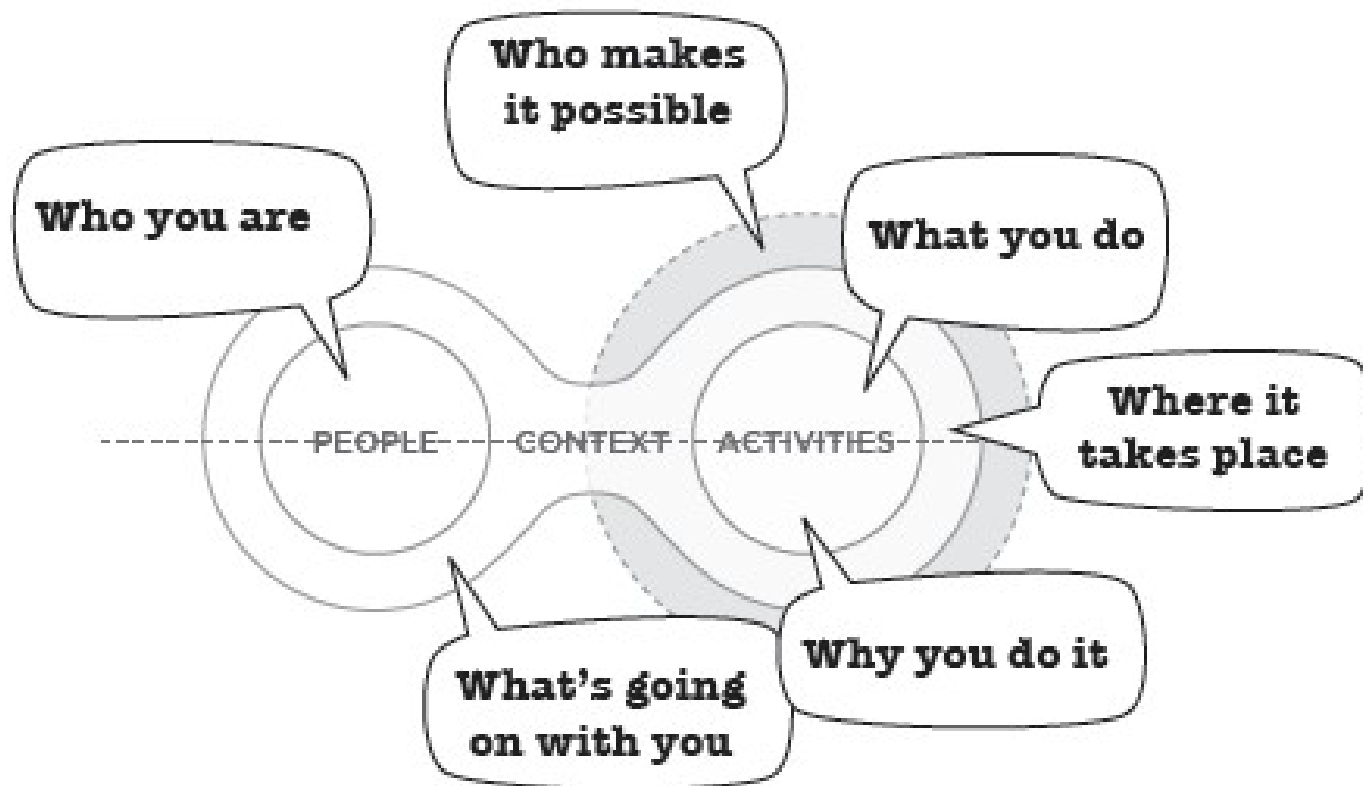
Source: courtesy of Motorola.



communicator. Courtesy of Nokia.



