A General Definition of Information

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A speech based on a paper in Chinese language :
Ching Chun Hsieh and Ying Chun Hsieh, "A General Definition of Information",
the First National Conference on the interdisciplinary Studies of Information,
Beijing Normal University, Beijing, China, October, 2005.

Outline

Introduction

Background : *Language, Information, Communication and Culture*

Previous works

A general definition of information

Concluding remarks

The concept of information 1

❖ Of our mundane and technical concepts, information is currently one of the most important, most widely used and least understood.

✳ Luciano Floridi, *Two approaches to the philosophy of information*, Forthcoming in *Mind and Machine*

✳ Luciano Floridi, *Open Problems in Philosophy of Information*, Forthcoming in *Metaphilosophy*, volume 35, no.3, April 2004

A Problem over 50 years…

❖ The definition of Information is a problem over 50 years since before the term "Information Science" was coined in 1955.

✴ A.D. Madden, *A Definition of Information*,
Aslib Proceedings, vol. 52, No.9, p.343-, 2000.10

"Information science, by nature and necessity, is interdisciplinary."

✵ Douglas Raber & John M. Budd, 2003, p.507

What is your first whim
when you confront the word "*information*"?

Many people think of computer while they confront the word "information".

What would be the answer if time goes back to 1946 before computer has been invented?

Seldom think of communication. Why people think of computer instead of communication?

Communication and Information

❖ *No information, no communication.*

❖ *No communication, no information.*

Therefore, information and communication always co-exist.

Oriental philosophy: the thought of unity

    Information ⇨ Static

    Communication ⇨ Dynamic

    Information and Communication are
       not two independent ones,
       but they are not the same.

   （***not one, nor two***）
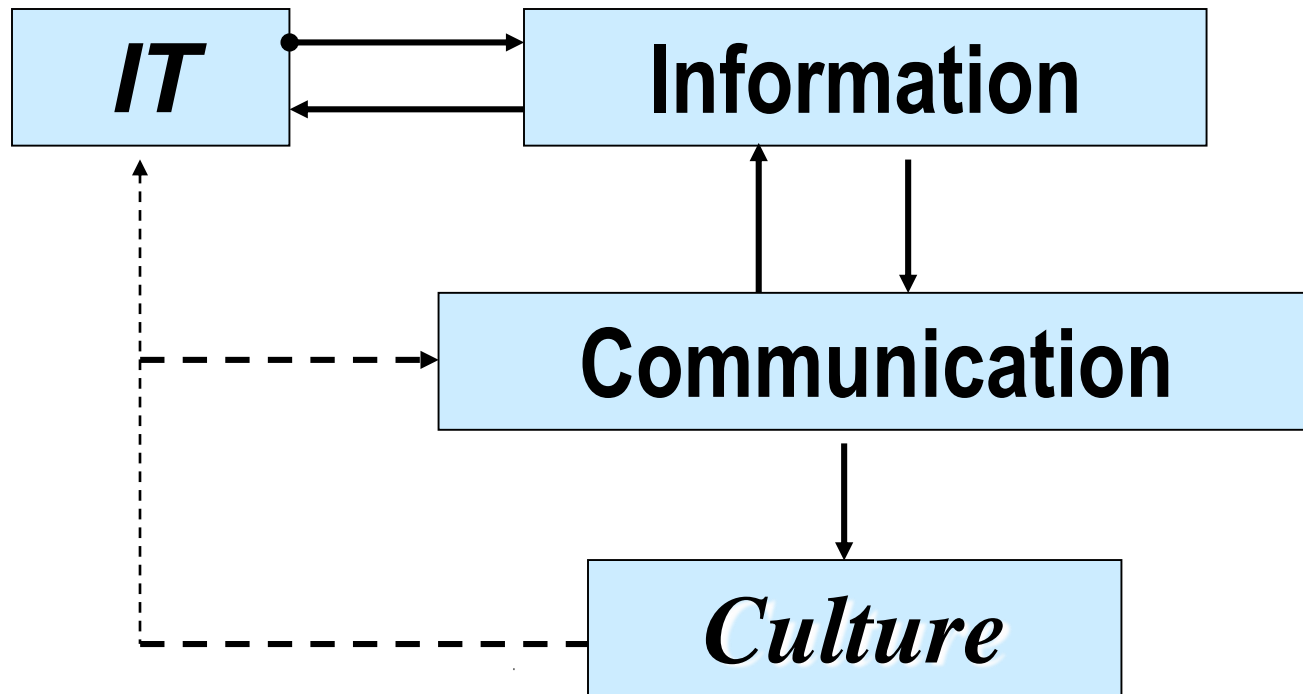
Communication and Culture

