Biometric	Sensor	Action	Biometric Class
Fingerprints	Fingerprint sensor capability in touch screen or casing	The Identity Caddy will receive fingerprint information from sensors either built into the device or within its casing.	Physical feature
Facial Features	Camera, Distance detector, Gyroscope	Based on certain triggering events monitored by the Distance detector and gyroscope, the Identity Caddy will activate the camera and capture facial features to confirm identity. These features will be captured at distances from a couple feet to inches and encompass various facial micro-features.	Physical Feature
Iris	"Front facing" web camera	Smartphone capabilities for capturing iris are limited by camera resolution and IR filtering. However, in the context of fusion, "coarse iris" images are useable identifiers.	Physical feature
Speaker identification	Microphone, Distance detector	The microphone will capture voice biometric information based on usage of the telephone capability.	Physical expression
Gait and movement	Gyroscope, Accelerometer	The Identity Caddy will monitor movement distilling distinctive patterns that corroborate identity.	Physical expression
Texting patterns	Touch screen	The Identity Caddy will establish character timing/sequencing patterns while texting.	Physical expression
Activities of everyday living	GPS, clock	The Identity Caddy will monitor physical locations at various times of day to establish patterns that corroborate identity.	Activity pattern
Other connected devices	Network connection	When connected to a network, the Identity Caddy will know other devices that are also connected—assuming it is not overtly blocked by the network. This feature may be useful in corroborating a transaction on another network computer.	Activity pattern

FIG. 1

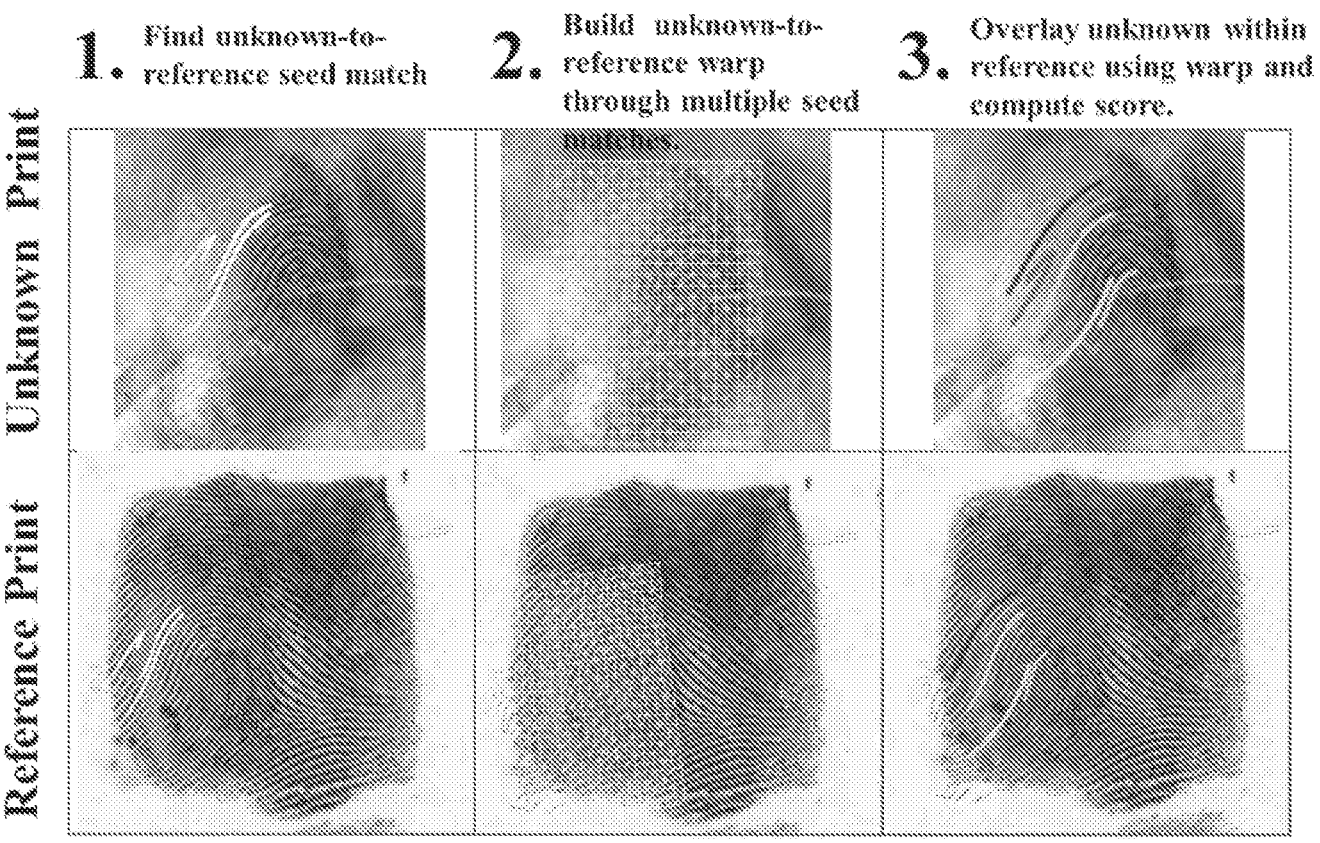

1. Find unknown-to-reference seed match
2. Build unknown-to-reference warp through multiple seed matches.
3. Overlay unknown within reference using warp and compute score.
Unknown Print
Reference Print

