Developing Camera Phone, Today and Future

April 2nd. 2003
SHARP CORPOTATION
Yoichi Sakai PhD.

1. Development history

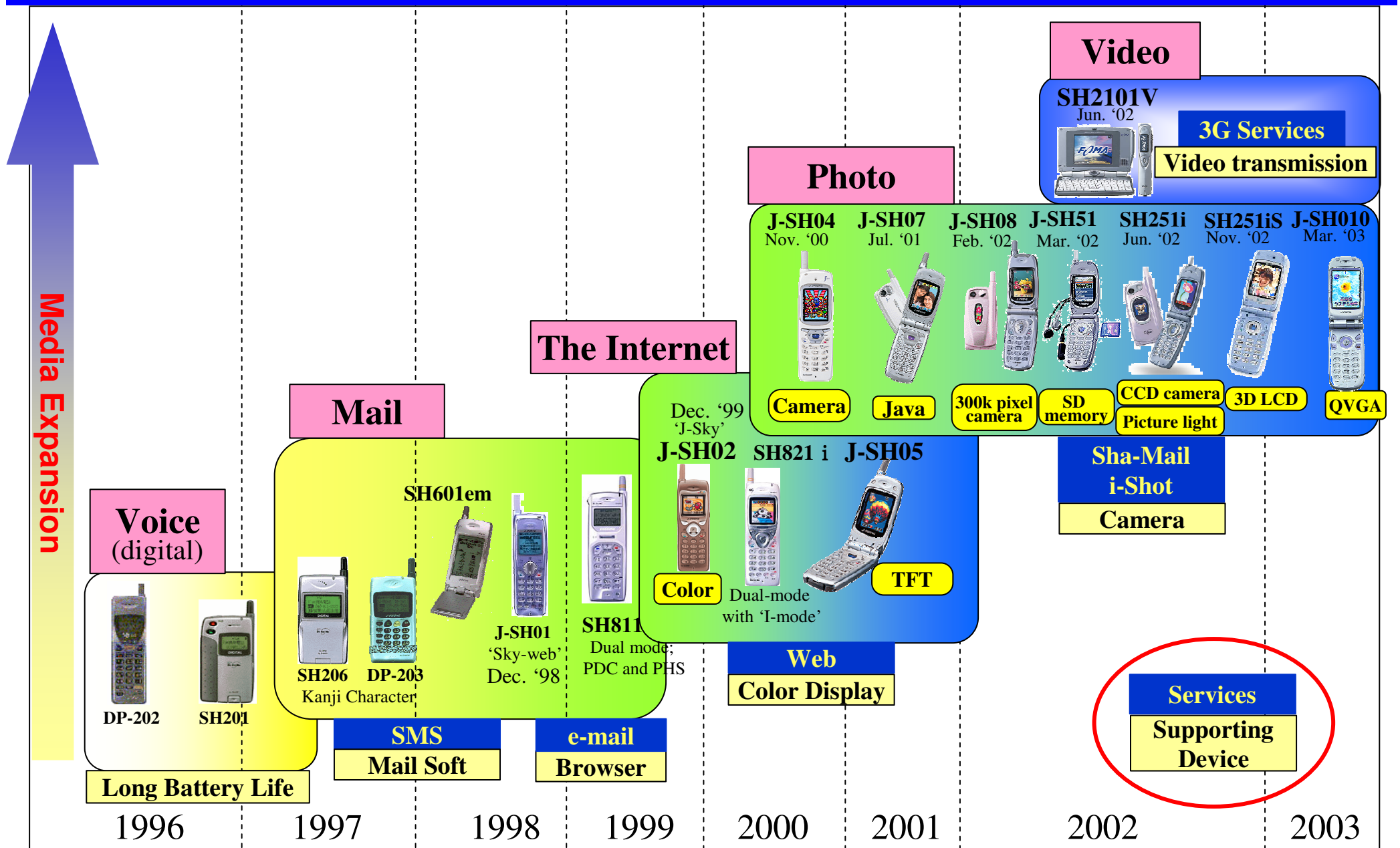2. Handset development

3. Future of mobile phone

1. Development history

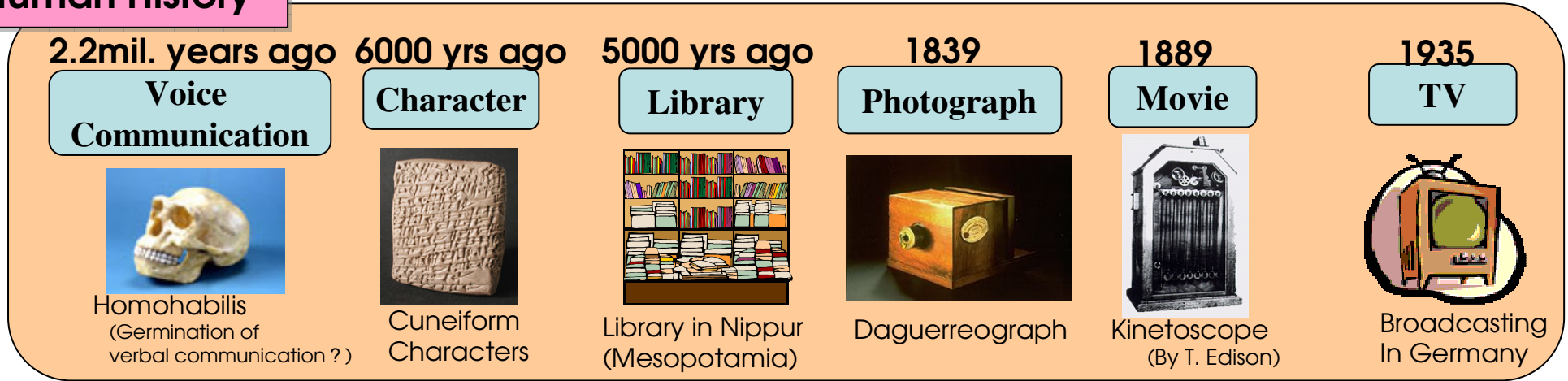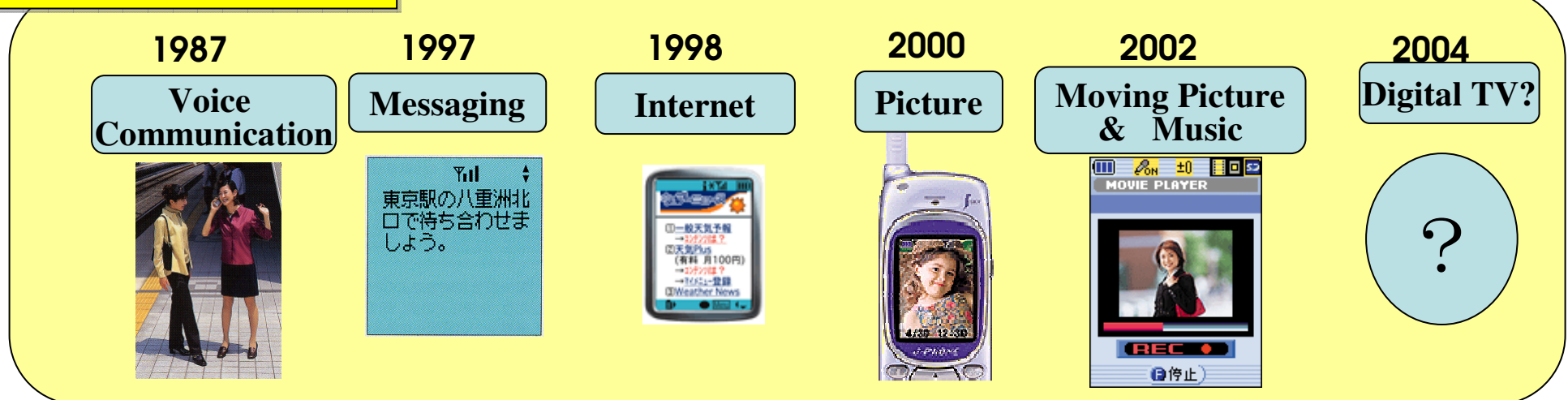# 1-1. Evolution of Sharp digital mobile Phone