PACT



People

- Physical differences
- Height, weight, different capabilities in sight, hearing, touch,...
- Psychological differences
- Different ways of working; different memory abilities, spatial ability; different amounts of attention at different times; ability to recognize things or remember things. Different 'mental models'
- Usage differences
- Experts versus novices, discretionary users of technologies, differences in designing for a heterogeneous group or a homogeneous group

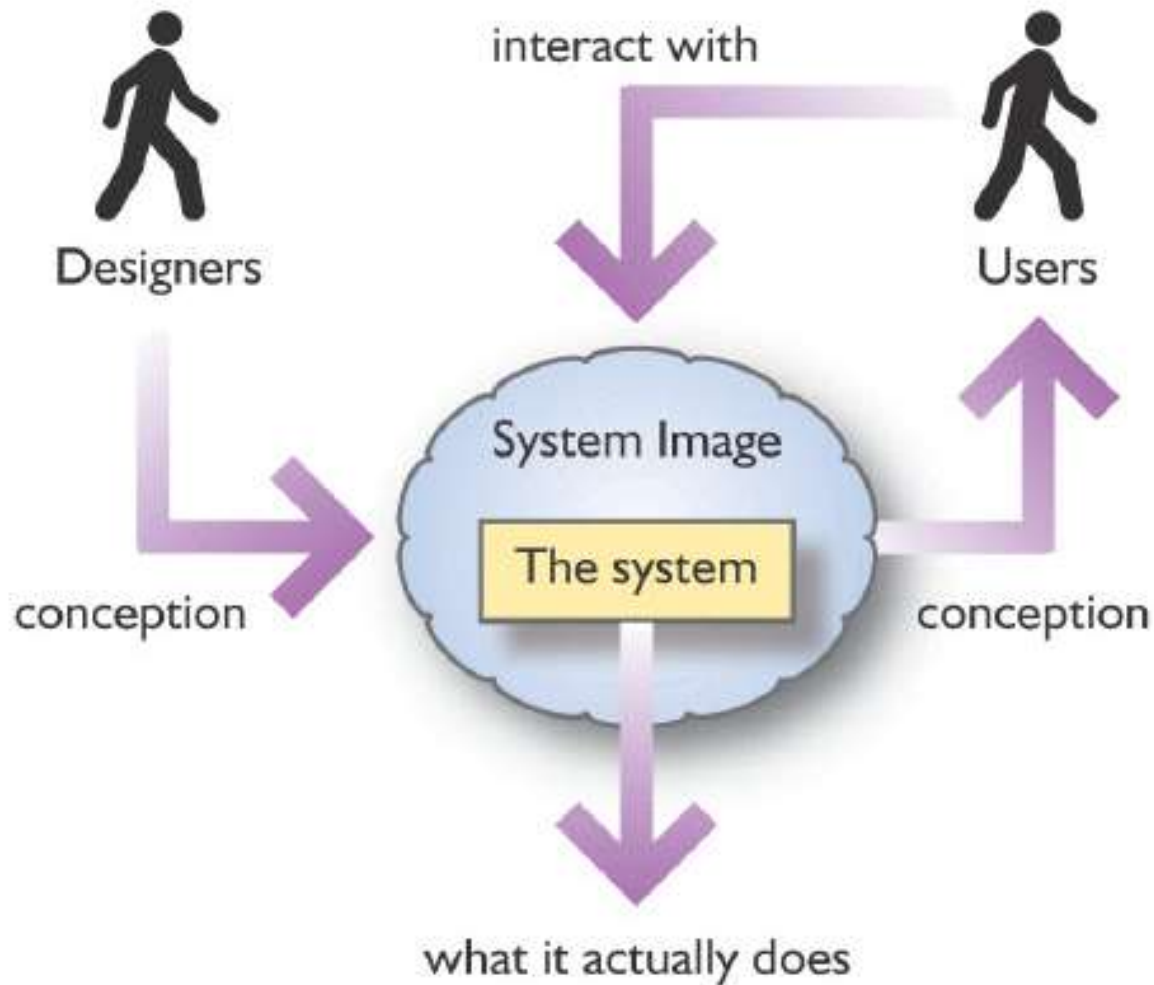
Psychological differences

- Differences in perception and attention
- Differences in memory - short term and long term
- Differences in mental models of things

Mental Model

- Also known as conceptual models...
- Mental models describe the ways in which we think about things - about how we conceptualize things.
- A key aspect of the design of technologies is to provide people with a clear model, ... so that they will develop a clear mental model
- ... but of course that depends on what they know already, their background, experiences, etc. etc.