❖ *No communication, no community*

✴ *No community, no culture*

❖ *Different communication behaviors leads to different cultures.*
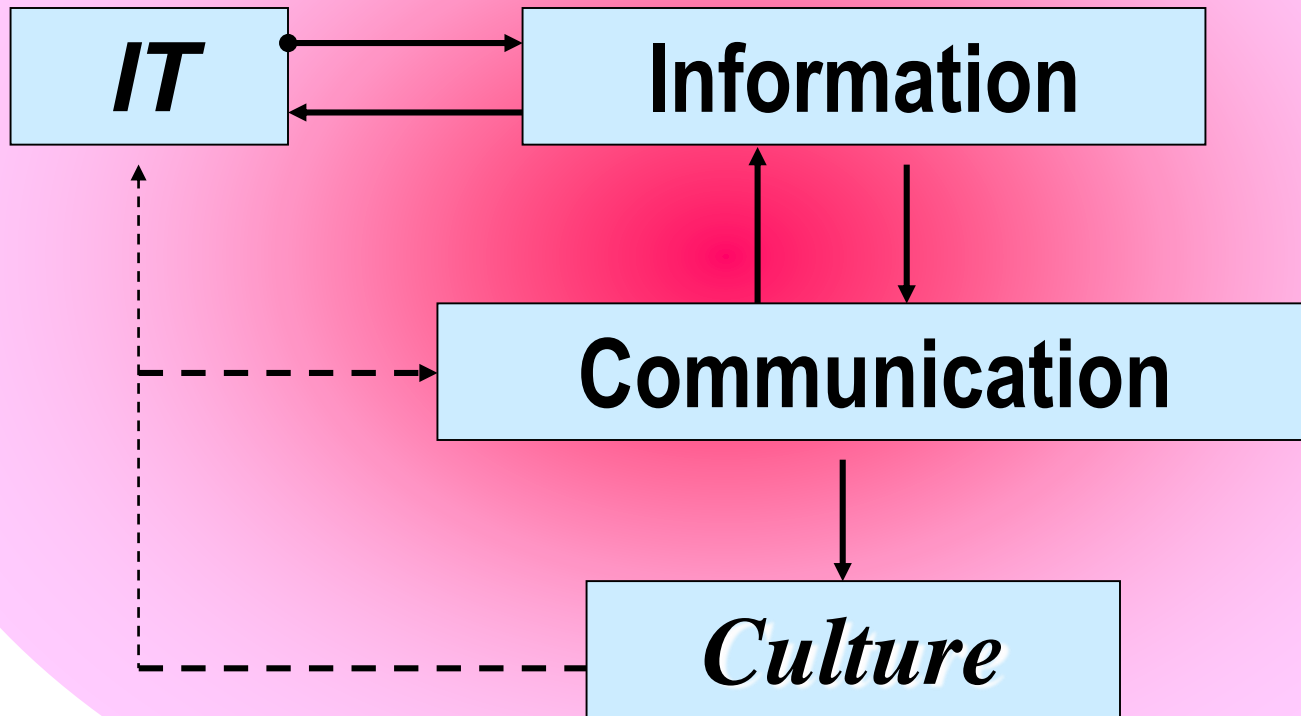
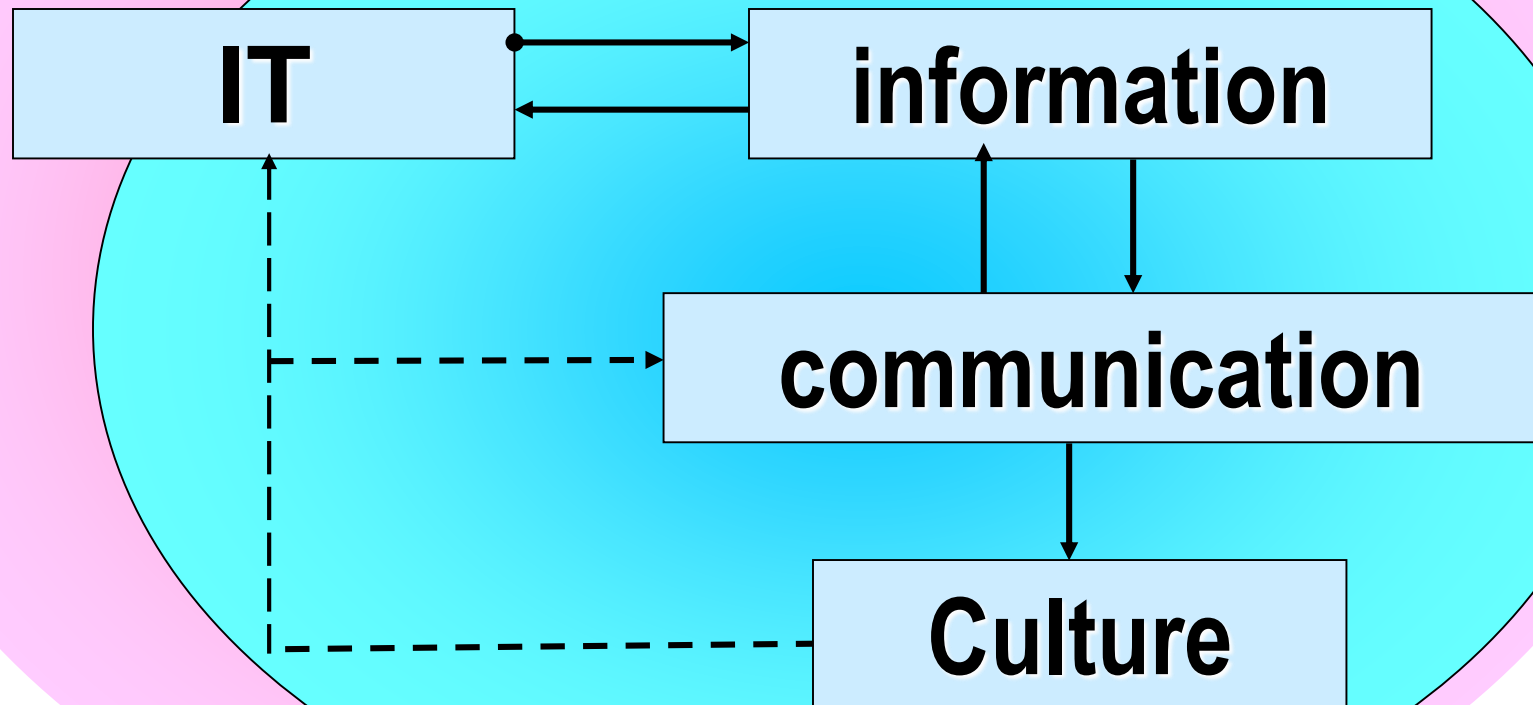