Security Device Interface

Display and Control Project

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Software and User Interface Design

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Project Brief

To Design a system of access control for bank vaults which alarms the police during a bank robbery with the manager at gunpoint.

Design Goals

1. Along with general access control the process of informing the security in alarming situations should be natural i.e. the robber/ dacoit or bank robber should not realize that an alarm is enabled.

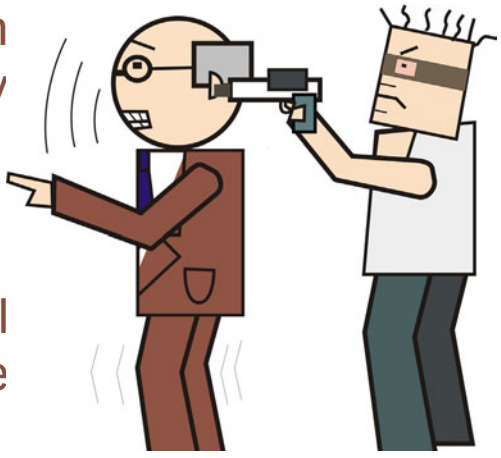
2. The case of false positives should be brought to the minimum.

The Scenario

With the perspective of developing the system the following scenario was visualized for deeper understanding

> *“It’s a silent Friday afternoon. With many people in the bank. Consider a bank at 1 in the afternoon when a bunch of robbers enter the area and proclaim the robbery. The robbery makes everyone alarmed and the manager/ cashier is taken at gunpoint. He is taken near the vault and asked to open the vault.”*

This is a basic scenario that can be thought for a bank robbery scenario.(before any research)