FIG. 2

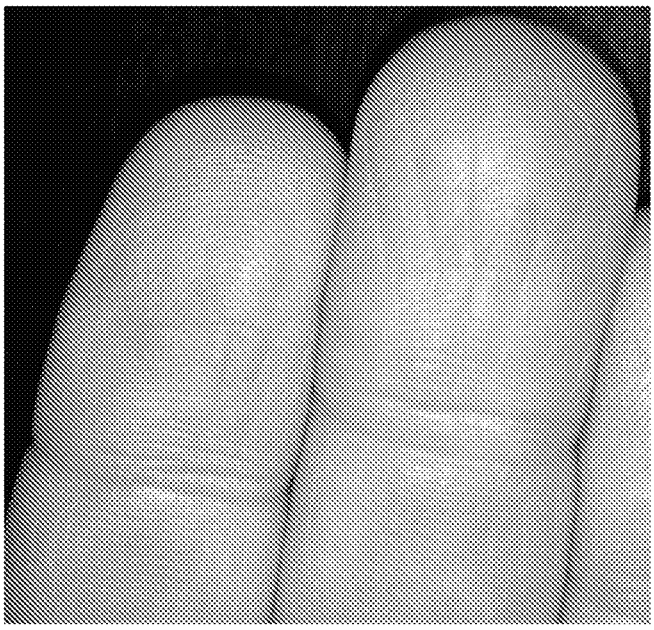


FIG. 3A

FIG. 3B

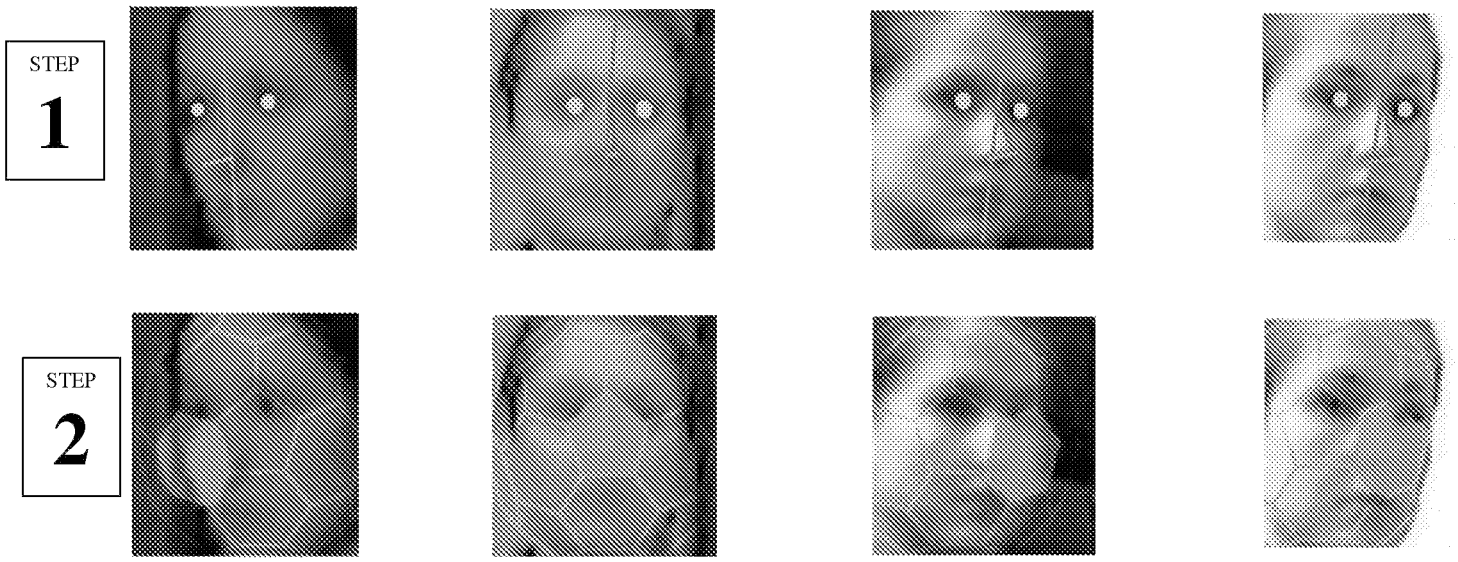


FIG. 4

FIG. 5

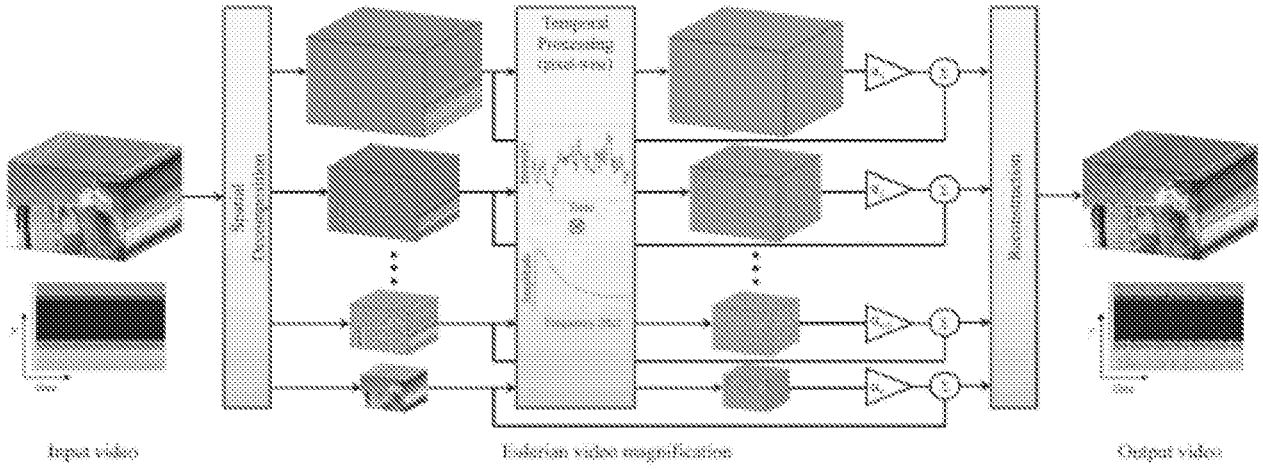


FIG. 6A

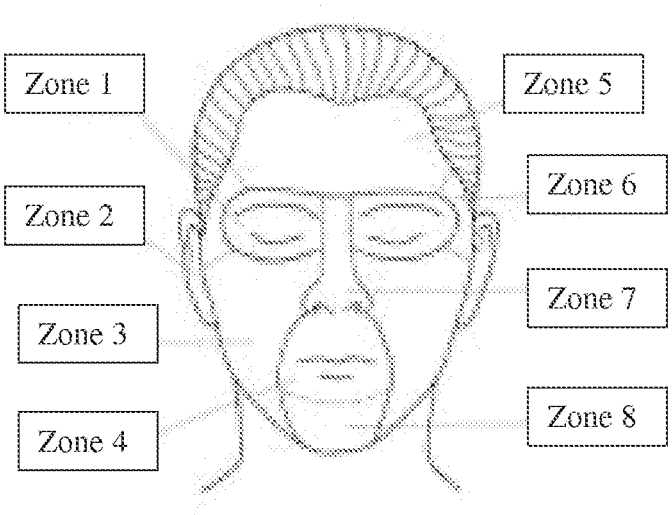


