



# Toward Digital Assistance for Appreciating Arts and Crafts in Museum

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# Outline

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- My interests
- My works which I have done
  - private digital notepad system for supporting thought
  - support system for super-small satellite team
- My current work
  - multimedia archiving of crafts for patrimony of artistic knowledge or skills
  - digital assistance for appreciating arts and crafts in museum



# My Interests

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- Supporting human intelligence for our happier life 😊
  - Not creating replaceable machines by human creativity
    - Creative activities, such as designing and producing artifacts, are fun to us!
  - Supporting creative (private) activities
  - Supporting collaboration with knowledge sharing
- Where can “knowledge” inhabit?
  - Can computers really store knowledge (standalone)?
    - “Fact” can be stored as information.
    - Computers can do symbol processing. That ability is very useful and powerful for us, human beings. But can they store knowledge?
  - Knowledge may be able to inhabit or emerge only in human’s mind when he/she faces the “knowledge remindable” information.
  - We can store not knowledge but just data or information in computers, can’t we?  
(like a book)



# Toward a Knowledge Remindable Environment

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- For knowledge sharing and supporting collaboration
  - To provide a knowledge remindable environment in which
    - users can understand or emerge knowledge or context in design process promptly and intuitively
    - users can think furthermore in this context or for their own purposes
- Keys
  - Information storage should be...
    - quantitatively and qualitatively rich, which includes a huge amount of heterogeneous information
    - grown dynamically with networked resources
  - context acquisition
    - We should do maintain context in design time as is.
  - what and how to provide information to users