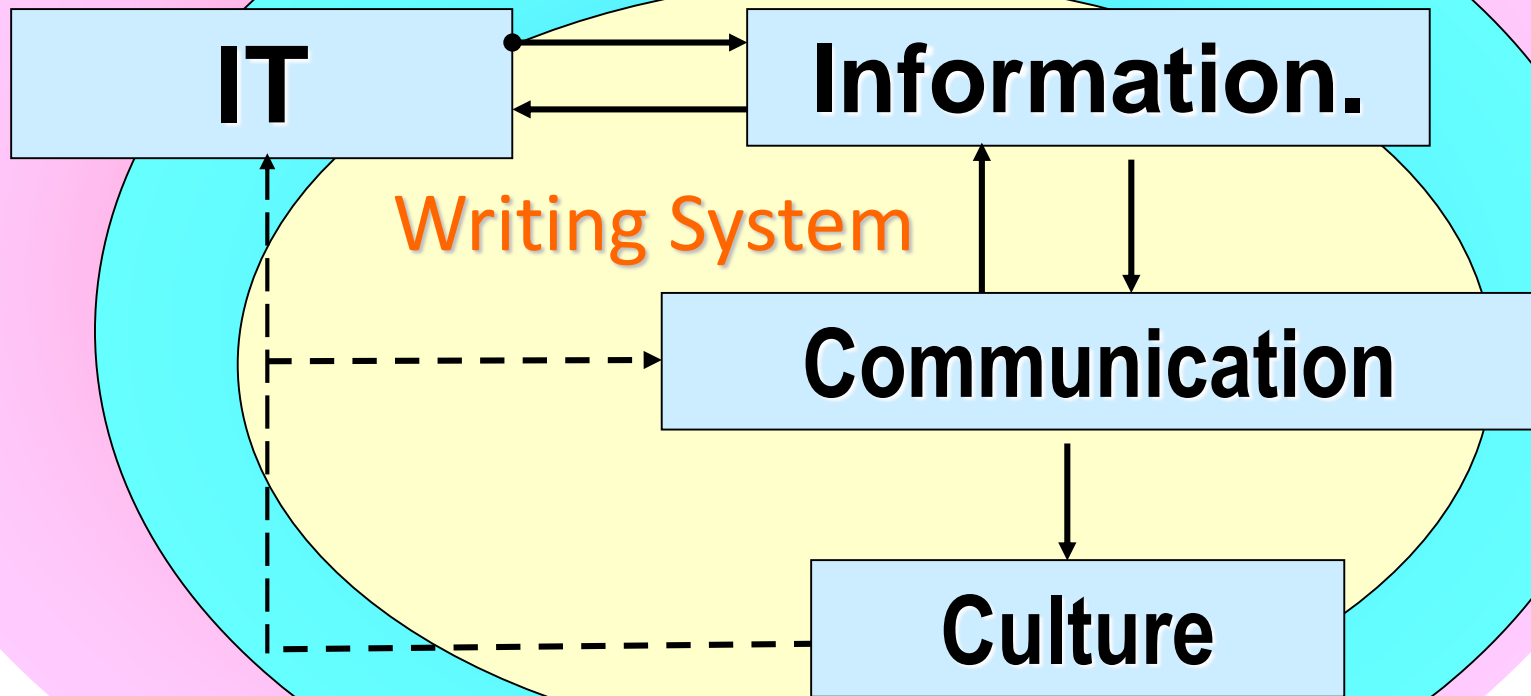❖ **Communication is a necessity part of culture.**