Media Expansion

Video

SH2101V
Jun. '02

3G Services
Video transmission

Photo

J-SH04
Nov. '00

J-SH07
Jul. '01

J-SH08
Feb. '02

J-SH51
Mar. '02

SH251i
Jun. '02

SH251iS
Nov. '02

J-SH010
Mar. '03

Camera **Java** **300k pixel camera** **SD memory** **CCD camera** **Picture light** **3D LCD** **QVGA**

The Internet

Sha-Mail i-Shot
Camera

Dec. '99 'J-Sky'

J-SH02 **SH821 i** **J-SH05**

Mail

SH601em

Color Dual-mode with 'I-mode'

TFT

J-SH01
'Sky-web'
Dec. '98

SH811
Dual mode;
PDC and PHS

Web
Color Display

Voice
(digital)

SH206
Kanji Character

DP-203

DP-202 **SH201**

Services
Supporting Device

Long Battery Life

SMS
Mail Soft

e-mail
Browser

1996 1997 1998 1999 2000 2001 2002 2003

1-2. Development Concept –Media Expansion-

Human History

2.2mil. years ago	6000 yrs ago	5000 yrs ago	1839	1889	1935
Voice Communication	**Character**	**Library**	**Photograph**	**Movie**	**TV**

Homohabilis
(Germination of verbal communication？)

Cuneiform Characters

Library in Nippur
(Mesopotamia)

Daguerreograph

Kinetoscope
(By T. Edison)

Broadcasting In Germany

Rich Contents

Mobile Phone History

1987	1997	1998	2000	2002	2004
Voice Communication	**Messaging**	**Internet**	**Picture**	**Moving Picture & Music**	**Digital TV?**

Ｙ.ｌｌ
東京駅の八重洲北
口で待ち合わせま
しょう。

?

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2. Handset development

2. Development Target

<Target for Camera Phone>

1. Same Size as Voice only Models

-Weight, Dimension, Battery life…

2. Share the Picture

-Hint from 'Print Club'
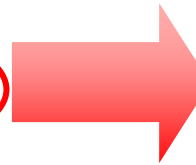
3. Shoot and Send with Ease of Use

-Send picture in time

Revolution of Handset development
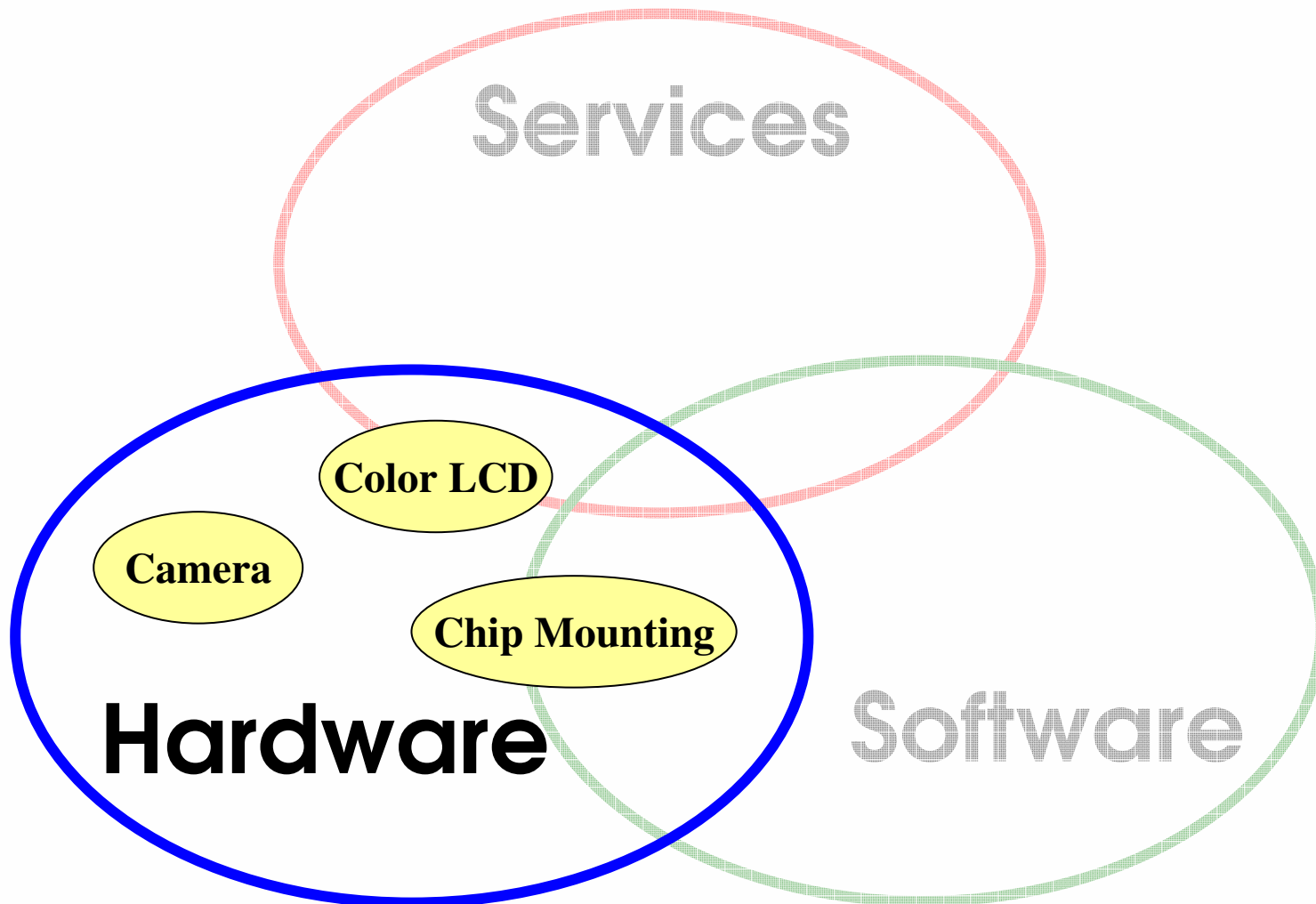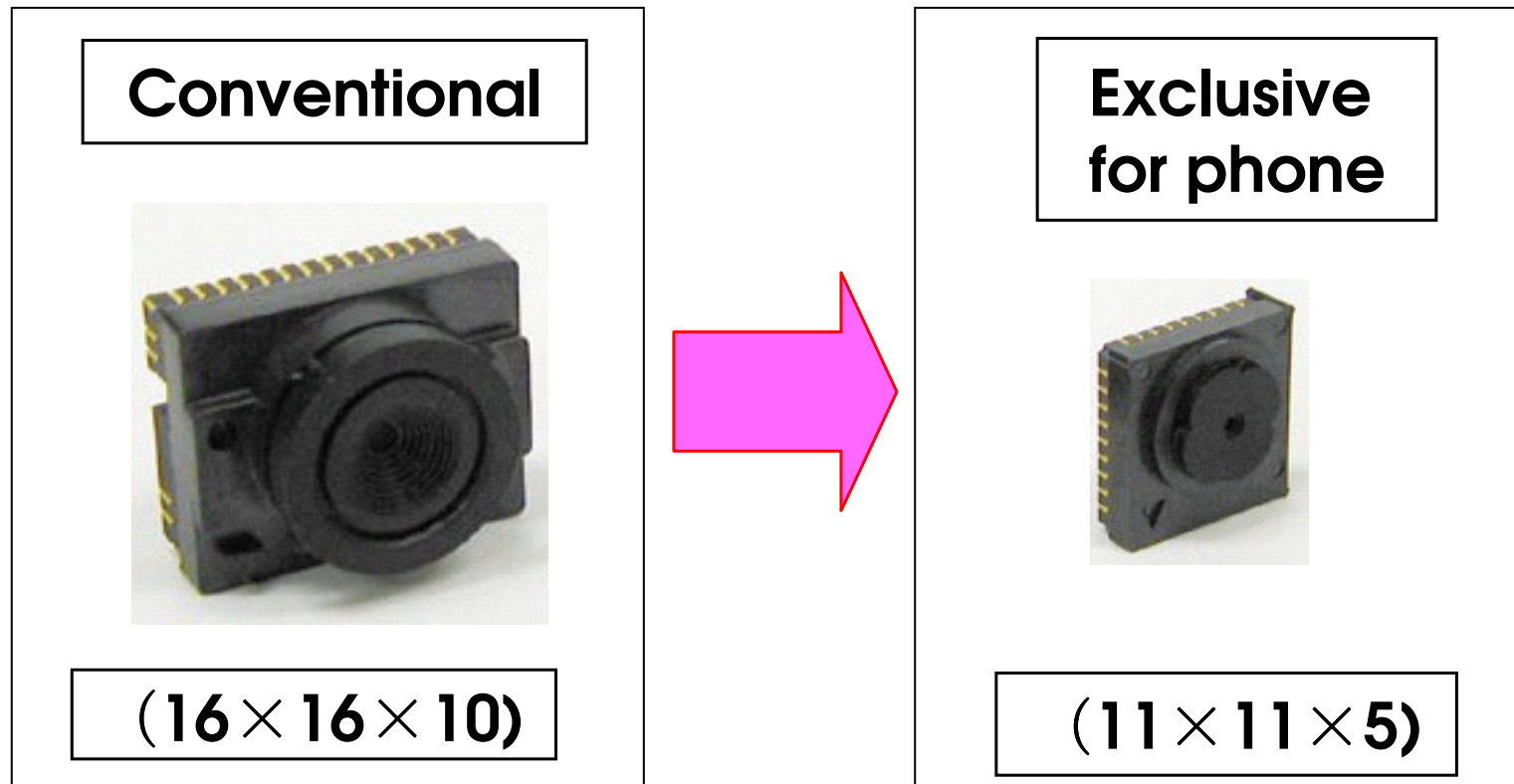