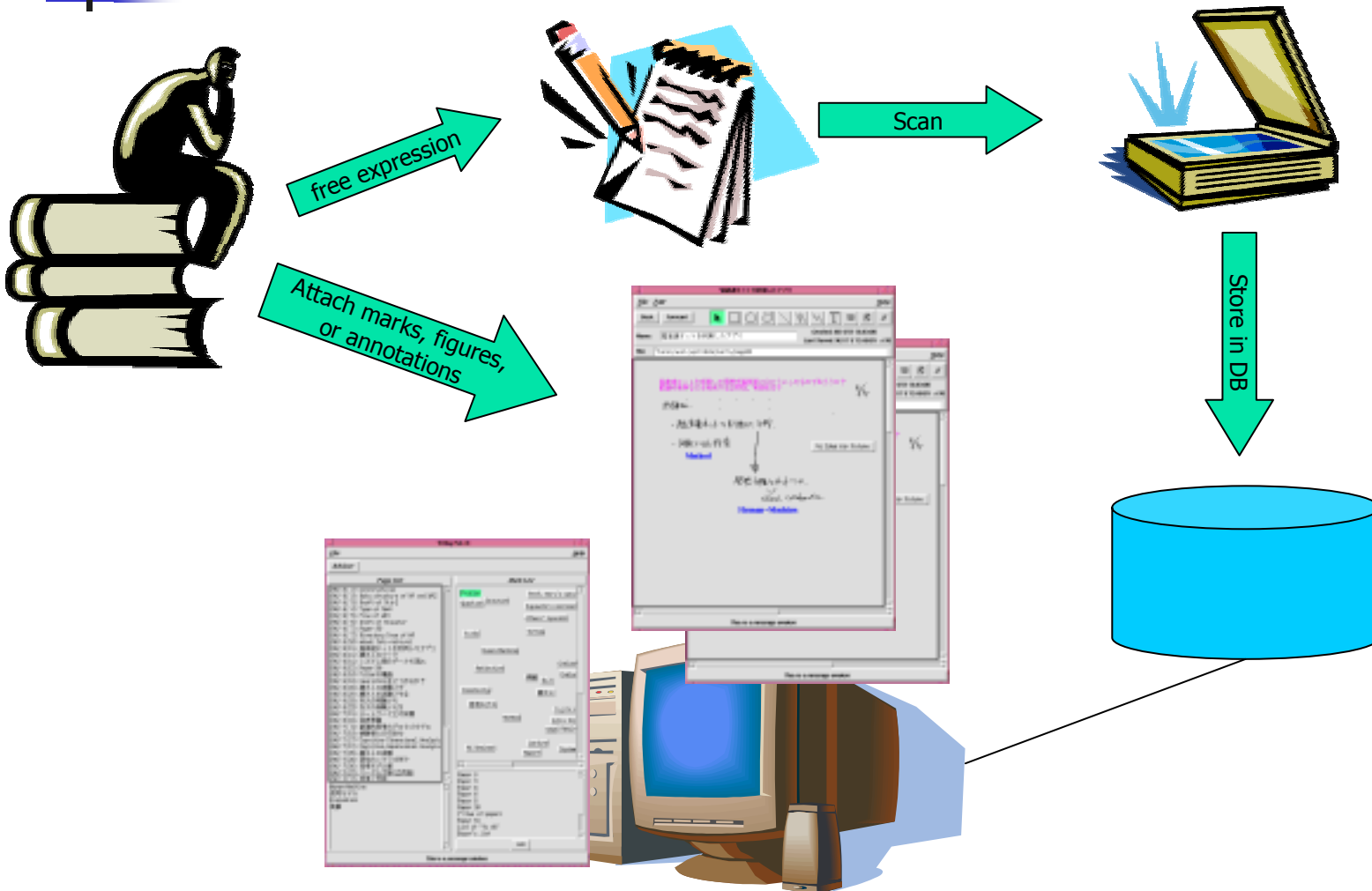


# Private Digital Notepad System for Supporting Thought

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- Resource: Handwritten notepads
  - Traditional and still competitive media in everyday thinking
  - “Context of thought may be expressed as a time series of private notepads.”

# What to do



# Pad Manager and Writing Pad

Writing Pad 2.8

File Edit Help

Advisor

Page List

- (06/ 6/ 2) Construction
- (06/ 6/ 3) Data structure of WP and WP2
- (06/ 6/ 3) Draft of Str2
- (06/ 6/ 4) Type of Mark
- (06/ 6/ 5) Flow of WP2
- (06/ 6/ 5) Draft of Animator
- (06/ 6/ 7) Paper 00
- (06/ 6/ 7) Directory Tree of WP
- (06/ 6/24) about Info retrieval
- (06/ 6/11) 超高速ネットを利用したアプリ
- (06/ 6/11) 橋さんのマーク
- (06/ 6/11) システム間のデータの流れ
- (06/ 6/12) Paper 00
- (06/ 6/14) Filterの構造
- (06/ 6/18) heuristicsをどうやるか?
- (06/ 6/20) 橋さんの実験メモ
- (06/ 6/20) 橋さんの実験メモ2
- (06/ 6/23) 矢入の実験メモ
- (06/ 6/23) 矢入の実験メモ2
- (06/ 7/11) ネットワーク上の知識
- (06/ 6/24) 発表準備
- (06/ 7/ 3) 創造的思考のアロセスモデル
- (06/ 7/10) 実験者との打ち合せ
- (06/ 7/17) Cognitive Dimensional Analysis
- (06/ 7/17) Cognitive Dimensional Analysis
- (06/ 7/25) 橋さんの実験
- (06/ 7/28) 研究のシナリオ作り
- (06/ 7/28) 思考モデル案
- (06/ 7/27) ユークと実験(立花様)
- (06/ 8/ 0) 日本ト音誌

Human-Machine  
思考モデル  
Evaluation  
実験

Mark List

Problem Prof. Mori's adv

Question Solution Sugimoto's opinion  
others' opinion

To Do Survey

Human-Machine

Reflection Evaluate

創造 矢入 Evaluate

Creativity 橋さん

思考モデル

Method T/L/T/C F

AI Designer Lecture Report System

Method C/D+ Proc  
KRIS Per3

Paper 3  
Paper 5  
Paper 6  
Paper 6  
Paper 8  
Paper 00  
TY Run of papers  
Paper 51  
List of "to do"  
Buen's list

Add

This is a message window

超高速ネットを利用したアプリ

File Edit Help

Back Forward

Name: 超高速ネットを利用したアプリ Created: 06/ 6/11 16:03:00  
Last Saved: 06/ 7/ 5 13:40:00 # 06

File: /kenro/work/wp2/data/kenro/page00

超高速ネットを利用した実験支援技術とはどういったものであろうか?  
新画面や音声を活用する必要性、有効性は?

6/11

おがみ。

超高速ネットを利用したアプリ。

実験への探索

Method

to Ideas for Future

実験支援ネットワーク

CSW, Collaboration.