IT and **Culture**

media

Expression system

IT ⇄ information

information → communication

communication → Culture

Media vs. Culture Development

❖ The three stages of culture development

✴ Audio Space (spoken language)

✴ Visual Space (text)

✴ Audio Space (multi-media)

✳ **Marshall McLuhan** *Understanding Media*, **McGraw-Hill, 1964**

Stage of Culture	Expression system	Media
Audio Space	Spoken language	Sound Wave
	(literacy)	
Visual Space	Written Text	Material
	(functional literacy)	
Audio Space	Multimedia	Energy-state

Previous works 1

In general, there is no general definition of Information in the past.

❖ Definition based on Communication Model

✷ Information/communication model by Claude Shannon

✷ Other definitions

❖ Definition based on Utility

✷ Information as…

✷ Others

Previous works 2

❖ Fritz Machlup,1902 -1983

  ✳ Fritz Machlup and Una Mansfield, *The Study of Information Interdisciplinary Messages*, New York: John Wiley & Sons, 1983.

❖ Madden, 2000

  ✳ A.D. Madden, "A Definition of Information," *Aslib Proceedings*, 52(9): 343-349, 2000

❖ Douglas Raber & John M. Budd, 2003

  ✳ "Information as sign: semiotics and information science," *Journal of Documentation*, 59(5): 507-522, 2003

The concept of information 3

❖ Information As…

 ✸ thing, goods

 ✸ knowledge, power

 ✸ resources

 ✸ communication

 ✸ part of a system

 ✸ …

❖ more than 40 different items are collected in：

Alvin M. Schrader, *In Search of a Name: Information Science and Its Conceptual Antecedents*, Library and Information

Science Research, 6:4, pp227-271, 1984

A.D. Madden, 2000

❖ Four aspects of the concept of information

  ✳ information as a representation of knowledge

  ✳ information as data in the environment

  ✳ information as part of communication

  ✳ information as a resource or commodity

❖ Information is a real entity.

❖ Other important points:

  ✳ Authorial context, Readership context
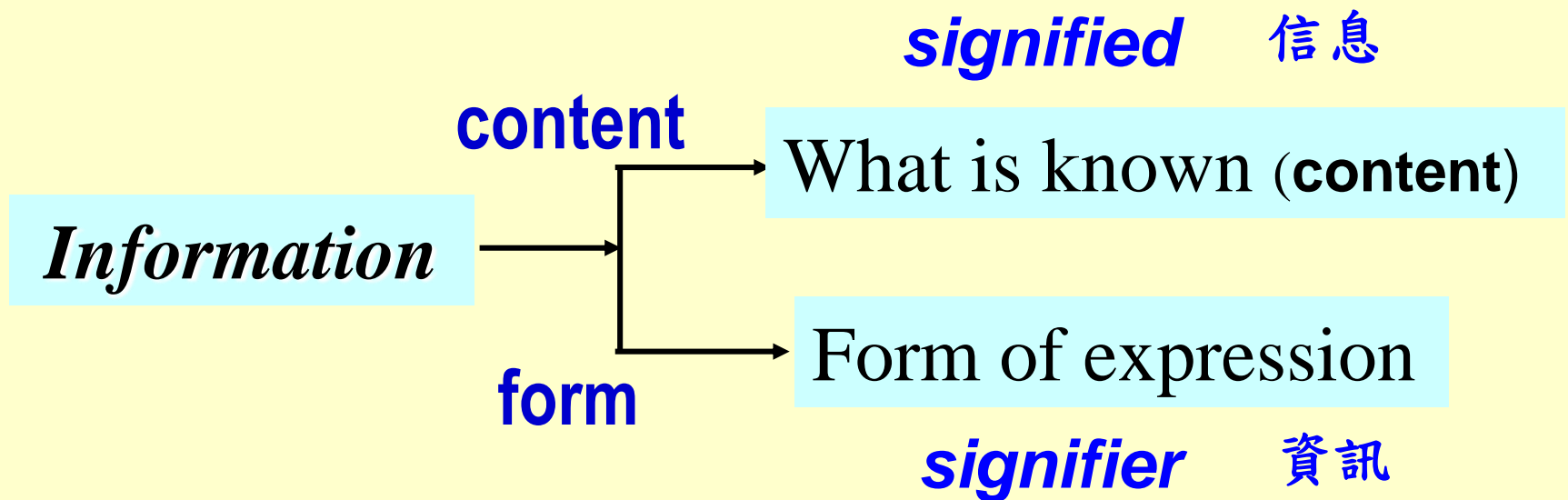
  ✳ Intension of communication

❖ From the perspective of semiotics, "information" is an ambiguous theoretical concept because the word is used to represent both signifier and signified, both text and content.