Services

Hardware

Software
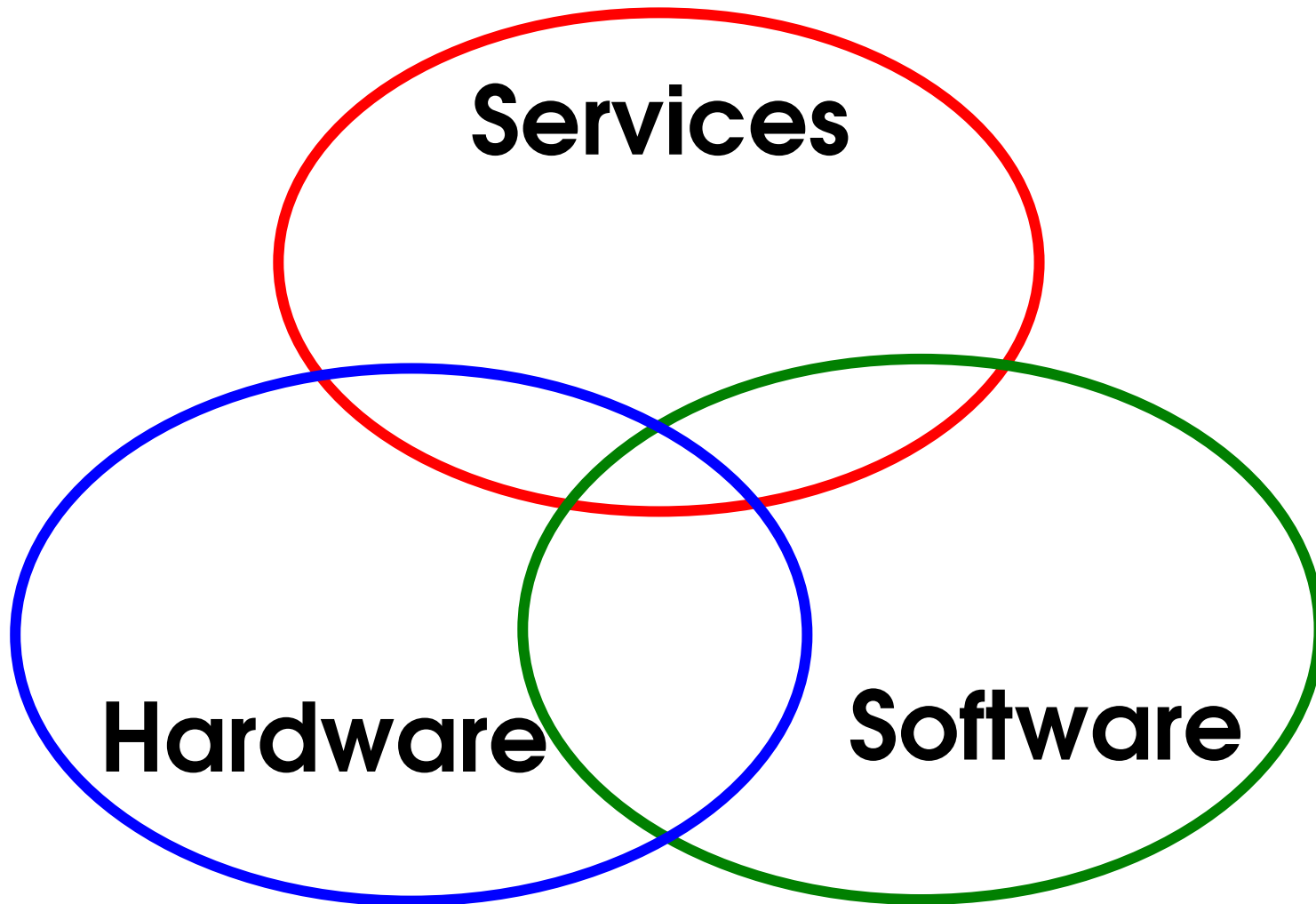
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1. Hardware development

From J-SH04 on
(Nov. '00)

Conventional		Exclusive for phone
	→	
（16×16×10)		（11×11×5)

（**numbers in mm; H x W x D**)

1. **Abolish 'hood' form component – accommodate hood with handset cabinet.**
2. **Reduce number of lens from 2 to 1**

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<u><Apply Flexible Circuit Film></u>

