



Collaborative Consultation Relevant to the Laryngeal Diseases: A Case Study using CoMed

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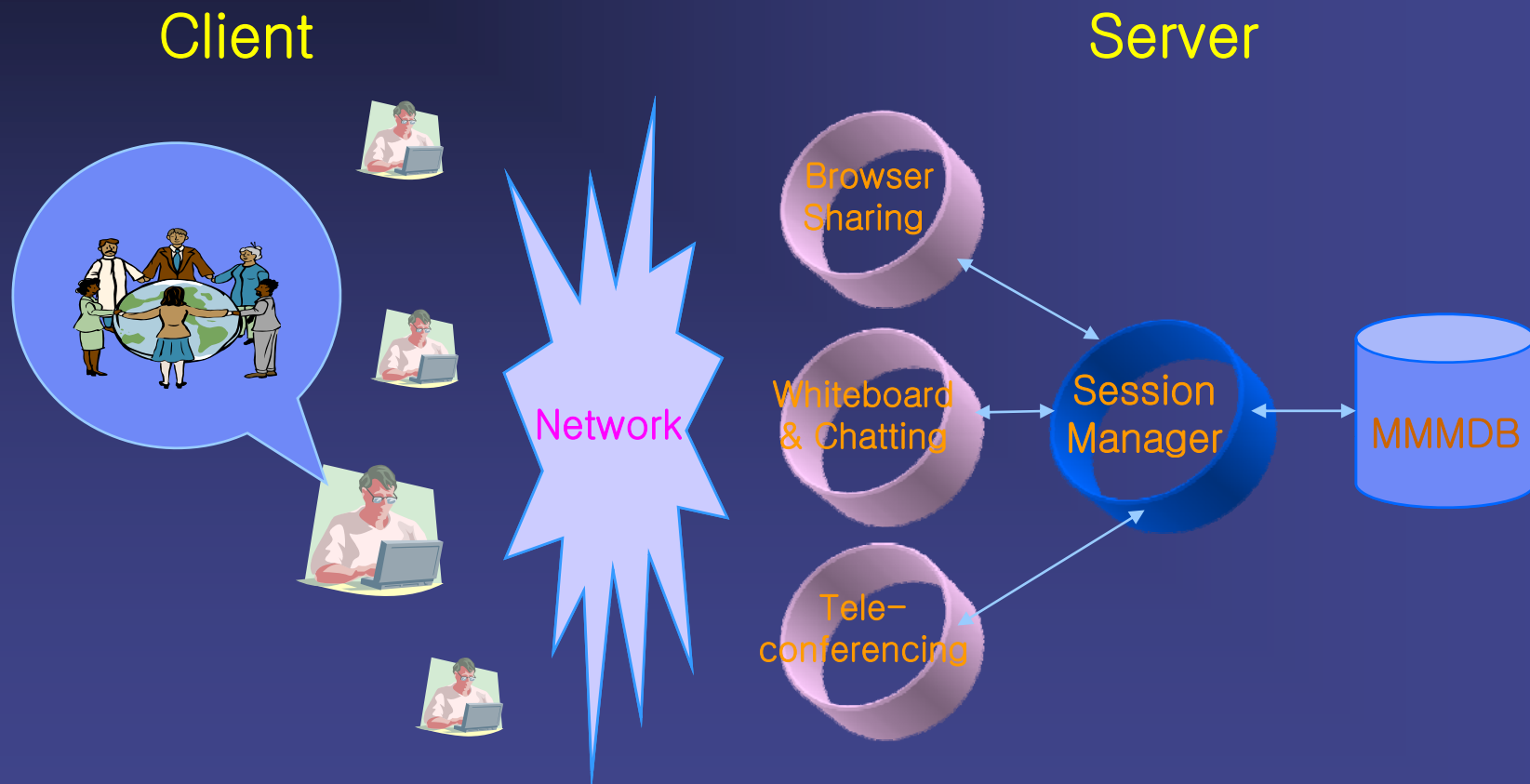
<http://marvel.inchon.ac.kr/~mysung>
mysung@lion.inchon.ac.kr

Collaborative Consultation

- Overview of CoMed
- A Case Study
- Conclusions

CoMed:

A Web-based Real-time Collaborative Medicine System



Multimedia and Laryngology

- Data on laryngeal patients can be multiform
 - the doctor's textual memo of the patients
 - the numeric data from the result for the analysis, for example, blood analysis
 - the image data for the radiological examination
 - the sound data from the stethoscope
 - the audio data for the voice sound
 - the motion picture of the walking test
 - the facial expression
 - the video data for the movement of the vocal folds, etc.