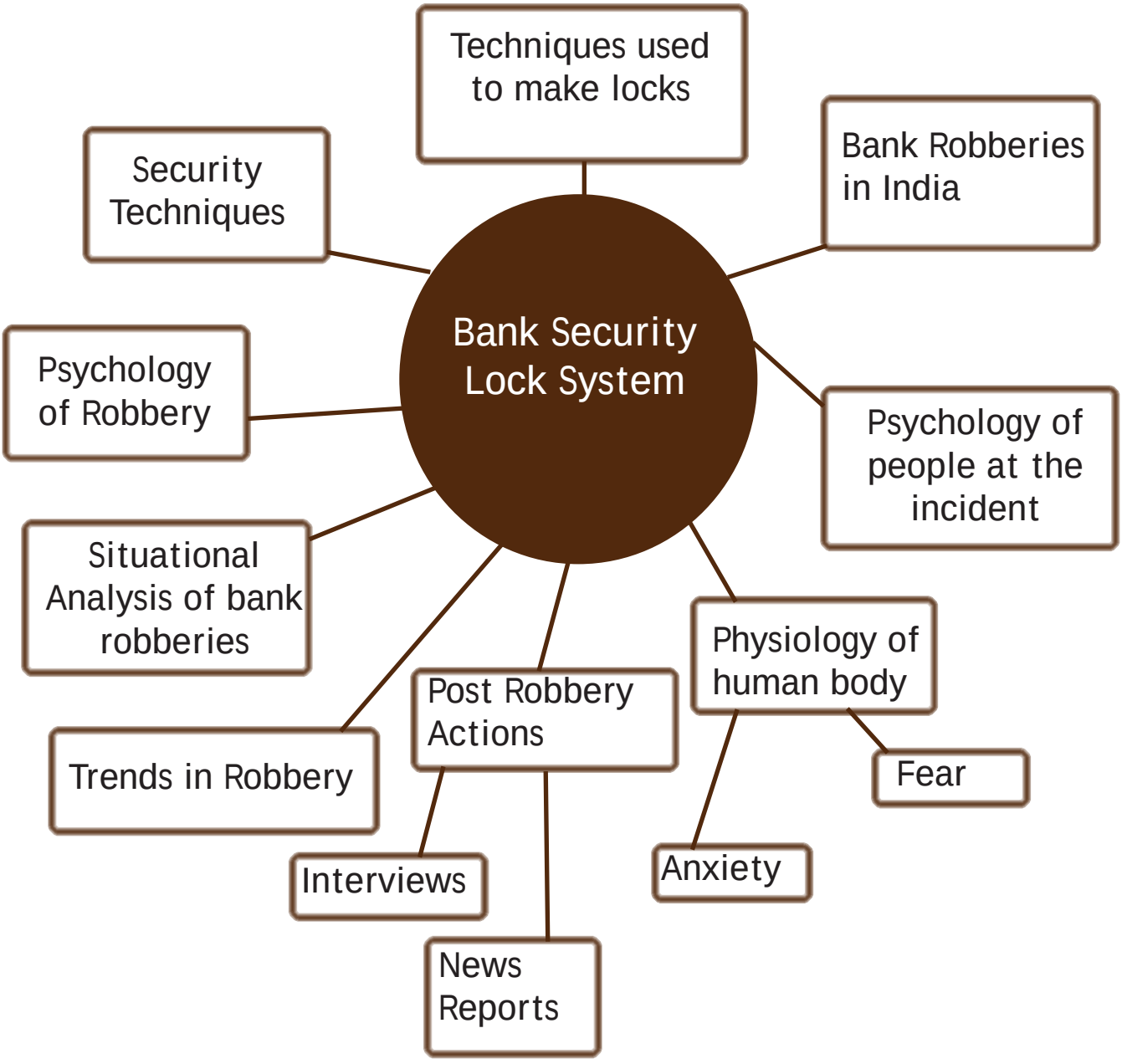


The scenario clearly shows the people involved who are in control of the incident or driving the cause and effect of the incident.

However what is not seen are the hidden layers in the scenario which are working in the background.

System level understanding

The Situation/ Scenario can have many perspectives which may affect or influence the working of any design with the specified goal.



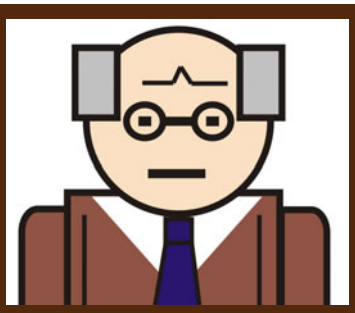
The Human Side

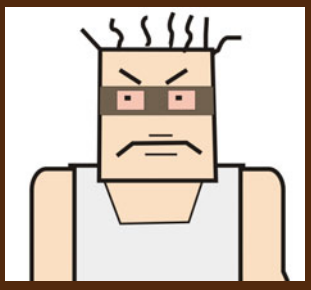
The Users

Since it's an access control system design it may be used by one or many authorized users. But apart from the person who may access the system in this case we also need to understand the person influencing his decision at gunpoint.

Thus there are two important humans involved in this design:

The bank manager or the person who opens the vault generally and is at gunpoint





The Robber or robbers who break into the bank threatening the bank manager at gunpoint.

In order to design the vault security for such a scenario it is key to observe

1. The Physical and Mental State of the person at Gun-point
2. The Physical and Mental State of the bank robber, along with his Intentions and inclinations.

The Human Side

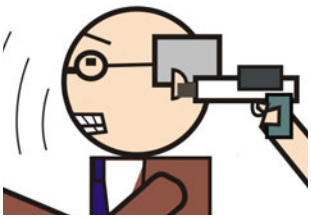
State of Person at Gunpoint

In a situation of burglary the person who is held at gunpoint has a by default increase in anxiety level. Lets see what happens to the bank manager when he is held at gunpoint.

a. His Thoughts

He enters a state of anxiety and wants to...

- Protect the money in the vault
- Also Protect his and other hostage lives.



b. His Actions:

The actions he wants to take...

- Either fight the robbery which he may try to do by activation of the alarm
- Or Flight i.e. runaway from that situation as soon as possible.

The Human Side

Fight

It is observed that if he tries to fight he still has a conscious anxiety and needs the courage to do so. This makes it a case where bank officials are expected to be people with high courage. But somehow this is not the general case.
Also if he decides to fight he has to consider the security of lives of all the hostages and himself (barring a few situations where the manager is not worried about his life!!!). Hence this decision needs to risk the lives of different hostages and self. And needs to be a very calculated risk.

Flight

Now this is an option which most of the people in such situation would like to opt.
But the constraint that again stops such an action is the threat of the gunpoint. Since any attempt to do so physically (run or hide out) may cause the person to lose his and others lives.
So in such a situation the best method to flight the situation is to submit to the robbery i.e. to follow the instructions of robbers and let them take away the loot.
Generally this is what is recommended by any police document to reduce the blood shed. And as observed that most of the robbers don't mind killing a few on their way to get the money.