Flexible Circuit Film

Image Processor

Camera Module
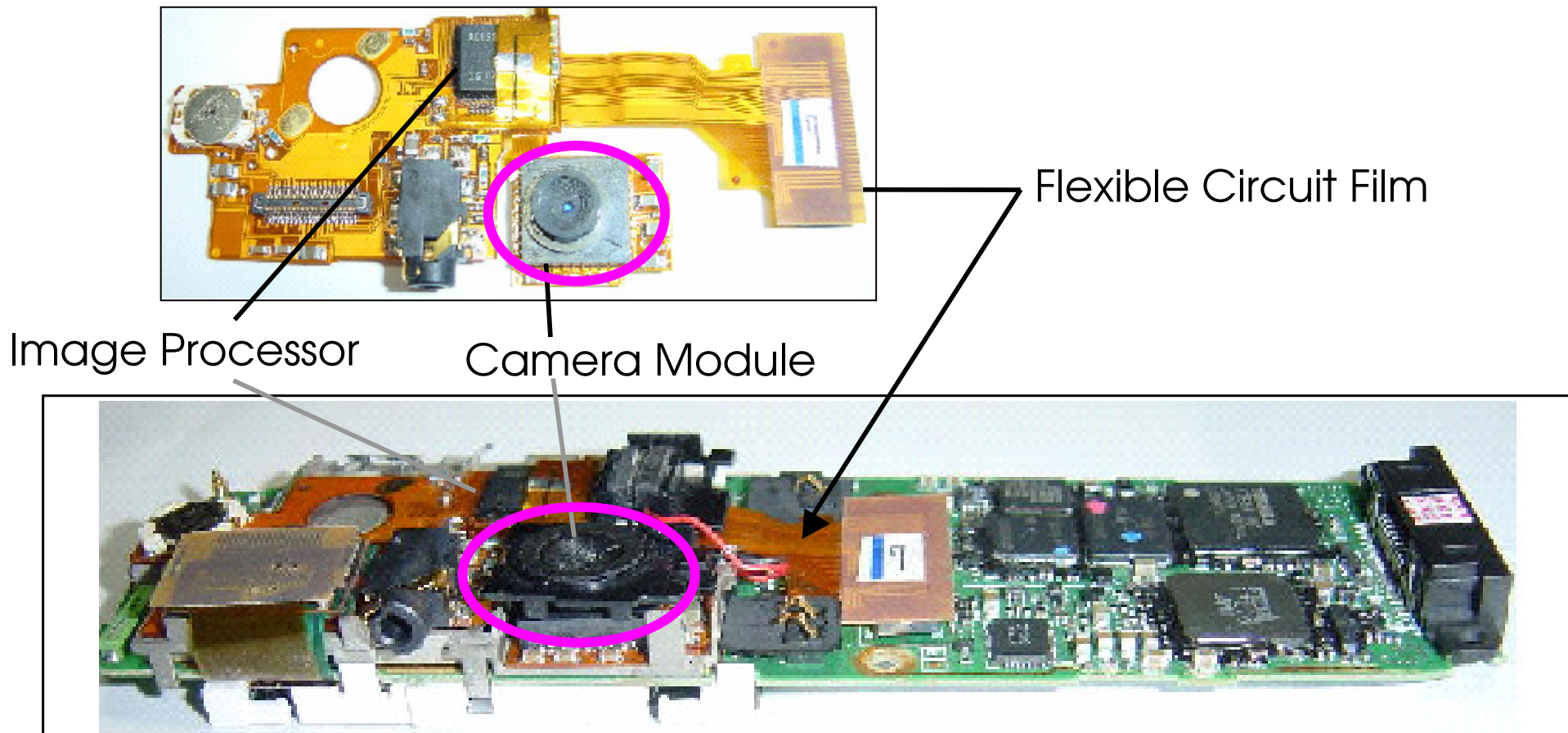
2-1-3. Hardware development –Handset Design-

Comparison between J-SH03(without camera) and J-SH 04(with camera)

J-SH04
(Nov. '00)

J-SH03

Front   Back   Side

Dimension 39mm x 125mm x 17mm

J-SH04

Mirror for self portrait

Front   Back   Side

Dimension 39mm x 127mm x 17mm

Only 2mm high!

(Dimension in W x H x D without antenna portion)

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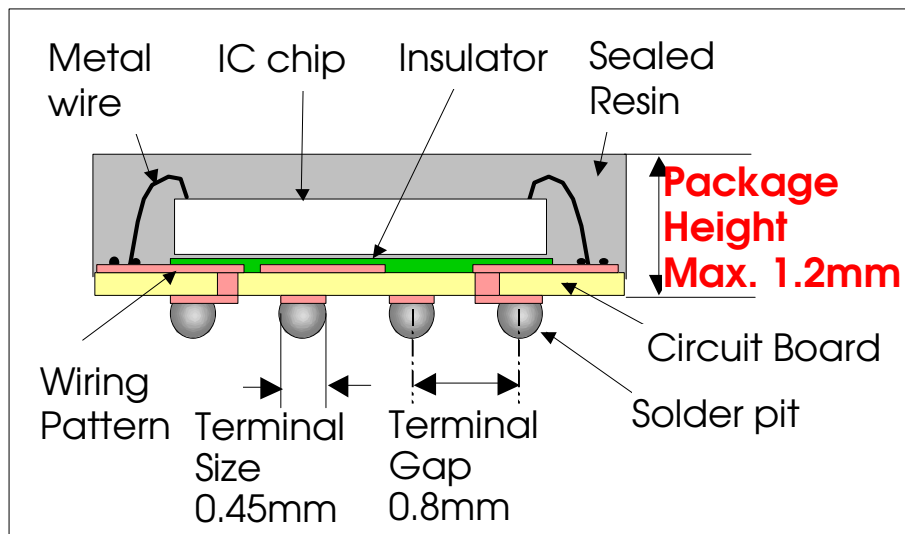
From J-SH04 on
(Nov. '00)

<Chip Size Package(CSP) of Memory Device>

Single Chip CSP

Metal wire · IC chip · Insulator · Sealed Resin · **Package Height Max. 1.2mm** · Circuit Board · Solder pit · Wiring Pattern · Terminal Size 0.45mm · Terminal Gap 0.8mm

3 Chip Stacked CSP

Metal wire · IC chip · Insulator · Sealed Resin · **Package Height Max. 1.4mm** · Circuit Board · Solder pit · Wiring Pattern · Terminal Size 0.45mm · Terminal Gap 0.8mm

SHARP
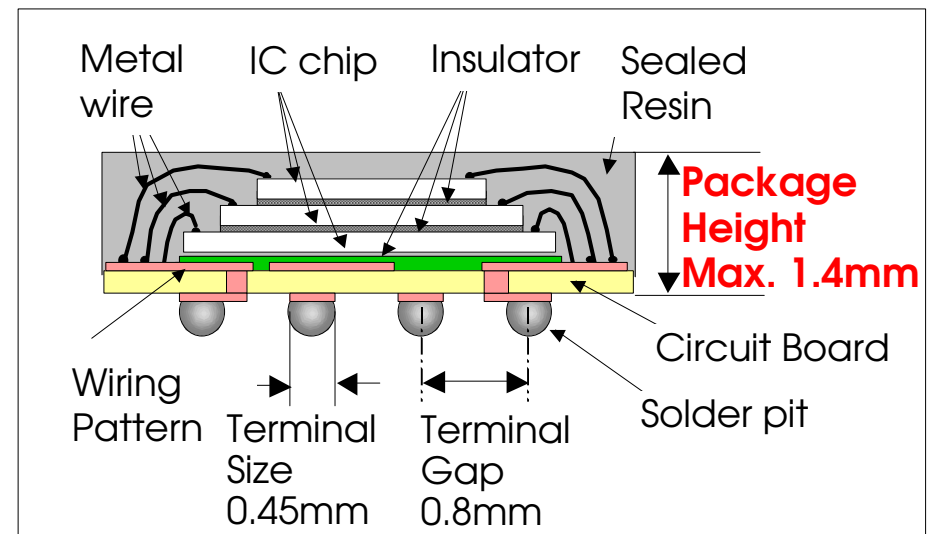
SH-251iS (Nov. '02)

Light from the odd and even pixels of the display is directed to two separate "windows" regions in space.

