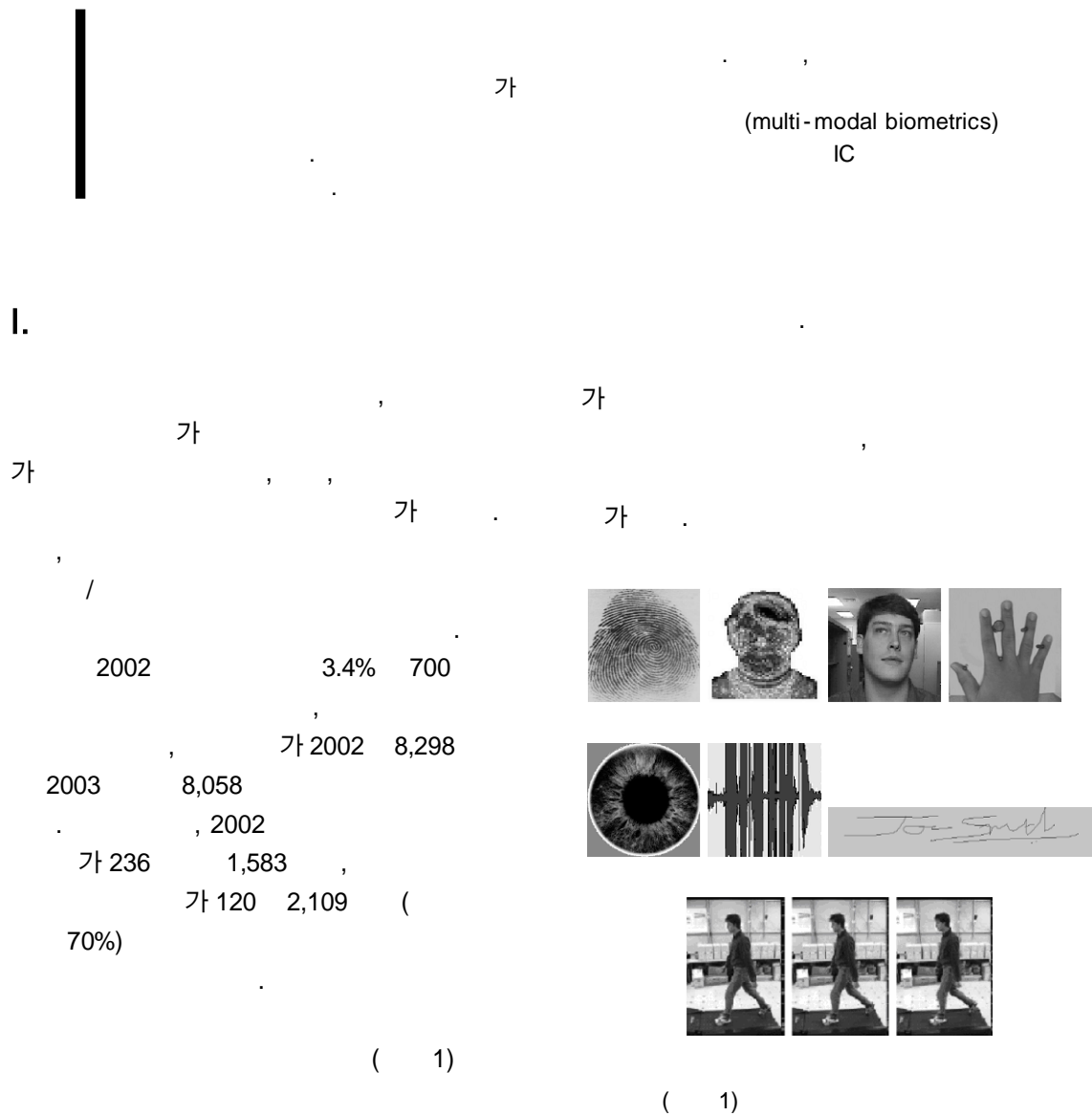


## Trends of Multi-modal Biometric Technology

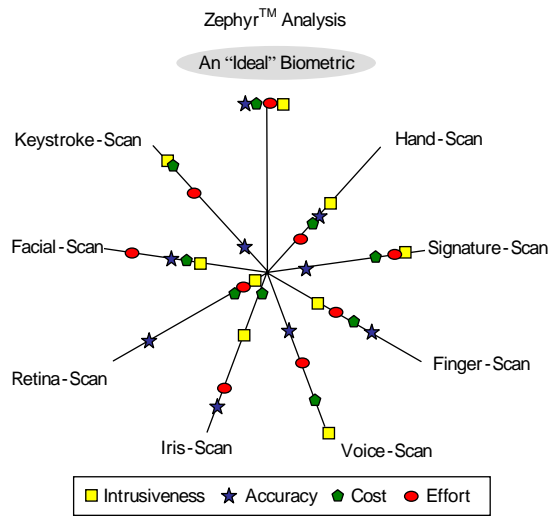
(Y.H. Gil)  
 (Y.S. Chung)  
 (D.S. Ahn)  
 (K.H. Lee)  
 (S.B. Pan)