What we can do with CoMed

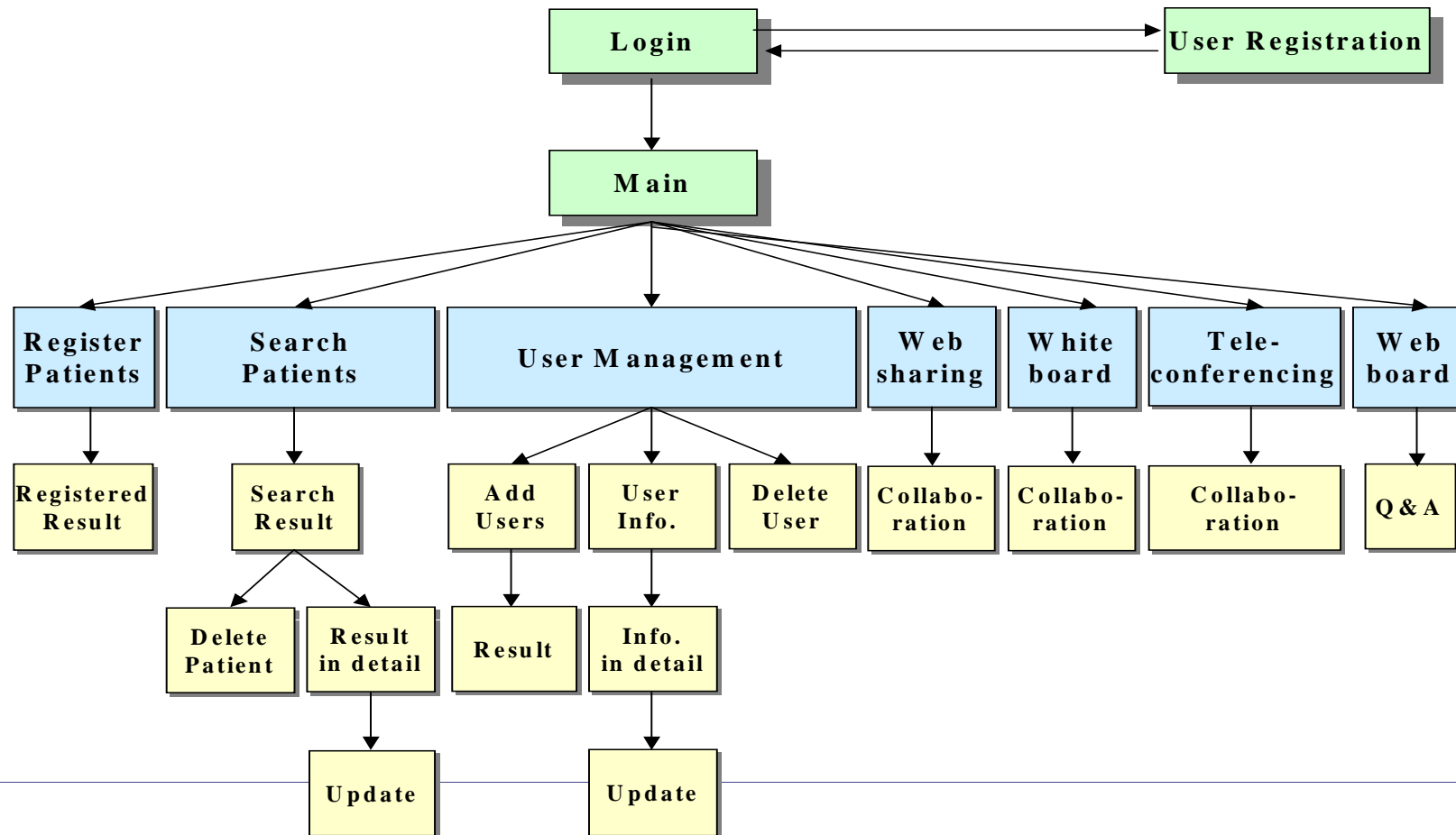
■ Database

- Access multimedia medical DB by 5 user levels
- Register patient records
- Search patient records
- Convert search results into the Excel files

■ Collaboration

- Web browser sharing
 - Using whiteboard
 - Chatting
 - Teleconferencing
 - Using multi-agent system for conference calling
-

Functional Structure



Login

- Five login levels
 - Administrator
 - Senior Doctor
 - Junior Doctor(Resident)
 - Nurse/Paramedic
 - Patient/Guest

Data Registry [1]

Patient ID

* is mandatory

Name	<input type="text"/> *	Sex and Age	<input type="radio"/> male <input type="radio"/> female
Chart No.	<input type="text"/> - <input type="text"/> *	Resident Registration Number	<input type="text"/> - <input type="text"/> *
Address:	<input type="text"/>		
PhoneNumber:	<input type="text"/>		
Permanent Domicile:	<input type="text"/>		
Occupation(in detail):	<input type="text"/>	<input type="text"/>	<input type="button" value="Upload"/>
Smoking:	<input type="text"/> pack/day x <input type="text"/> years, quit at <input type="text"/>		
Alcohol:	<input checked="" type="radio"/> 0. Never <input type="radio"/> 1. Occasional <input type="radio"/> 2. Moderate <input type="radio"/> 3. Heavy		
Brief History	<input type="text"/>		
comment for Patient ID	<input type="text"/>		