FIG. 6B

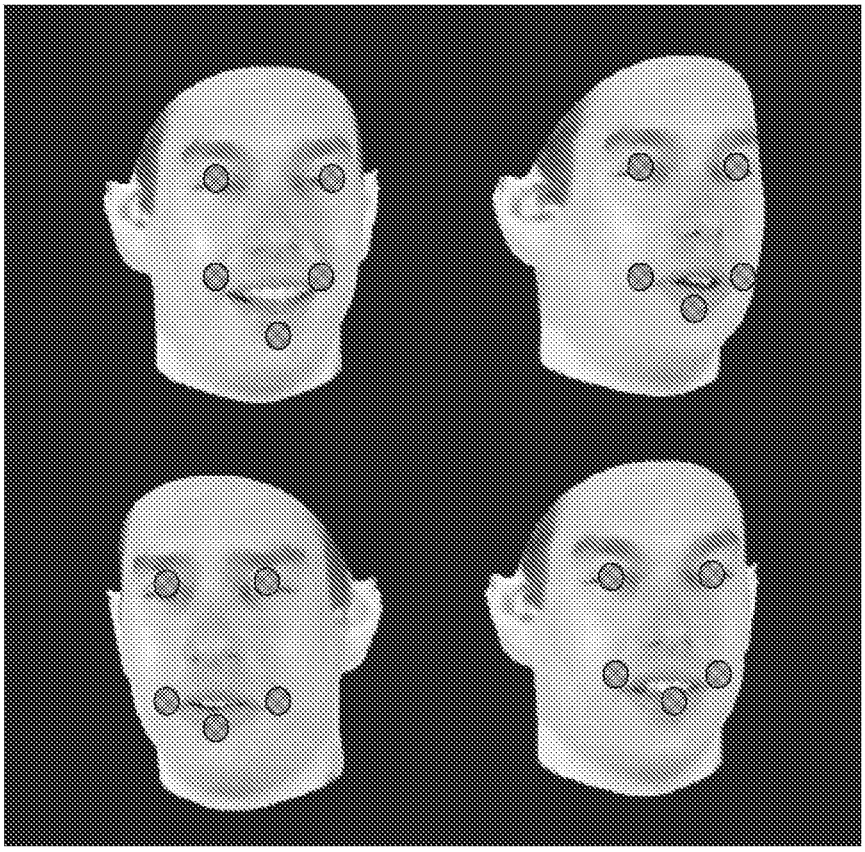


FIG. 7

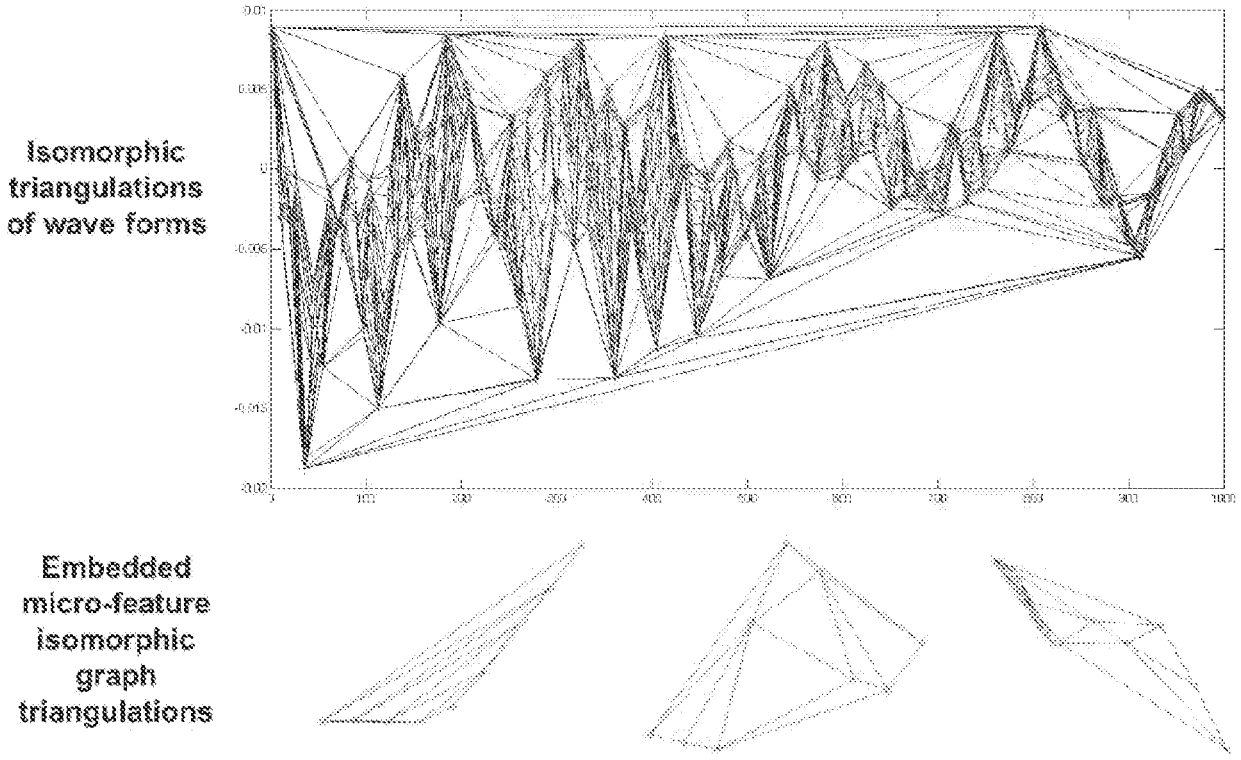

Isomorphic triangulations of wave forms
Embedded micro-feature isomorphic graph triangulations