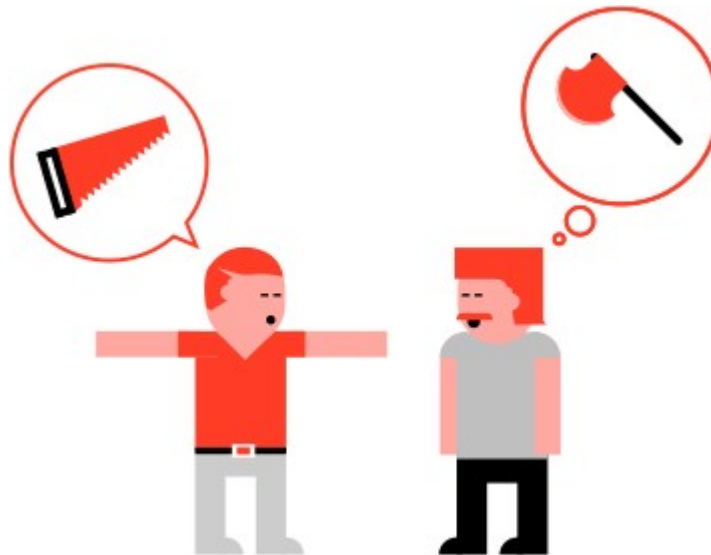
Creating Mental Model



Mental Model

- A mental model is an explanation of someone's thought process about how something works in the real world.
- A mental model is a kind of internal symbol or representation of external reality, hypothesized to play a major role in cognition, reasoning and decision-making
- Mental models can help shape behaviour and set an approach to solving problems (similar to a personal algorithm) and doing tasks

*“mental model of the customer”
as compared to the “mental
model of the company”*



Activities

- Temporal aspects
- To do with timing, frequency etc.
- Co-operation and Complexity
- Working with others or not
- Safety critical
- What problems happen if something goes wrong?
- Content
- What information and media are we dealing with?

More Characteristics of Activities

- More characteristics of activities
- Co-operative or not?
- Is awareness of others and what they are doing important?
- Are they well-defined or vague ?
- Browsing versus doing something clear.
- Safety-critical issues
- Data requirements
- Large amounts of alphabetic data - e.g. writing
- Small amounts of static, unchanging data - e.g. swipe cards
- Media requirements
- Need for video, text, color, sound, etc.

Context (Activity)

- ‘Context’ sometimes means things that surround an activity and sometimes what glues an activity together
- Physical environment is one sort of context
 - ATM or ticket machine versus computer at home
- Social context is important
 - Help from others, acceptability of certain designs
- Organizational context
 - Power structure, changes in life style, de-skilling, etc.

Technology

- Hardware and software to consider
- Input
 - How to enter data and commands into the system
- Suitability of medium for different contexts/activities
- Output
 - Characteristics of displays
- Characteristics of the content. Also feedback is important

Different Technology

- Communication
 - Between person and technology. Bandwidth, speed
- Communication between devices
 - Functional systems versus systems more focused on content

PACT - Example 1

- Example: designing a ticket machine
- KMITL AirPort link station is introducing a new system of automatic barriers and ticket machines.
- What are the characteristics of buying a ticket?
 - Regular/infrequent? Peaks and troughs; interruptible?
- Response time; co-operation? well-defined?
- Safety critical? Errors? Data requirements; media
- What mental model would you want to engender in people.
- How would you design for this?