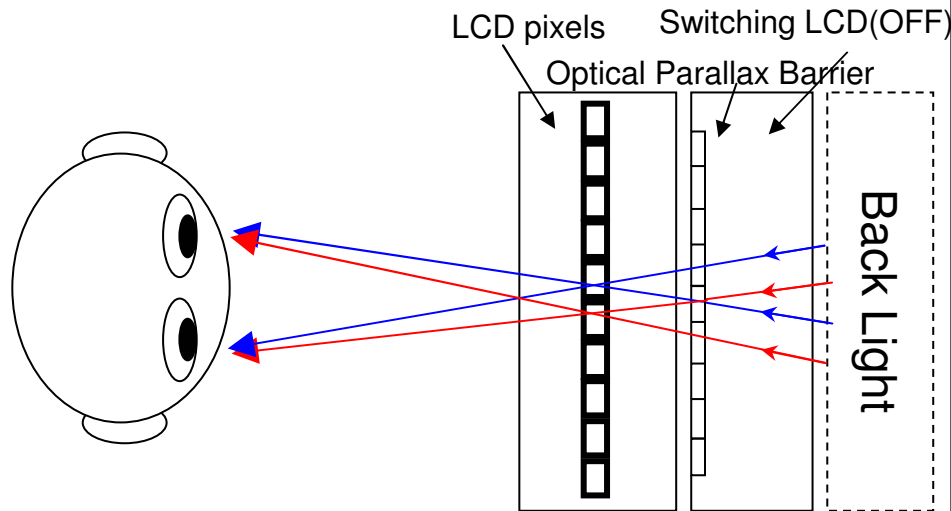**The micro-optical parallax barrier makes each eye to receive a different image and the brain perceives 3D.**
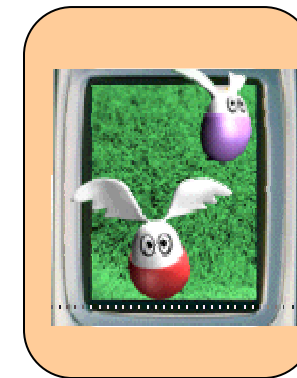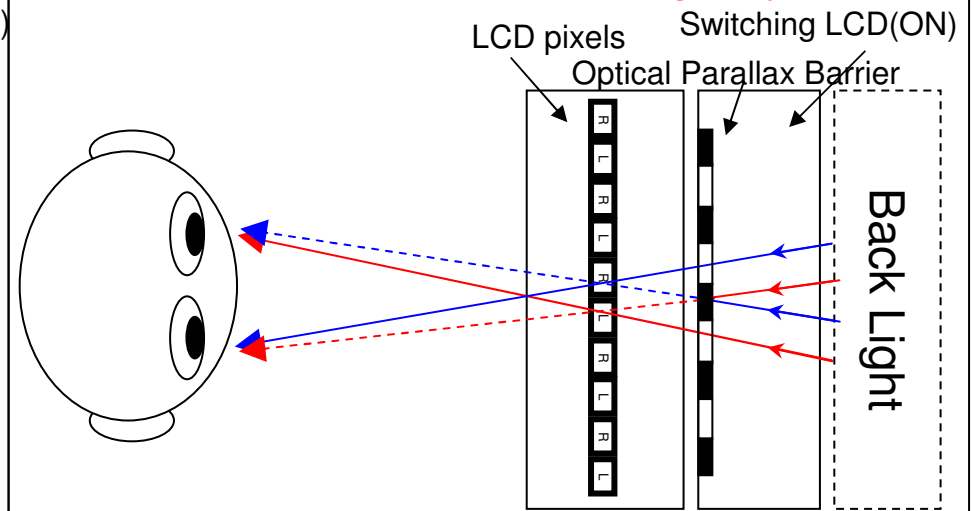
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Sharp's Unique; 'Dual Mode' with 2D and 3D

2D Display

Electrical control on the switching LCD makes it possible to show equivalent information between left and right eyes.
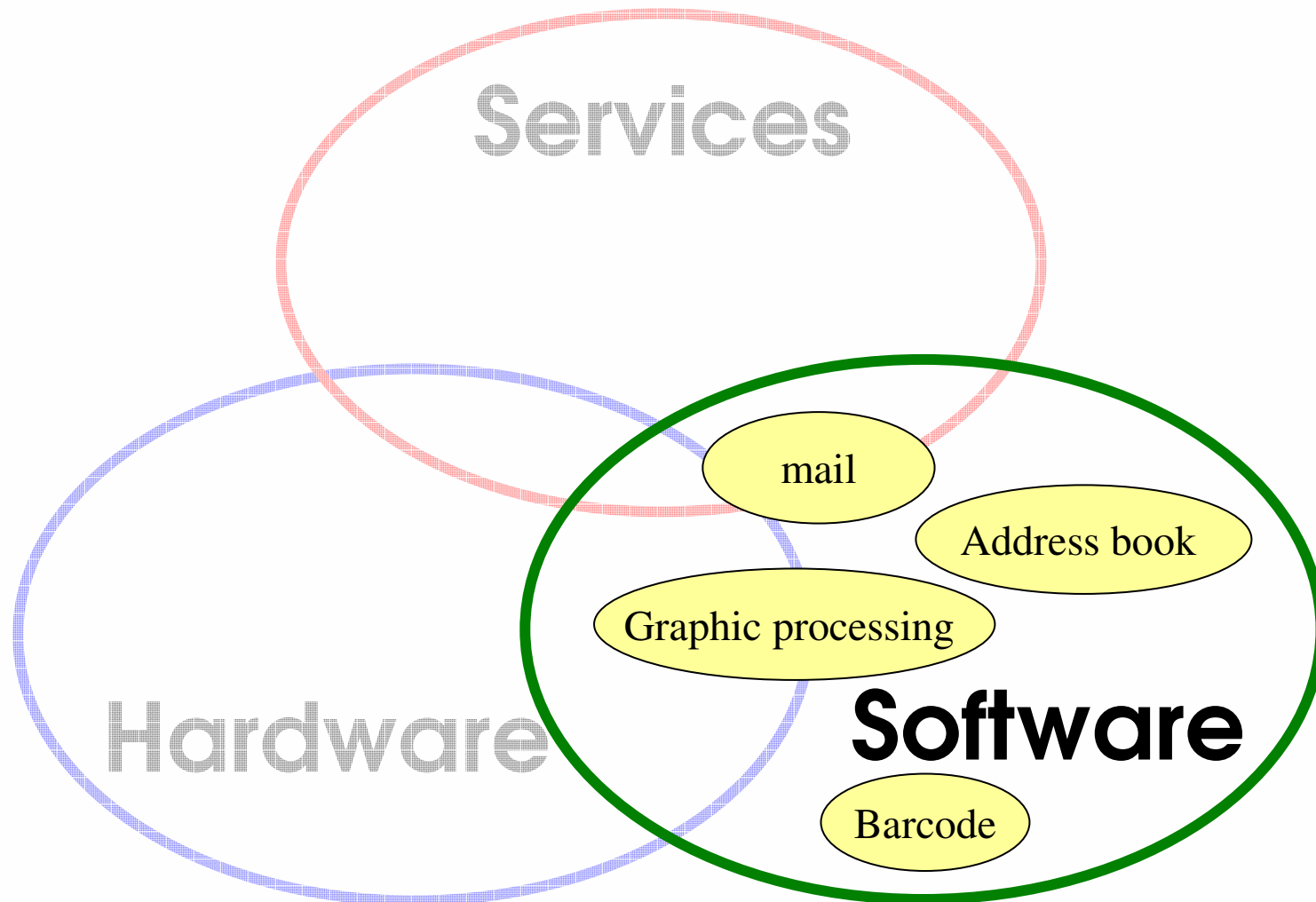
LCD pixels   Switching LCD(OFF)

Optical Parallax Barrier

Back Light

3D Display

Micro-optical parallax barrier separates image elements and different image information reaches to left and right eyes.