Data Registry [2]

Disease					
Side:	<input checked="" type="radio"/> Rt, <input type="radio"/> Lt, <input type="radio"/> Both, <input type="radio"/> Midline,	Site: <input type="text"/>	Other	<input type="text"/>	
Clinical Stage(AJCC):	T <input type="text"/> N <input type="text"/> M <input type="text"/>	->stage	<input type="text"/>		
Pathologic Stage:	T <input type="text"/> N <input type="text"/> M <input type="text"/>	->stage	<input type="text"/>		
Pathology :	<input type="text"/>				
Dis Meta(if any):	<input type="text"/>				
Double Prim(if any)	<input type="text"/>				
Comment for Disease:	<input type="text"/>				
Picture :	<input type="text"/>	Upload			
Movie :	<input type="text"/>	Upload			
Sound :	<input type="text"/>	Upload			

Data Registry [3]

Neck				
	Right Neck		Left Neck	
L/N Level	Clinically (+) L/N	Removed L/N	Clinically (+)L/N	Removed L/N
Submental	<input type="checkbox"/> Ia	<input type="checkbox"/> Ia	<input type="checkbox"/> Ia	<input type="checkbox"/> Ia
Submand.	<input type="checkbox"/> Ib	<input type="checkbox"/> Ib	<input type="checkbox"/> Ib	<input type="checkbox"/> Ib
Upper Jug.	<input type="checkbox"/> II	<input type="checkbox"/> II	<input type="checkbox"/> II	<input type="checkbox"/> II
Mid Jug.	<input type="checkbox"/> III	<input type="checkbox"/> III	<input type="checkbox"/> III	<input type="checkbox"/> III
Lower Jug.	<input type="checkbox"/> IV	<input type="checkbox"/> IV	<input type="checkbox"/> IV	<input type="checkbox"/> IV
Posterior	<input type="checkbox"/> V	<input type="checkbox"/> V	<input type="checkbox"/> V	<input type="checkbox"/> V
etc.	<input type="checkbox"/> VI	<input type="checkbox"/> VI	<input type="checkbox"/> VI	<input type="checkbox"/> VI
Removed Structure	<input type="checkbox"/> SCM <input type="checkbox"/> SAN <input type="checkbox"/> IJV <input type="checkbox"/> CA		<input type="checkbox"/> SCM <input type="checkbox"/> SAN <input type="checkbox"/> IJV <input type="checkbox"/> CA	
Other comment	<input type="text"/>		<input type="text"/>	

Data Registry [4]

Tx and F/U

Initial Tx Plan Mark in S, R, C (Surgery, RT, Chsom)-operator specilies

Date	Event Code	Description	ResPonse	Tumor Status	Patient Status
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Data Registry [5]

Tx Summary & Fill_Up Information

Fill_Up Dr. * Fill_Up Date * Password *

Data Search

Search Result

Select Record = 5

Page Count = 1

Number	Name	Gender	Age	Chart No.	Resident Registration Number	Telephone	Site	Fill-Up Dr.	Delect	Select
51	유석철	Man	58	1384119-9	530201-1267311	064)746-7047	LXG	성명훈	Delete	<input type="checkbox"/>
52	정종채	Man	26	1384120-9	750606-1631720	02-839-2955	NPP	김동영	Delete	<input type="checkbox"/>
53	전형주	Man	26	1384125-9	750417-1394334	02-234-5384	NPI	성명훈	Delete	<input type="checkbox"/>
54	이성제	Man	26	1384145-9	760923-1342268	02-576-3984	OCH	성명훈	Delete	<input type="checkbox"/>
55	장진희	Man	27	1384145-9	760902-1483294	02-333-4696	OCH	김동영	Delete	<input type="checkbox"/>



Convert the selected patient(s) into an Excel file

Web Browser Sharing

- Existing web browser
- URL synchronization
- HTML with Java scripts and Java applet
- Synchronous and efficient collaboration

Whiteboard & Chatting

- Sharing all images, drawings or pen-based inputs
- Sharing web pages
- Sharing MS Office documents
- Supporting personal pointers
- Storing and retrieving contents of whiteboard
- Supporting group & one-to-one chatting

Teleconferencing

- Audio conferencing
- Video conferencing
- A control mechanism for maintaining the voice data to be unbroken
 - Variable sized audio buffers
 - Variable number of audio buffers