⁑ Douglas Raber & John M. Budd, *Information As Sign*, Journal of Documentation; 2003;59,5

The ambiguity of Information Concept

signified   信息

content

What is known (**content**)

Information

Form of expression

form

signifier   資訊

Some dualities

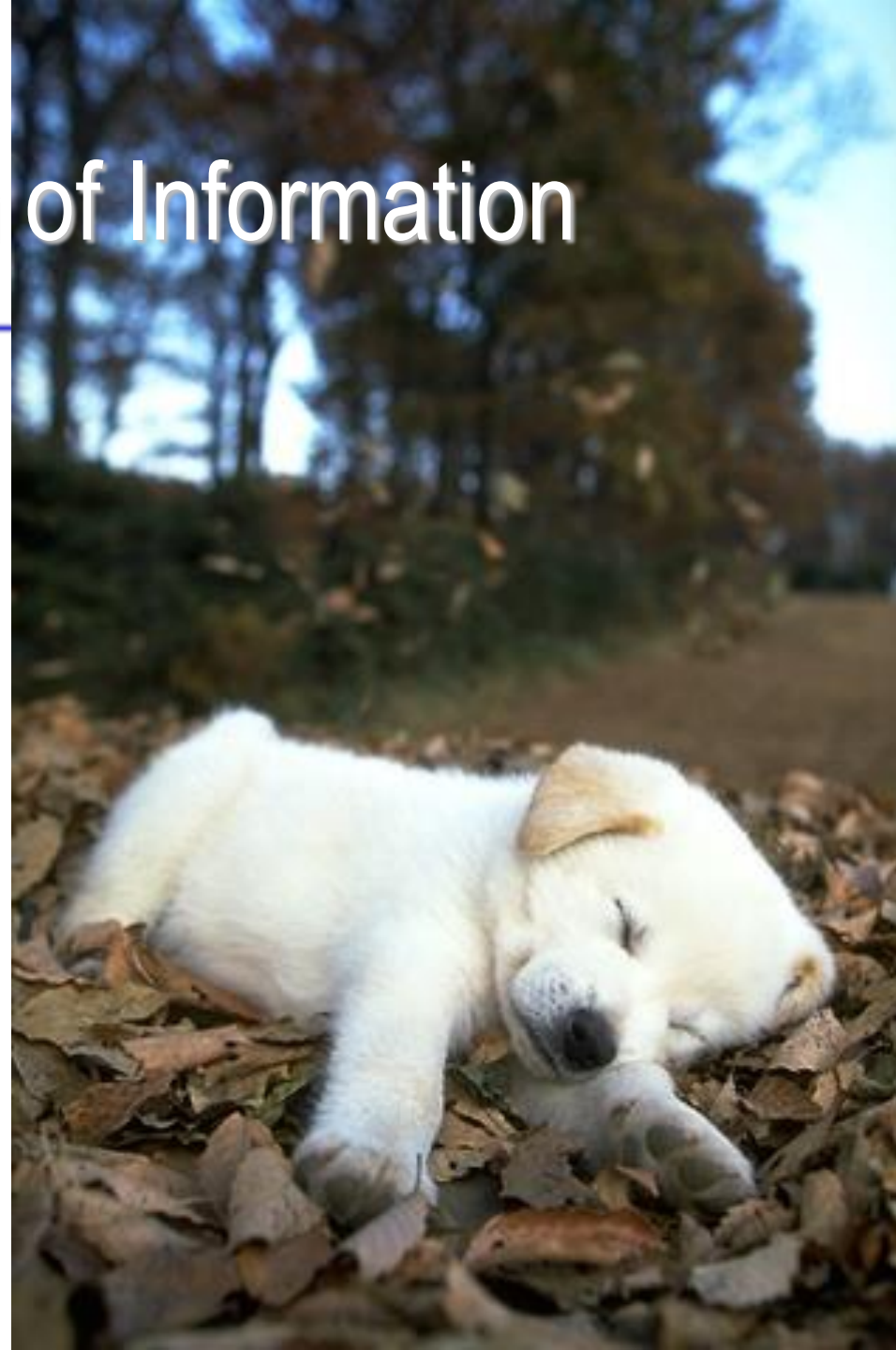|	the mind	physical
Aesthetics	Content	Form
Semiotics	Meaning, Ideas	Sign
Linguistics	Content, Meaning	Elements
Info. Science	information?	information?