LCD pixels   Switching LCD(ON)

Optical Parallax Barrier

Back Light

2. Software development

From J-SH04 on

(Nov. '00)

<Apply Pictures on Address Book Feature>

①

| Paste Captured Photo on Address Book |

Address book database with photograph
-Grouping feature
-Database link
-Personal data

②

| Caller ID With Photo |

Display caller's photo and name/number

-Ringing tone can be distinguished by each caller
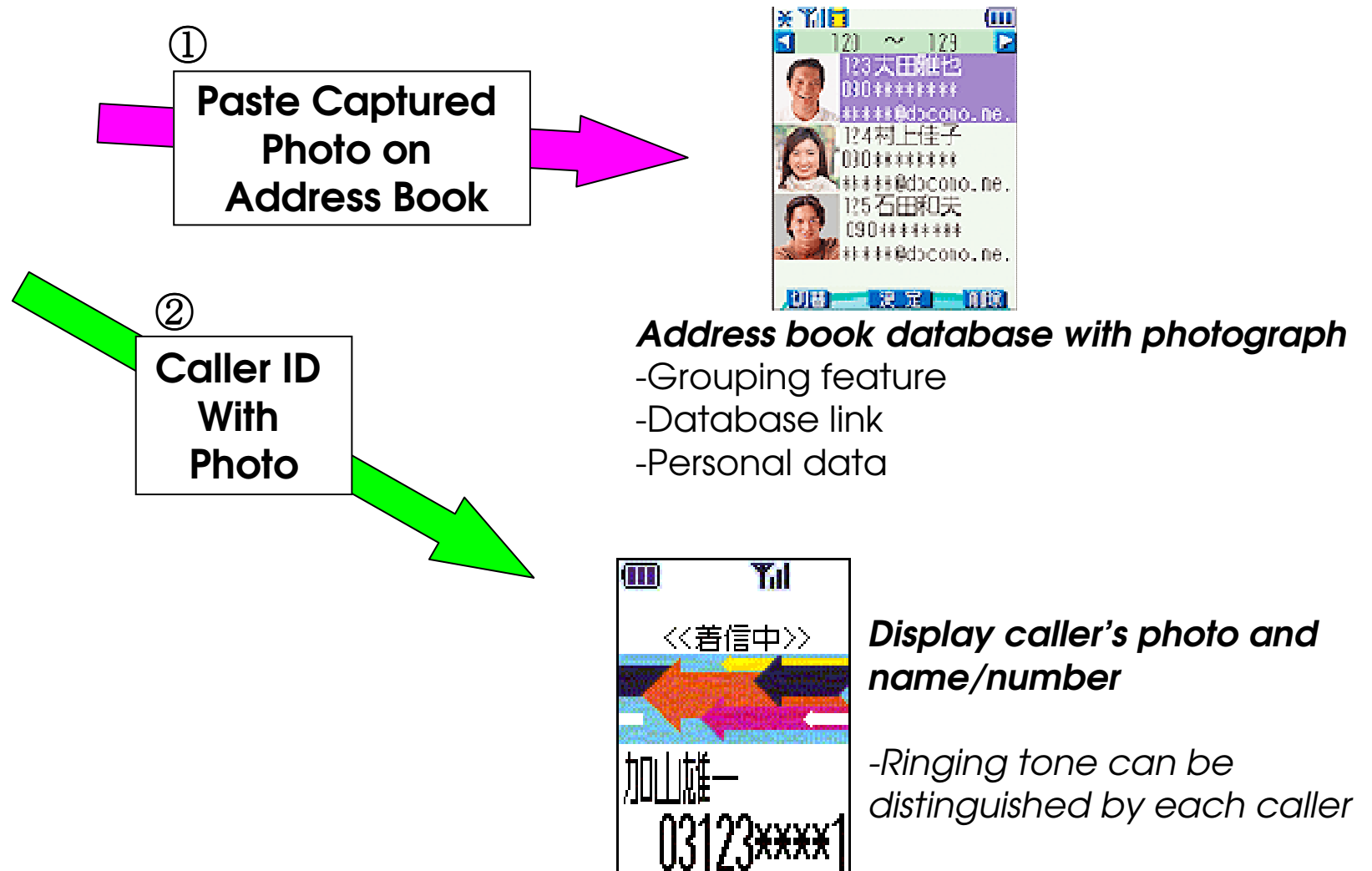
From SH251iS on (Nov. '02)

<Quick and Accurate Word/Sentence Conversion Feature>

Continuous-phrase Conversion

Continuous phrase can be converted into correct paragraph

-No need to convert word by word.

A.I.(Artificial Intelligence) Conversion

The handset memories converted words

-No need to enter full word.

One Touch Conversion

Handset infers each one key touch into correct words

-No need to punch same key many times.

| 4 GHI | 3 DEF | 5 JKL | 5 JKL | 6 MNO |

"HELLO"

Analogy Conversion

Only one key touch will list several candidacy analogized form time and key

-Just select from list correspondents.

4 GHI

(For example)
Key-in "4" in the evening

"Good evening"
"Go for a drink?"
"Going home"
"Go for it!"
"Hello"
"Hanging around?"
:

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2-2-3. Software development –Photo Entertainment(1)-