PACT Example

- Taking into consideration the contexts of use, the activities and the people.
- What technology will you design for the new ticket machines? Consider
 - Input
 - Output
 - Communication
 - Content

Ticket Machine ideas



- **Input** - need to specify destination, need to provide payment, need to specify ticket type
- Press button (depending how many stations). Have touch screen (gets greasy). Pay by mobile phone?
- **Output** - need to specify options, need to provide a ticket, need to say when complete.
 - Ticket could be electronic or paper. Printing facility needed. Options as buttons, or menu items? Need to provide change
- **Communication** - must be simple. Could be Bluetooth. Probably button presses are easiest
- **Content** - need to specify stations, but it could have lots of local information. Help with travel planning?

PACT Example 2

- National Museum
- Waiting to reserve tickets
- Lost guidance
- Meeting Points
- Sufficient touristic information
- Favorite interests
- Write scenarios for people who visited the Museum
- Conduct PACT analysis

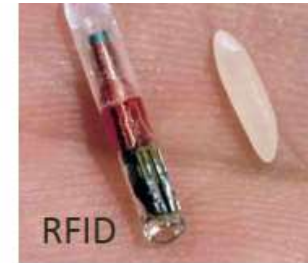
PACT Example 2



Floor Projector



AR



RFID



Audio Guiding



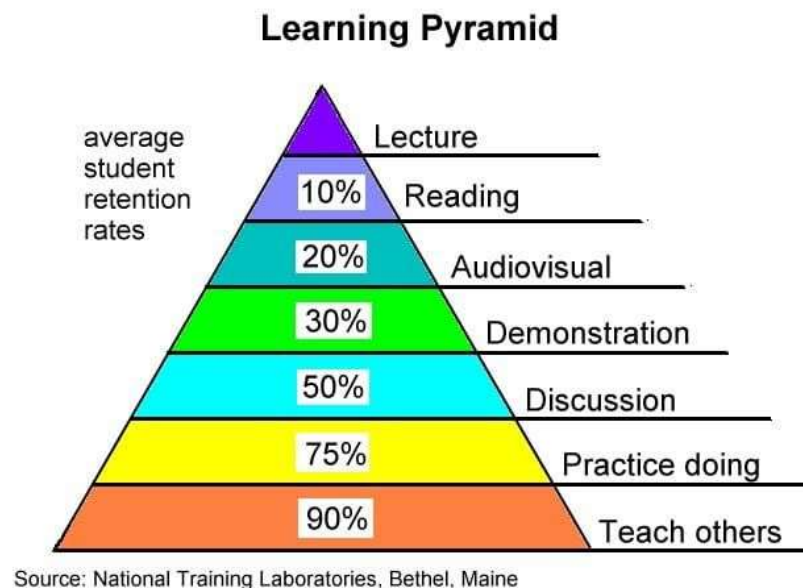
QR Codes

PACT Analysis

People	Activity	Context	Technology
Age: 20~25 and Elderly	Walking	Location change	Pocket Projectors
Professional: Expert, Novice	Reading Information	Time	Indoor BT locators
Affiliation: Professor, Doctor		Identity	
Persona: Reduce time, Reduce Cost			
Mental Model:			
Physical aspects: Long term memory, Blind, Deaf			

Group Assignment II

- Journal, Full Paper Searching
- Select the HCI-Related Project Topic
- Published within 10 years
- Page length ≥ 10 Pages
- Submit the selected papers by Friday 12th, 2018
- Database: *IEEE Xplore*, *ScienceDirect*, *PLoS*, *Frontiers*



Midterm Exam

- Date: Oct 16th, 2018 (Tue)
- Time: 9:30 a – 12:30 p
- Room: IC01
- Contents:
 - Combination of multiple choices and write-up exam
 - Covering all contents
 - Closed notes, closed books, turn off all electronic devices
- Score: 35% Net

Special Lectures

- Invited topic: '*Programming with OpenCV*'
by Assoc.Prof.Dr.Theekapun Charoenpong (SWU)

Schedule (tentative)

- Part I, Monday, November 12th, 2017 (13:00-16:00)
- Part II, Monday, November 19th, 2017 (13:00-16:00)