Why a general definition is needed

❖ An ever rapid changing world we are living in…

  ✺ Time and Space

  ✺ Communication Practice and Information Processing

  ✺ The changing of relations, values, context……

❖ A general definition is crucial to the cooperation / collaboration works in the digital era.

❖ We need to understand information technology and its impacts on culture and humanities more, in order to planning a better future.

A general definition of Information

❖ Some important considerations

❖ The definition

❖ Properties of information derived from this definition

A general definition should… [1]

1. Define information as a real physical entity.

2. A general definition should include both the abstract part (content) and the physical part (form) of information. The co-exist situation of these two parts should also be clarified.

3. A general definition should not engaged in any application nor any scholarly field of information.

   Differentiate general definition from work definition or operational definition.

A general definition should… 4. We are not going to define information by applying the communication model firstly used by Shannon for the following reasons:

  ✸ Communication is not the only way to obtain information. For instance, observation is another important way as well.

  ✸ As the "speaker (transmitter)" and the "audience (receiver)" of the communication model is concerned, the authorial context and the readership context various so great nowadays such that it would meaningless to put them in one model.

    ➤ As a consequence, we consider the information creation (author) side and the reader side separately, while deriving the general definition.

A general definition should… 3

5. In order to fulfill condition 3 above, We have to search for a general phenomena of information from its life-cycle.

  * The creation of information is a general phenomena which is independent of the content of information and hence independent from any field or application.

  * The creation of information is subjected to the express system applied, such as natural languages for daily use or for performing arts. Therefore, express system will be included in the definition to indicate various characteristics provided by each express system.

Media is crucial to the properties and generation of information. Also, media is the borderline of the studies of information between natural science and humanities. Therefore media will play an important role in the general definition of information.

Media

- ❑ **material**
- ❑ **instruments and tools**
- ❑ **techniques/technology**

- ❑ **infrastructures**

- ❑ **expression system**
  - ❑ *languages*
  - ❑ *semiotic systems*

Digital Media

➢ energy-state media, instead of material media

    ➢ *almost no material barrier*

➢ ***the only medium***

➢ **Media are like the gene of information**

    ➢ *Media do have effect of interpretation of information*

        ➢ *"The media is the message"*

A definition viewed from creation

❖ At the information creation side, information is defined as :

> "The form/sign of *what is known* expressed on media material by author. "

Note: The Sanskrit "jñeya" is a better wording for "what is known".

The definition

❖ At the receiving end, information is defined as :

The sign/form that we can receive.

❖ The interpretation of the sign/form depends on the expression system used, and the readership context.

A Comparison of the Author side and the reader side

	Author Side	**Reader Side**
People	Author	Reader
Behave	Start from what is known, externalized, from mind to physical entity, from abstract to real	Start from any form, feel it, understand it. Internalize, from physical entity to mind, from real to abstract
Purpose	Create information	Understand the content and its meaning
Context	Fixed authorial context	Open readership context
Ending situation	Convergent. Ceased while work is done.	Divergent. After understand the original meaning, extended meanings are possible by readers.
outcome	Information intented to communicate	Rational understanding and sentimental feeling of the information provided by author.