FIG. 8

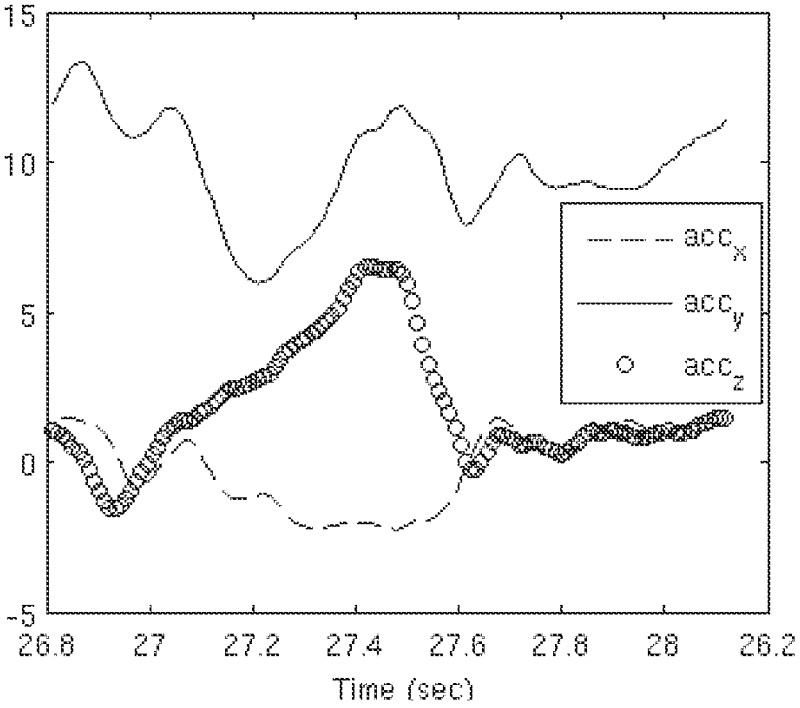


FIG. 9

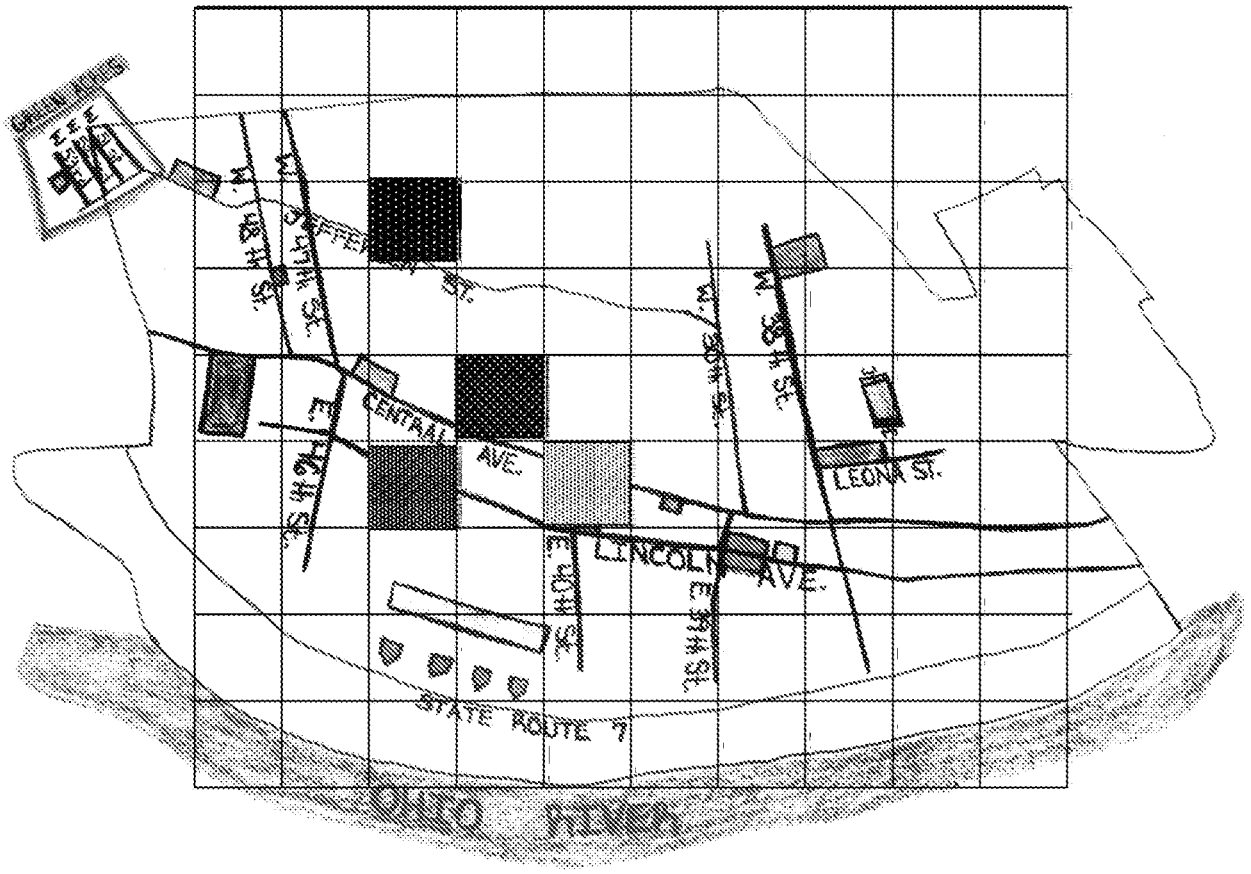

W. 8TH ST.
W. 6TH ST.
JEFFERSON ST.
ST.
CENTRAL AVE.
E. 6TH ST.
W. 3RD ST.
W. 3RD ST.
LEONA ST.
LINCOLN AVE.
E. 4TH ST.
E. 3RD ST.
STATE ROUTE 7
OHIO RIVER

FIG. 10

FIG. 11