가

가 , 가  
가 가

가



< >: International Biometric Group. www.biometricgroup.com

( 2 )

## II.

### 1.

( 2 )  
 (intrusiveness), (accuracy),  
 가 (cost), (effort)

(iris-  
 scan)

< 1> < 2>

FVC 2004  
2000

FRVT NIST

(Newark)

< 1>

[1]

Test	Test parameter	EER	FMR100
FVC [2004]	24 years (average age)	2.07%	2.54%

) FMR: False Matching Rate

< 2>

Test	Test parameter	FRR	FAR
FRVT [2000]	11~13 month spaced	10~20%	0.1~20%
NIST [2000]	Test independent	10~20%	2~5%

) FAR: False Acceptance Rate

가

FVC 2

[2]-[4]

3

< 1> < 2>

EER(Equal Error Rate) 2.07%

FRR(False Rejection Rate) 10~20%

10 1 2

가

가

70,000

140 가

10,500

4

가

- (performance):

(robustness)

가?

- (acceptability):

가?

- (circumvention):

가?

가

2.

가

[5].

- (multiple sensors):

가 . ( )

- (multiple biometrics):

가 . ( , )

- (multiple units of the same biometrics):

가 . ( , , , , , , , , , , , )

- (multiple instances/impressions of the same biometric):

가 가 . ( 가

)

- (multiple representation and matching algorithms for the same input biometric signal):

가 가  
가 가

가 ( 가 )

가 ,

Hong Jain[7]  
n

, < 4> 1% FAR FRR  
15.8%, 3.9% 1.8%  
FAR  
FRR

FAR(%)	FRR (%)		
1	15.8	3.9	1.8
0.1	42.2	6.9	4.4
0.01	61.2	10.6	6.6
0.001	64.1	14.9	9.8

가. +

Brunelli Falavigna[6]  
(classifier)

가

Jourlin [8]

가 (weighted geometric average)

shape model active  
HMM  
weighted sum

(rank) 0 1

< 3> 98%  
(88%) (91%)

### III.

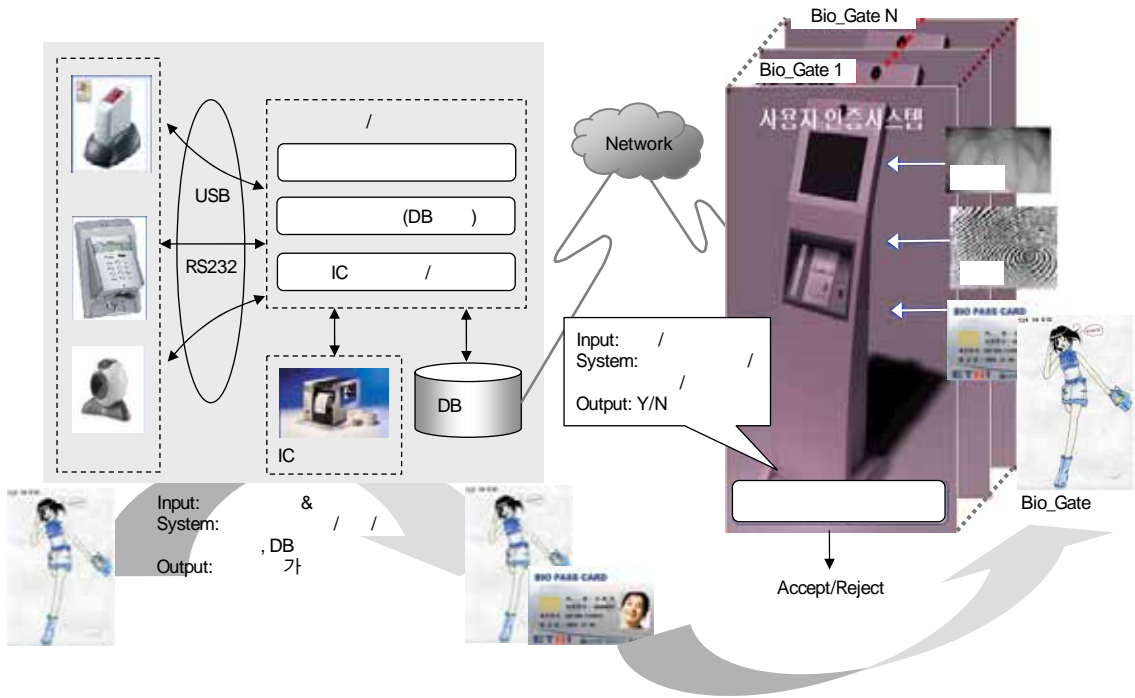
< 3> Brunelli Falavigna

	(%)
	88
(static)	77
(dynamic)	71
	91
	80
	77
	83
	98

IC

IC 가  
( 3)

가



( 3 ) IC  
 IC . DB  
 가  
 가  
 가 DB  
 ( 4 )  
 IC .