Human-Machine

This is a message window

This is a message window



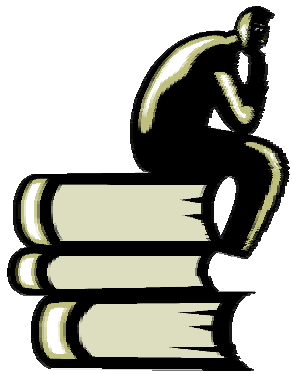
# Private Digital Notepad System for Supporting Thought

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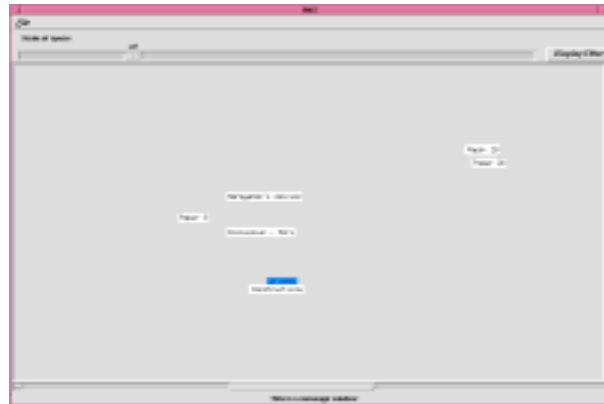
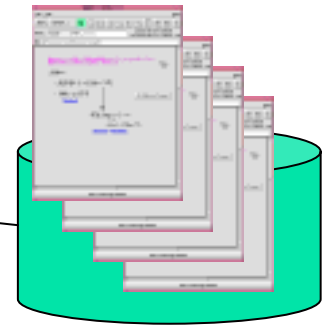
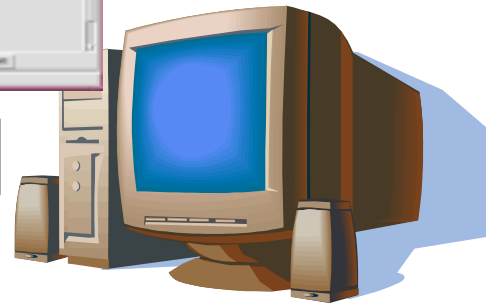
- What and how to show
  - A time series of notepads as is (List of notes)
    - “Myself in past may be a differently thinking subject from the current me.”
    - “I don’t remember what I thought about this!”
  - “Mark” based reconfiguration of icons in 2-D space, filtered by a time stamp of each notepad
  - “Changing a constraint of thought is effective in order to think alternatively.”
    - Show alternative views to change a constraint related to time for alternative thinking