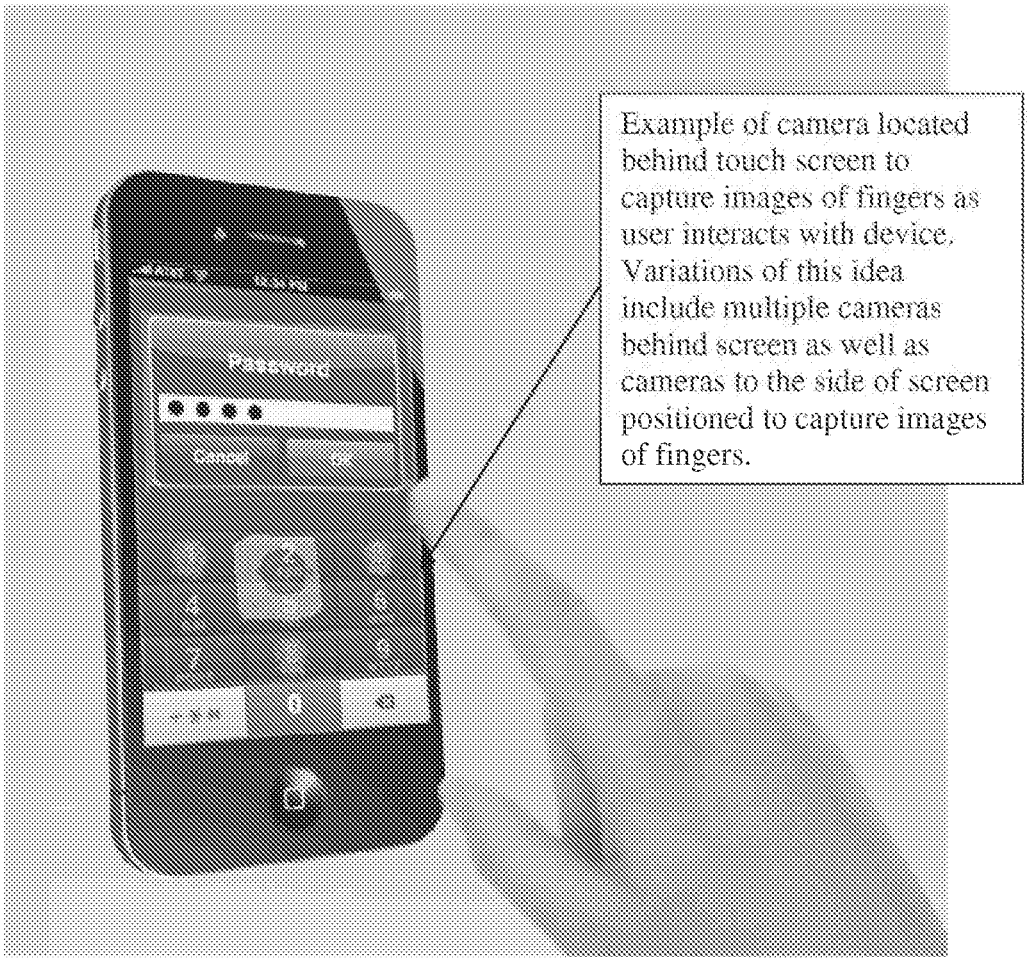

Example of camera located behind touch screen to capture images of fingers as user interacts with device. Variations of this idea include multiple cameras behind screen as well as cameras to the side of screen positioned to capture images of fingers.