Original Photo

Frame Work

Merry Christmas
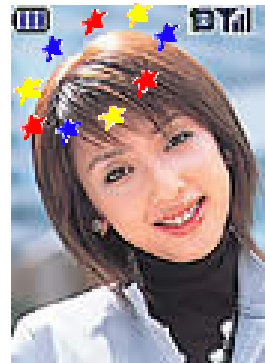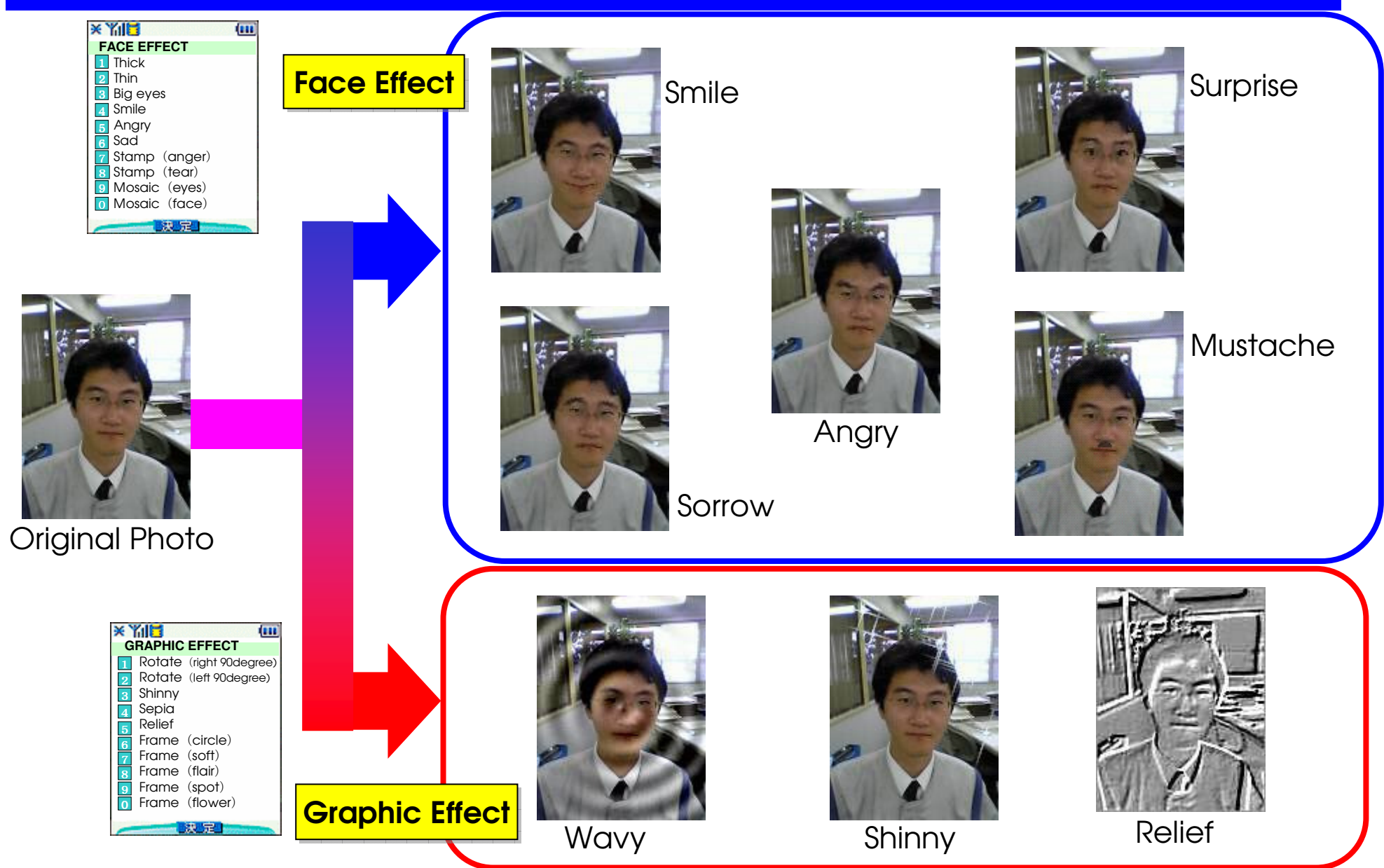
Happy New Year

"Eureka !"

On the TV

Snowfall

Add animated effect for more impression and fun.

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2-2-3. Software development –Photo Entertainment(2)-

From SH251iS on (Nov. '02)

2-2-3. Software development –Barcode Application-

<u>**<"An Electronic Eye" in the Pocket>**</u>
(Camera is not only entertainment device, but also practical)

Business card → Text

E-Commerce → URL

Promotional Poster → URL

http://www.sharp.co.jp/corporate/news/030130-1.html

<QR Code>

<Galamo>
http://galamo.com/

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3. Services development

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2-3-1. Services development –Mail Magazine(1)-

<Merumo> 'Mobile Mail Magazine' available on mobile phone and PHS
Major subject of this business model
= **Community of 'Voluntary' Publishers**
25,153 sites are active (as of Feb. 2003)

Magazine Contents List

Mobile Phone/PHS (2070)
General / i-mode / j-sky / Home page/ Mail magazine / Graphic, Melody / Illustration / PDA

Travel (222)
Domestic / International / travel / Shopping / Event, Ticket / Gourmet, Restaurant / Fast food

Lifestyles (693)
Lottery, Present / Fashion / Cosmetic / Cooking / Winery / Wedding / Kids / Hospital / Habitation / Pet, Garden

Hobby, Art (9718)
Internet, PC / Art, Music / Movie / Book, Magazine / Comic / Game / Horoscope / Psychology

Entertainment, Sports (2799)
TV / Baseball / Football / General sports / Fishing, Outdoor / Auto / Gamble

Business (94)
Recruit / Entrepreneur / Stock, Investment / Finance / Politics, Economy / Venture business, SOHO
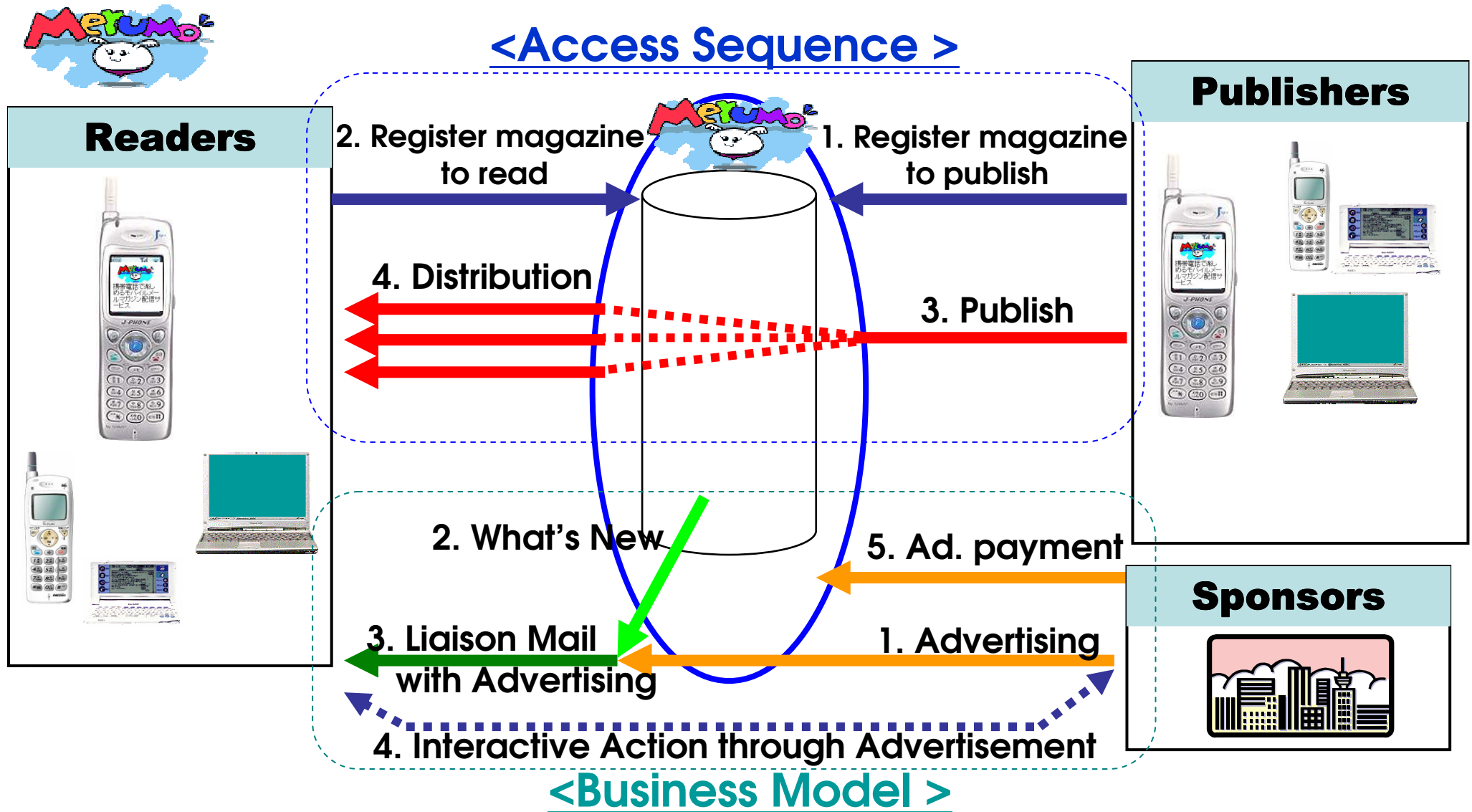
Community (8667)
Mail Friends / Community / Diary / Essay, Poem / Haiku / Humor/