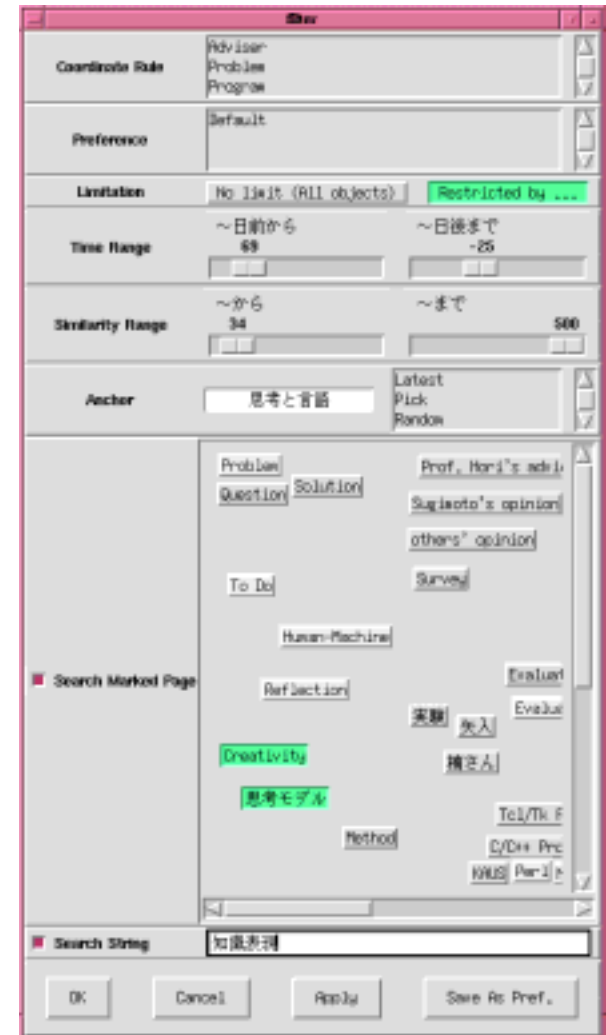
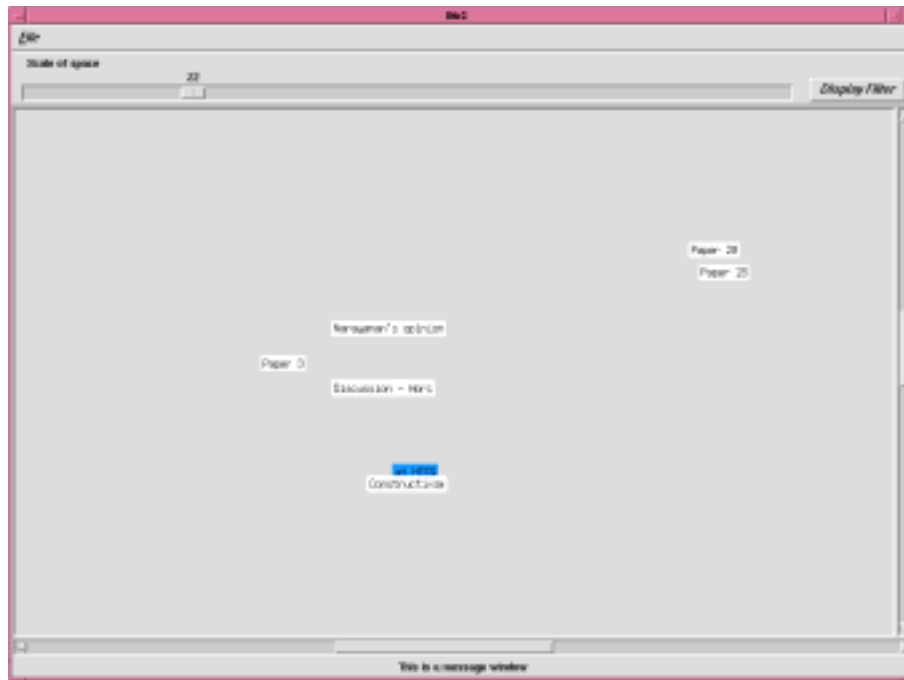
# How users can do



List of notepads  
2-d configuration of notepads



# Visualizer and Filtering Control





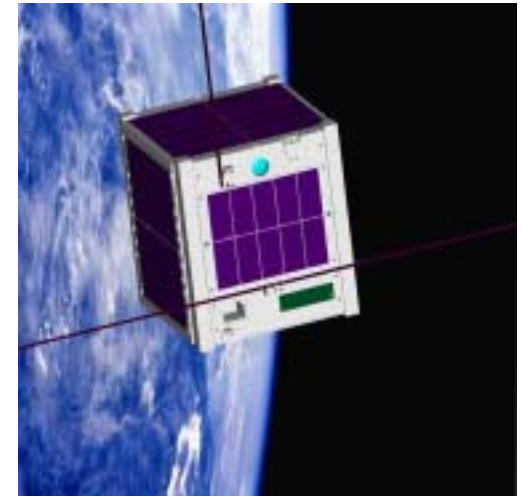
# Supporting Super-Small Satellite Team

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- CubeSat Project
- “Context of collaborative work in design time including design rationale may be expressed as a time series of E-mails, meeting minutes, test data and its reports, if it wasn’t described in a document.”
- To develop an information sharing system for supporting CubeSat Project team using various kinds of information including *disappearing* one

# CubeSat

- International educational project for developing small-satellites
- <http://www.cubesat.org/>
- 10cm cubic satellite weighing less than 1kg
- 650km circular, Sun-synchronous orbit
  
- Univ. Tokyo CubeSat Team
  - Mission
    - The on-orbit verification of the super small satellite bus system using commercial-off-the-shell components
    - Operation using a frequency in the amateur communication band
    - Receiving pictures from the onboard camera
  - Launched on June 30, 2003 from Russia
  - <http://www.space.t.u-tokyo.ac.jp/cubesat/index-e.html>