FIG. 12

FIG. 13

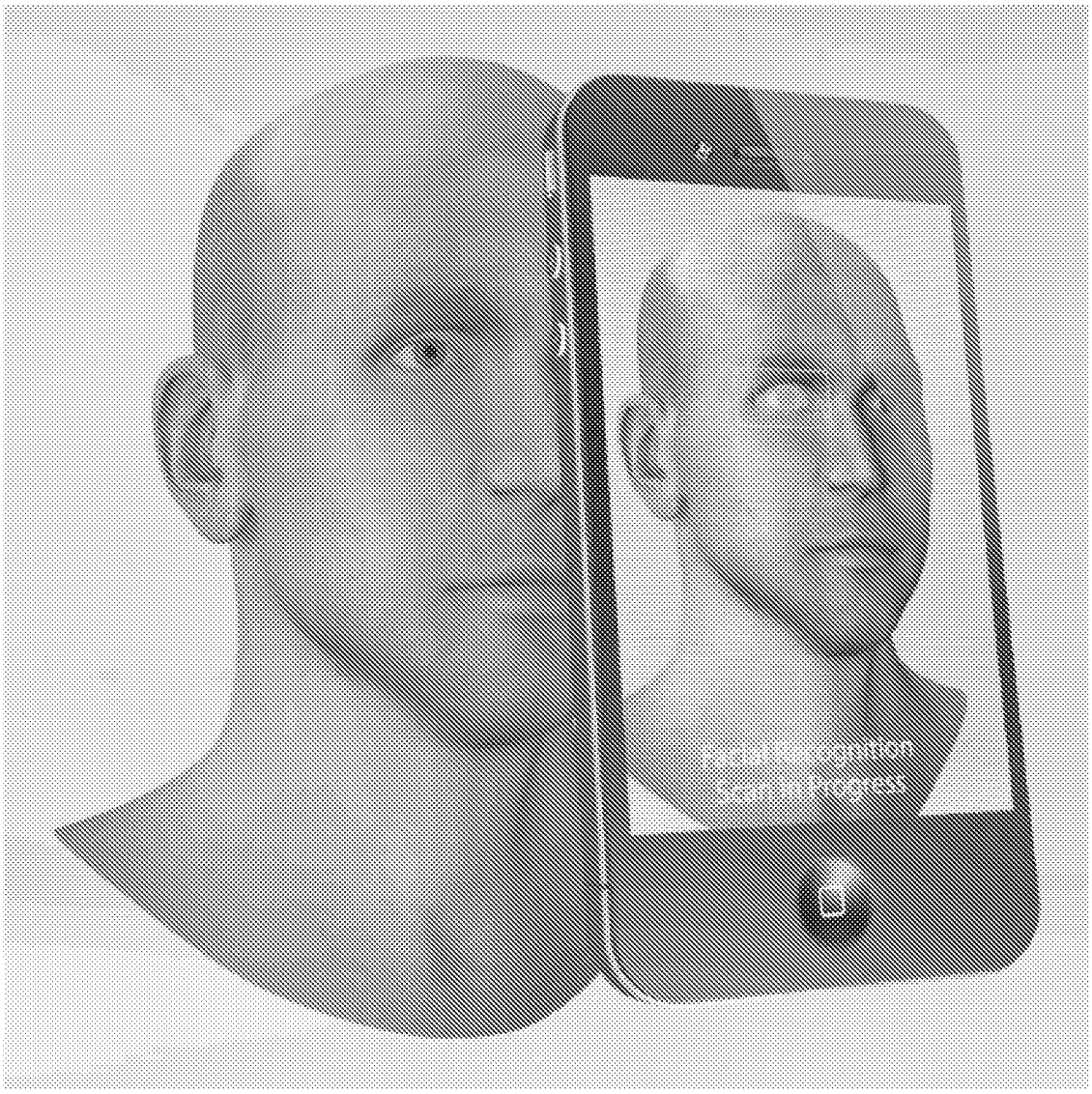
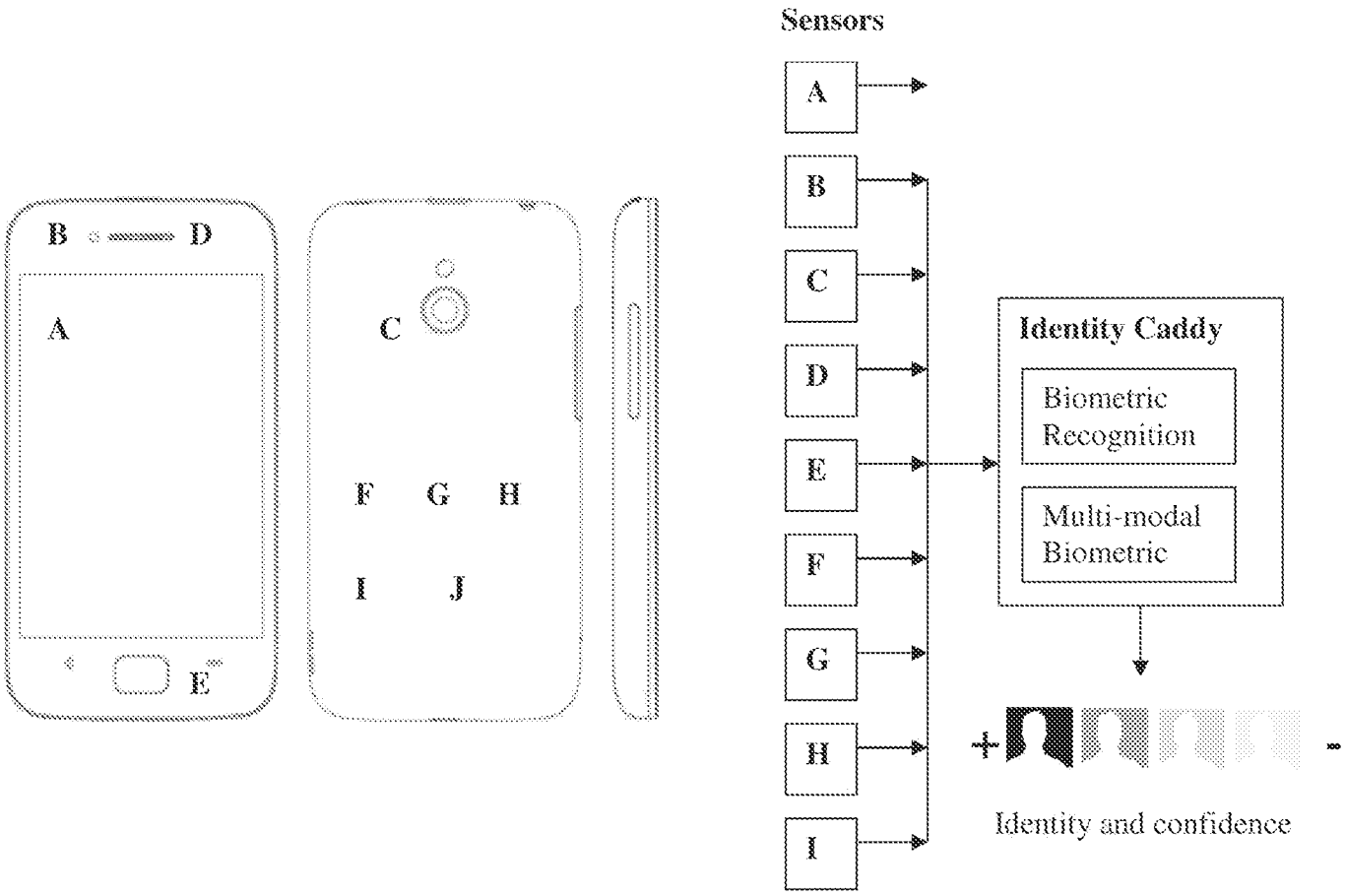