Types of Information reader can perceive

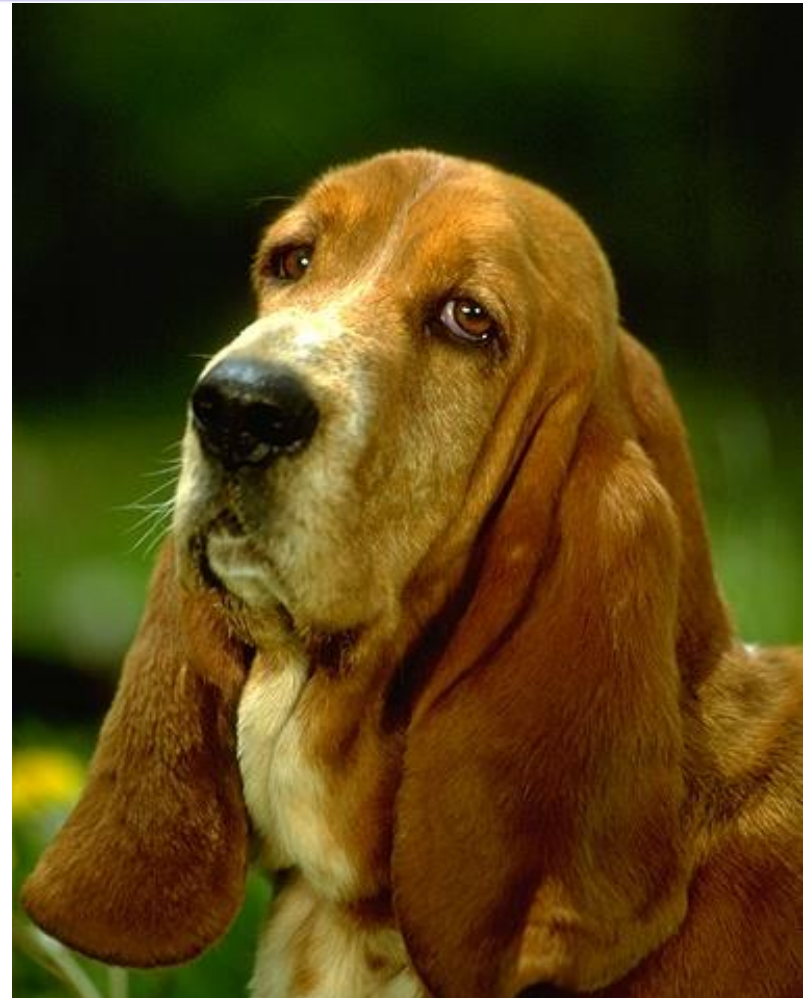| Information	Intention of comm.	Typical Action	Examples of information	Definition of Information
Artificial	**Yes**	**Communi-cation**	**Language, text, artworks, ritual, code, sign, symbol …**	**The form on media created by expressing what is known by author**
	yes	**Planning, Creation…**	**Intra-communication such as recall, imagine, …**	**The form created by reader himself**
	no	observation	**Cultural and social phenomenal**	**Form or "Sign"**
Natural	**no**	observation	**Natural phenomenal**	

4 categories of Properties of Information

❖ Inherited from "What is known" (所知)

❖ Introduced by digital media

❖ By harness of digital instruments and related techniques

❖ Introduced by applying the express system

Concluding Remark [1]

❖ Understanding media and understanding the affinity among knowledge-based disciplines such as *Communication, Linguistics, Semiotics, Information Science, Aesthetics…*should be a good way for understanding the nature of information .

Concluding Remark 2

❖ The definition derived can be used in any field, no matter it is in nature science, social science, humanities, esthetics, etc.

❖The definition derived can clarify the concepts and relations among some commonly used terms, such as, computer, information, data, knowledge, feeling… etc.

❖ The definition derived also shows how related fields are related to the creation of information.

Concluding Remark 3

❖ The definition derived can explain why previous definitions were so coined. And thus, the definition can explain a lot of concepts of information that were not explained in the past.

❖ Reduction of the range/scope of "what is known", proper selection of express system and choose the media applied will reduce the general definition to a specific definition of information which might be served as a work definition for a specific project.

Concluding Remark 4

❖ The general definition derived solved an very fundamental and open problem of information studies which has been suspended over 50 years.

This definition provides correct concepts of information, systematically reveals the properties of information, and, hopefully, it will effectively improve cooperation / collaboration works that *PNC* has tried to promote for years.

The
End

Thank you !