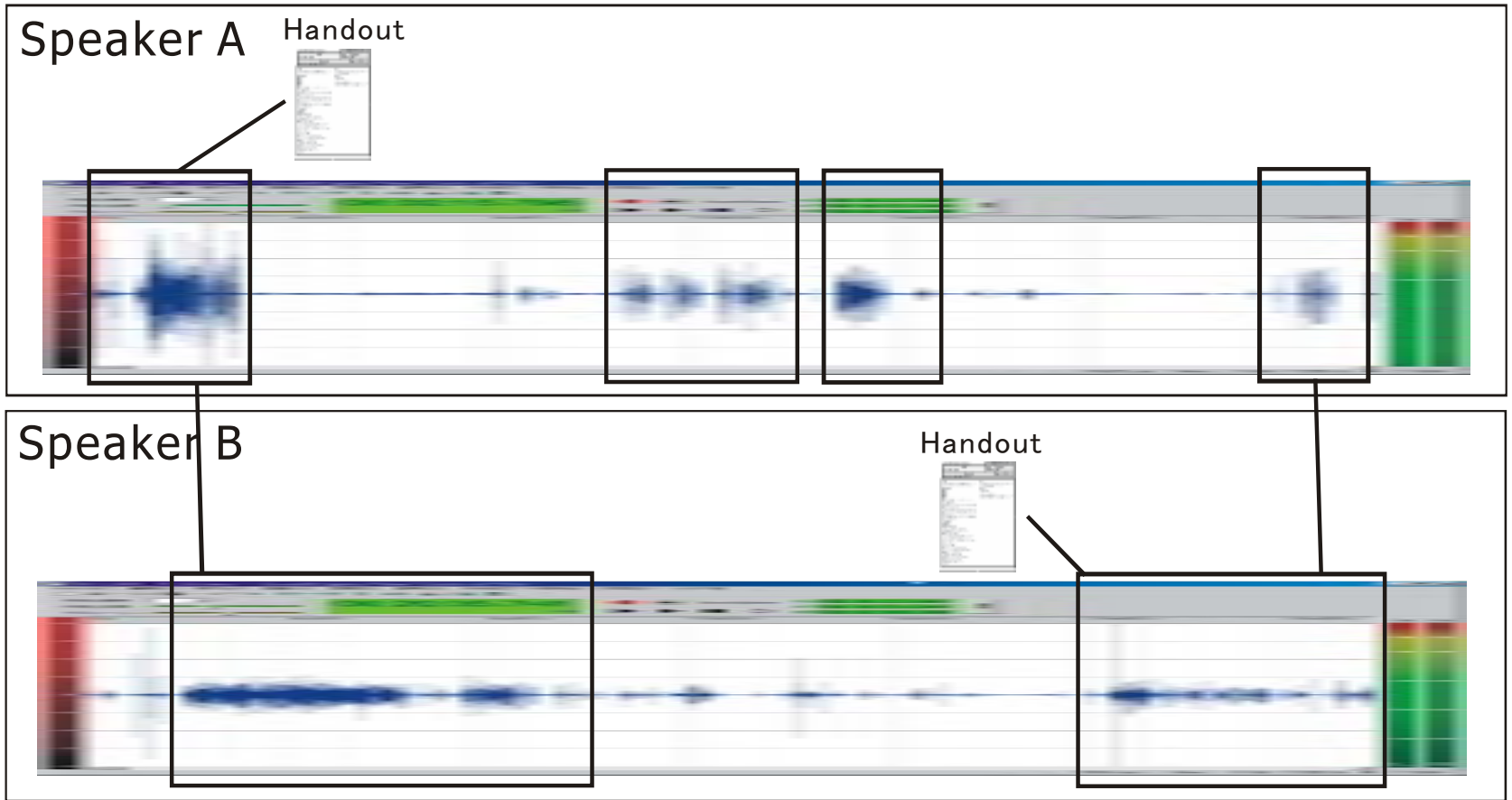
# Information in Design Process

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- Text
  - handouts
  - minutes
  - E-mail
  - specifications, manuals of components
  - test data
  - source programs
  - external resources (ex. web)
  
- Sound - Speech at meetings
  - speech recognition technology is still underdeveloped
  - spotting technical term occurrences in speech data may be efficient
  - using for enhancing related documents
  