Multi-agent System

- Propose the most promising dates for the conference
- Agents
 - Facilitator Agent
 - Scheduler Agent
 - Negotiator Agent
 - Group Information Manager Agent
 - Personal Information Manager Agent
 - Interface Agent
- Communication among agents using KQML(Knowledge Query and Manipulation Language)
- Forward Chaining and Back Propagation Network

Main Frame Set - 천리안미(가) 공급한 Microsoft Internet Explorer

주소(D) http://marvel.inchon.ac.kr/comed/Medical/SearchView.asp?Number=51

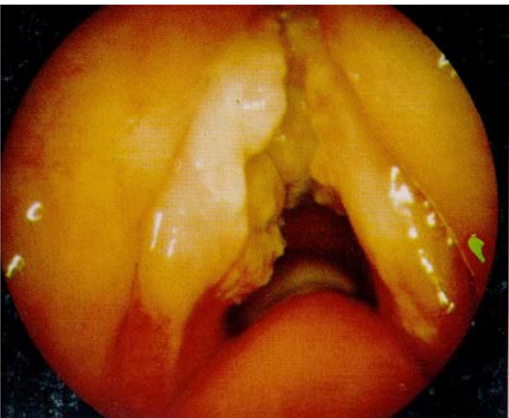
Patient ID

Name 유석철 남 여 58 세
 Chart No. 1384119 -9 주민등록번호 530201
 주소: 제주도 제주시 미도2동 134-32
 전화번호(지역번호): 064)746-7047
 본적:

CoMed
 Home
 Register
 Search
 WebSharing
 Manager
 Whiteboard

Group: marvel

DYKim Save Clear Upload FILE list Load Undo



X : 234
 Y : 210
 Message
 Homepage
 Color
 Text

Isj (147.46.172. DYKim (hns.snu.ac.kr) entered ##

Chatting Field:

http://marvel.inchon.ac.kr/comed/conf/works/유석철%20case.p...
 주소(D) http://marvel.inchon.ac.kr/comed/conf/wor

S. C. Yoo (M/58)

- Chief complaint : voice change (onset ; 1999. 6.)
- Systemic review : fatigue in phonation (+)
 dyspnea (-), dysphagia (-)
 cough / sputum (- / -)
- Past medical history : (-)
- Social history :
 occupation ; volleyball manager
 smoking ; 30 pack-year
 voice abuse (+)

See You Client Version 1.0 - [DYKim] 님
 Server Option About

Current User

Users	Group
Dr.Kim	marvel
JangJinHee	
Isj	

User DYKim
 Talk Listen
 Exit

Congraduate!! Connected to Server

경고: 애플릿 창

시작 Window... Microso... Main Fr... http://... Group: ... http://... http://... 인터넷 오후 7:29

Case Study using CoMed

- Collaboration between
 - Seoul National University Hospital, Seoul
 - Cheju Provincial Medical Center, Cheju island
- Laryngeal cancer patient
 - S. C. Yoo (M/58)

S. C. Yoo (M/58) [1]

- Chief complaint :
 - Voice change for several months
- Social history
 - Occupation : ex-volleyball manager of national team
 - Smoking : 30 pack-year
 - Voice abuse (+)

S. C. Yoo (M/58) [2]

- 1999.8.9. P/E at SNUH

- Videostroboscopy finding :



video1

Rt. vocal fold hyperkeratotic mass

- 1999.8.10. 1st Laryngeal microsurgery with laser

- Permanent biopsy : Laryngeal cancer



video2

(squamous cell carcinoma)

- Follow-up with CoMed



video31






video32



video33

S. C. Yoo (M/58) [3]

- 1999.9.17. F/U, Cheju island
 - Videostroboscopy finding :  video4
Rt. vocal fold hyperkeratotic lesion
- 1999. 10.19. 2nd LMS, SNUH  video5
 - Frozen biopsy : no malignancy
 - Permanent biopsy : keratosis with severe dysplasia
- Further Follow-up with CoMed
- 2000.6.2. Last OPD F/U  video6
 - Videostroboscopy finding : No Evidence of Disease

Current Application of CoMed

- Collaborative consultation on laryngeal diseases
 - Remote community doctor's consultation
 - Post-treatment follow-up
- Data acquisition
 - Multimedia medical data from multiple sites
- CoMed can be utilized for
 - Solo research
 - Collaborative consultations among medical specialists
 - Telemedicine with participation from patients and medical specialists

Conclusions

- Using CoMed

- Synchronous & Asynchronous Collaboration
- Medical Database → Statistical Conclusions

- CoMed can be

- Be available anytime, anywhere on the Internet
 - Be extensible in using the object database O₂ and CORBA
 - Supports some useful facilities for collaboration
 - Minimize efforts while conference calling
-

Future Work

- More clinical experience to validate the effectiveness of CoMed for collaborative consultation
- Confidentiality of patient's personal clinical information