FIG. 14



Letter	Sensor/Device	Identity-related feature
A	Touch Screen	Fingerprint/finger motion
B	Back-facing camera	Face/Iris/Coarse Iris/fingers
C	Forward-facing camera	Hand/Fingers
D	Distance Detector	Distance to face
E	Microphone	Voice
F	Accelerometer (not visible)	Motion
G	Gyroscope (not visible)	Motion/Position
H	GPS (not visible)	Location
I	Wireless network adapter	Location via networks
J	Clock	Time

FIG. 15

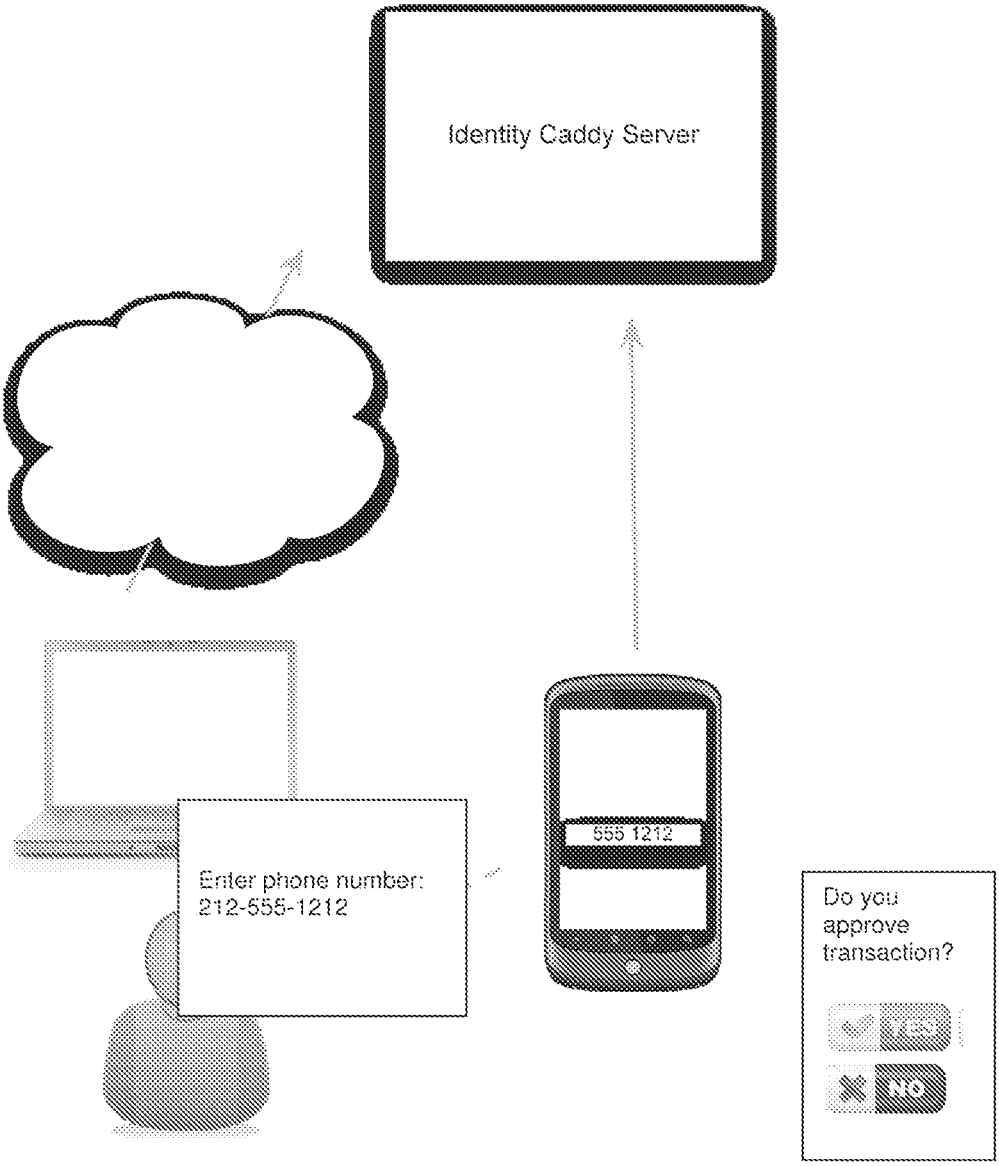

Identity Caddy Server
Enter phone number:
212-555-1212
555 1212
Do you
approve
transaction?
YES
NO