- Image
  - photos
  - notes
  - circuit diagrams

# Meeting

Minutes





# In Use Time (Operation Phase)

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- When a satellite shows an anomalous behavior...
  - a operator locates the fault
  - he/she tries to identify its cause
  - he/she may need to understand its design rationale (or context of design) to repair the fault
  - he/she retrieves “a series of information” in our system
    - consists of a document and related speech or test data
      - speech and the speaker’s handout or the minutes of the meeting
      - test data and the test report
    - not a cluster, but a sequence of information in temporal order = context of design
- To search information...
  - query by keyword
  - query by telemetry data (as a use-time context)
    - matching telemetry data to test data
    - selecting the related test reports, then returning the series of information
  - Browse directories for satellite

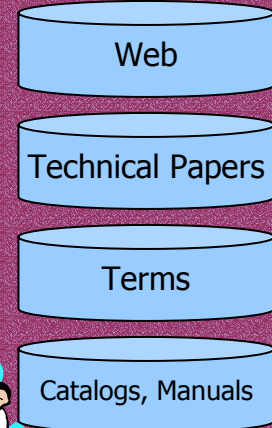
# Design and Development Phases



## Personal Documents



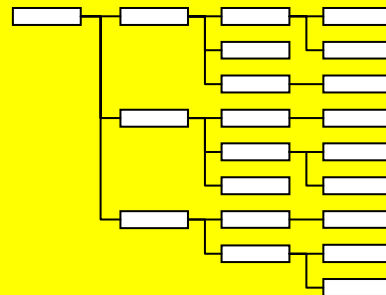
## External Resources



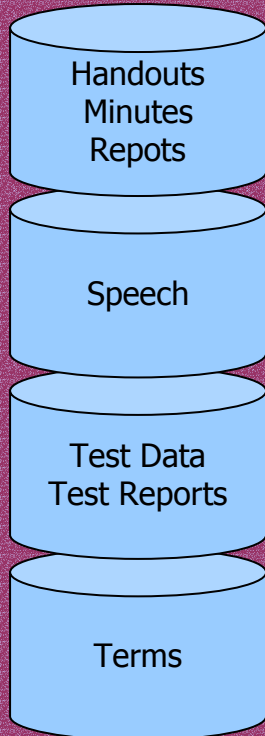
Classification

Classification

## Information Directories for Satellite (ontology)



## Group



Classification



## Operation Phase

Search  
Browse







# Digital Assistance for Museum Visitors

~ for enjoying arts and crafts more 😊 ~

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- To enjoy things, such as works of art, in the real world
  - Can you be satisfied only in the digital world?
  - Can you really enjoy without real objects?
  - Digital world for experiencing the real world
- With mobile assistance
  - Can you appreciate works of art well enough at the museum?
  - Catalog, Audio assistance... are they enough or usable?
- Support a cycle of museum-visiting
  - pre-visit, on-site, post-visit, and re-visit
  - not only at “onetime visit” but also “frequent visits”
- “Providing context of artists or professionals for museum visitors to appreciate the real craft on- and off-site.”



# Digital Assistance for Museum Visitors

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- Resource: rich contents on works are needed
  - meta information
  - photos
  - video of works
  - video of an interview with creators, meisters, or professionals
  - maintain and provide interview videos as an interviewee told
- Context acquisition from users
  - to identify where a user want to see
    - Bluetooth for identifying the work (location awareness)
      - ~10m
      - ~1Mbps
    - snapshot image (awareness of the user's focus)
  - path of works, queries, and contents which he/she has accessed
  - To be considered...



# Digital Assistance for Museum Visitors

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- What and how to provide information
  - Off-site
    - show videos
      - sequence of videos in temporal order on the top
      - closed captions on the right
      - related information on the bottom
    - Related information from its own archive and the WWW appears on the device
  - On-site
    - Usable like a “Magnifier”
      - Just point the device where you want to see more precisely or deeply...
    - show videos on small appliances
      - To be considered...