( 4 ) IC

, DB 가  
 가  
 가  
 IC 가  
 “Big Brother Problem”

( 3 )

- : FDU01
- : VP-IIS
- RF Reader: Dual600 dummy Reader
- : Quick Cam Pro 4000
- IC : (S3C89K8 )
- Interface: ISO/IEC 14443 Type B, ISO/IEC 7816

- Frequency: 13.56 MHz
- Operation distance: 10 cm
- Memory: 8 KB

1.

( 5)  
IC

가

가

가

DB

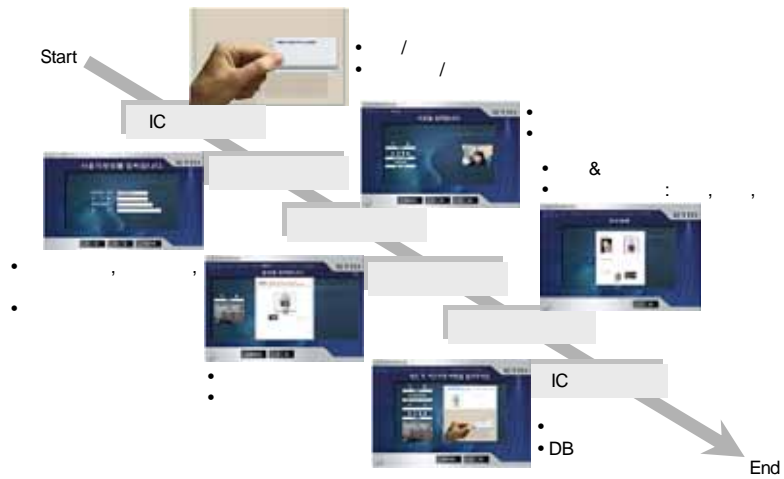
IC

2.

IC

IC

IC



( 5)



( 6)

National Identification Document

6) IC 1998 IC 가  
 IC 가 8 11 (< 5>

IC		가		
----	--	---	--	--

IV.

ID

가			가	
			- Travel documents 가 - 2003. 4. ~ 6. - 가 : 250	- 가 - 가
			- 가 - 가 : 5,764 Probes + 143,000 Gallery	- 가
	NIST		- (2003 7 )	- CANPASS Air - NEXUS Air
			- US-VISIT DB 가	- 가 - 가
			- TSA Knoxville Operational 가	
	가	/	- SENTRI	-
가		/	- IACS	
			- (Smartgate)	- Qantas
		/	- DB 가	
		/	- 2005 6 DB -	-
			- AFIS (2002 2 ) - IC 2	
		/	- (1998 ) - ICAO e-Passport	- 450 - 49 Autogate( )

2007

1. (US - VISIT)

2004 10 26 Enhanced Border Security and Visa Reform Act 303 27 ICAO가

( ) 가

, , 가

US-VISIT

US-VISIT

US-VISIT

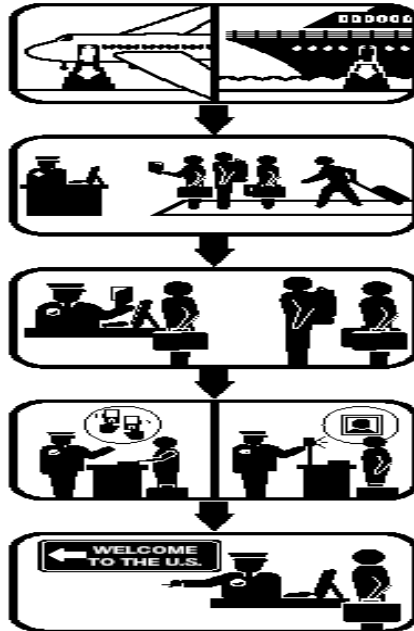
(( 7 ) ). MRTD

14

(115 ) (14 )

US-VISIT

Air and Sea Port  
US-VISIT Arrival Process for Visitors



( 7 ) / US-VISIT

2.

가. (TIPIS)

1997 3

2000 1 1

2003 7 1



2~3 )  
 83.8%가  
 ( )  
 가  
 가 .  
 V.  
 가  
 (I-PAS) 가 ,  
 TIPIS 가가  
 (I-PAS) 가  
 IC 가  
 가  
 1,500 ( 2003 9  
 599 )  
 10 3  
 [9], 81.6%가  
 ( )  
 52.2%가 가  
 65.1%가 가  
 가 ( )  
 가 ( )  
 가 ( )  
 가 ( )

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