Education (890)
Language / License, School, Lecture / Common Sense / General / News, Whether / Natural Science

<Access Sequence >

Readers

Publishers

2. Register magazine to read

1. Register magazine to publish

4. Distribution

3. Publish

2. What's New

5. Ad. payment

3. Liaison Mail with Advertising

1. Advertising

Sponsors

4. Interactive Action through Advertisement

<Business Model >

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2-3-2. Services development –Mobile Gallery-

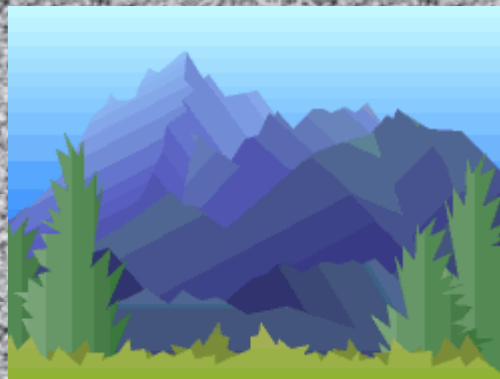## <Galamo>; 'Gallery Mobile'

Expose and View photographs taken by camera phones.
Downloading is applicable for any camera phone & PC user.

<Animegalamo>; 'Annimation Gallery Mobile'

Expose and View animation created on PC.
Downloading is applicable for any camera phone & PC user.
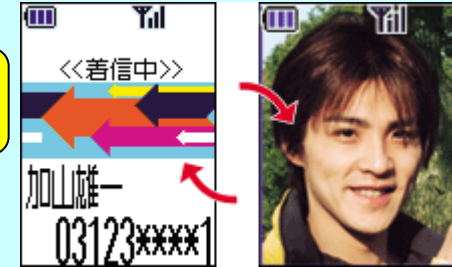
3. Future of camera phone

3-1. Future of Camera Phone –Learn from Today's Use-
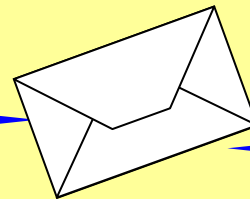
1. Use Photograph into Varied Application

Wallpaper

Address book with Photo
Caller ID with Photo

2. Send Photograph as Attached Mail （Online-Communication）

Look!
My First Step,

1. Take picture with Camera Phone
2. Send Picture with Easy Operation
3. Receiver can Retrieve the Photo in time

3. Share the Picture On Site （Offline-Communication）
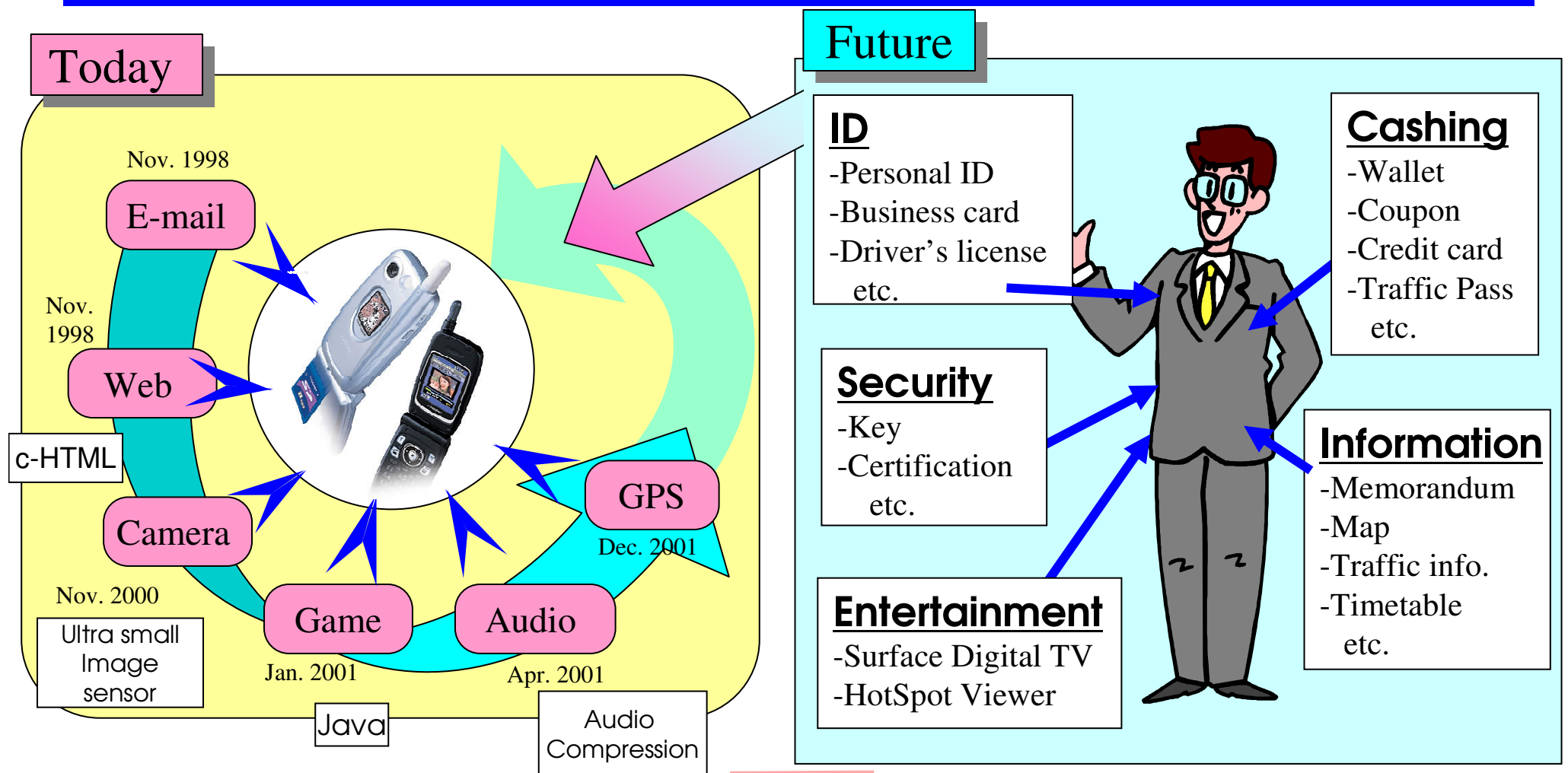
Photo on talk

Memory Photo

Additional Entertainment

"Solution in a Pocket"

Bring All the Personal Information Environment into a Mobile Phone

3-3. Future of Camera Phone –Future Vision-

Today

Nov. 1998
E-mail

Nov. 1998
Web

c-HTML

Camera

Nov. 2000
Ultra small Image sensor

Game

Jan. 2001

Java

Audio

Apr. 2001

Audio Compression

GPS

Dec. 2001

Future

ID
-Personal ID
-Business card
-Driver's license
  etc.

Security
-Key
-Certification
  etc.

Entertainment
-Surface Digital TV
-HotSpot Viewer

Cashing
-Wallet
-Coupon
-Credit card
-Traffic Pass
  etc.

Information
-Memorandum
-Map
-Traffic info.
-Timetable
  etc.

Mobile Phone will be 'LIFE' Always be with Everybody

Developing Camera Phone, Today and Future

April 2nd. 2003
SHARP CORPOTATION
Yoichi Sakai PhD.