sequence of videos (fwd)

sequence of videos (rew)

sub video

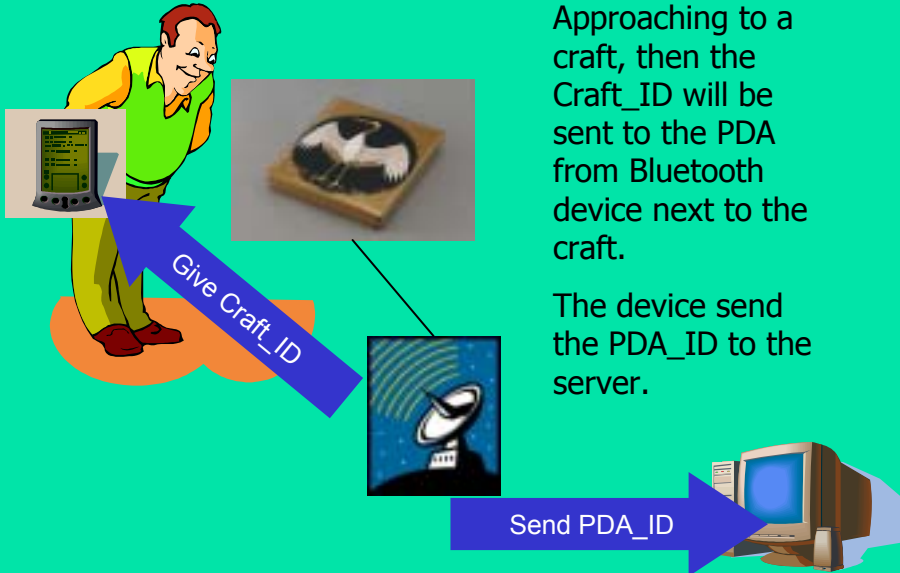
related information (int)

main video

caption

related information (ext)

# 1. Approaching to a craft

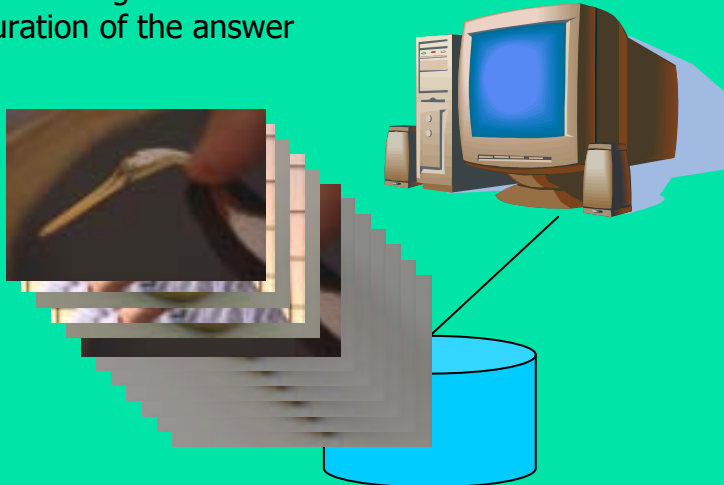


# 2. Pointing the PDA at the craft



# 3. Query matching

Query matching and configuration of the answer



# 4. Showing information





## Works to do

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- to design capturing of user's context
- to design a layout of interface on PDA
- to get an image matching component
  
- I'd like to complete the basic design in a month...



# System's Features

System's Feature Theme	Resources	Context Acquisition in Design Time	Context Acquisition in Use Time	What and How to Provide Information
Private Digital Notepad	Handwritten notepads	A series of notepads in temporal order	-----	List 2D configuration
Supporting CubeSat project	Documents, Speech, Test data	A series of information in temporal order	Telemetry data	A series of information in temporal order
Digital Assistance for Appreciating Arts and Crafts in Museum	Video, Images, Documents	As an interviewee told	A sequence of visited works, queries, and accessed contents	Along the process of the interview Configuration of related info.



# Links

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- Kenro Aihara
  - <http://research.nii.ac.jp/~aihara/>
- Private Digital Notepads
  - K. Aihara, and K. Hori: Enhancing creativity through reorganising mental space concealed in a research notes stack, *Knowledge-Based Systems*, Vol. 11, No. 7-8, pp. 469-478, 1998.
  - Search “aihara and hori” at <http://www.sciencedirect.com/>
- Supporting a CubeSat team
  - K. Aihara, A. Takasu, and Y. Kato: Supporting Collaborative Development and Operation Based on Integrated Heterogeneous Data with Temporal Information, Conference Supplement of ACM 2002 Conference on Computer Supported Cooperative Work, pp.163-164 (Nov. 2002)