FIG. 16

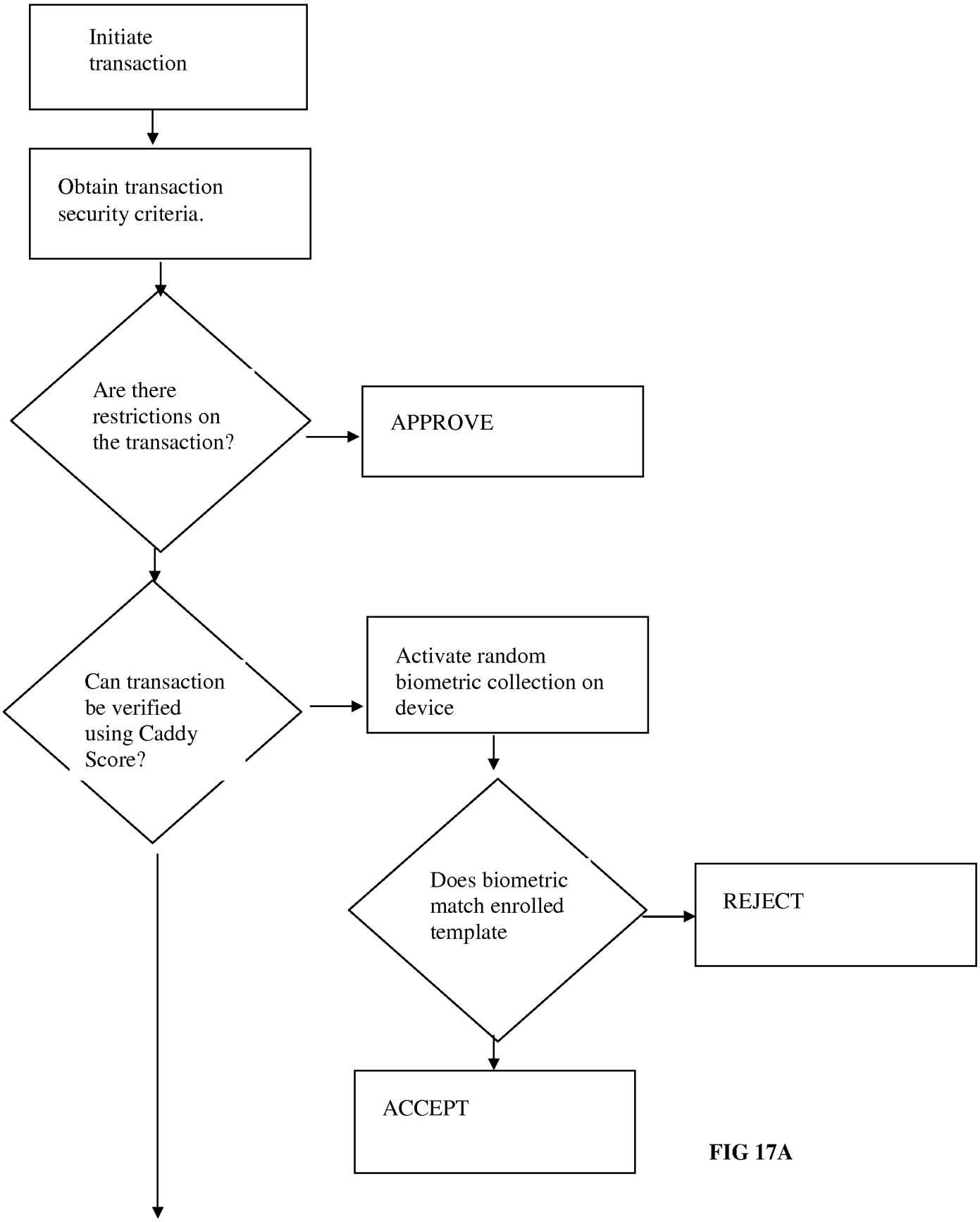

Initiate transaction
Obtain transaction security criteria.
Are there restrictions on the transaction?
APPROVE
Can transaction be verified using Caddy Score?
Activate random biometric collection on device
Does biometric match enrolled template
REJECT
ACCEPT

FIG 17A

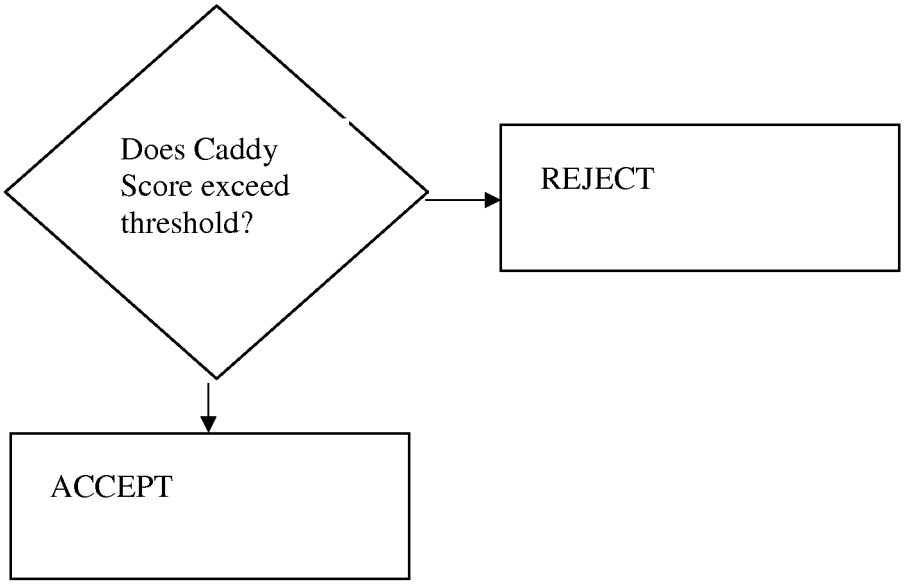


FIG. 17B