The Human Side

The Body State

Human body in itself has an inbuilt system to deal with such situations. The above thought process and intended actions are also to some degree due to these biological changes during such a situation.
One feeling that we may see during the above situation is Anxiety/ Fear

Anxiety is a response to danger or threat.
Immediate or short term anxiety is termed the fight/flight response. It is so named because all of its effects are aimed toward either fighting or fleeing the danger. Thus, the number one purpose for anxiety is to protect the organism.

System level understanding

The Human Side

Back in the days when we were cave people, it was vital that when faced with some danger, an automatic response would take over causing us to take immediate action (attack or run). Even in today's hectic world this is a necessary mechanism. Just imagine if you were crossing a street when suddenly a car sped toward you blasting its horn. If you experienced absolutely no anxiety, you would be killed. However, more probably, your fight/flight response would take over and you would run out of the way to be safe. The moral of this story is a simple one -

The purpose of anxiety is to protect the organism, not to harm it.

Anxiety as a whole manifests itself in 3 different systems in human body

1. Mental System – Which we discussed earlier
2. Physical System
3. Behavioral System

System level understanding

The Human Side

The Physical System

When some sort of danger is perceived or anticipated, the brain sends messages to a section of your nerves called the autonomic nervous system. The autonomic nervous system has two subsections or branches called the sympathetic nervous system and the parasympathetic nervous system

In Short there are two systems one to prepare the body for flight or fight and the other to restore the body to normal condition.

The Sympathetic Nervous system produces the following effects:

1. The Heartbeat of the person increases. This increase the blood flow and improves delivery of oxygen

2. Blood flow is generally taken away from places where it is not needed and blood flow increases where it may be needed most.

Blood is taken away from toes, fingers and toes. This is useful because if the organism is attacked and cut in some way, it is less likely to bleed to death. Hence, during anxiety the skin looks pale and feels cold and fingers and toes become cold and sometimes experience numbness and tingling. In addition, the blood is moved to the large muscles such as the thighs and biceps which helps the body prepare for action.

4. Increase in speed and depth of breathing. This is to provide more oxygen to the body.

Which in turn may produce breathlessness, choking or smothering feelings, and even pains or tightness in the chest.
Importantly, a side effect of increased breathing, especially if no actual activity occurs, is that blood supply to the head is actually decreased. While this is only a small amount and is not at all dangerous, it produces a collection of unpleasant (but harmless) symptoms including dizziness, blurred vision, confusion, unreality, and hot flushes.

The Human Side

5. Increase in sweating.

This has important adaptive functions such as making the skin more slippery so that it is harder for a predator to grab, and cooling the body to stop it from overheating.

6. The pupils widen to let in more light which may result in blurred vision, spots in front of the eyes

7.Decrease in salivation, resulting in a dry mouth.

8.Decreased activity in the digestive system which often produces nausea, a heavy feeling in the stomach and even constipation

9.Many of the muscle groups tense up in preparation for fight or flight and this results in subjective feelings of tension, sometimes extending to actual aches and pains as well as trembling and shaking.

The Human Side

10. All of your senses are heightened are survival vigilance. You are more sensitive to noise (ringing telephones or door bells), to light, to smells, even to increased sensitivity to touch. Your neo-cortex (the thinking part of your new brain) shuts down and the survival mechanisms in the middle and lower more primitive parts of the brain take over, so you react to things and do not think things through as well

The Behavioral System

The Fight or flight system prepares the body for action either to attack or to run
The overwhelming urges associated with this response are a desire to escape wherever you are. When this is not possible the urges will often be shown through such behavior as foot tapping, pacing, or snapping at people.

Impact on Design

Hence we can see that the design of the system needs to consider the special condition in which the user will operate system. The access control interface should hence be easy to operate during such a scenario. If the system can understand the state of the human in such a scenario it may add to the quick response of the person.

System level understanding

Threat of robbery

There are several elements which are necessary for a crime to take place.

These include motivation, opportunity, ability on the part of the perpetrator, a reasonable expectation of escape, and a low probability for detection and apprehension.

The goal of the security practitioner is to lower the available level of opportunity and increase the potential for detection and apprehension through a variety of preventative efforts which harden the potential target in the hope of deterring the criminal. This line of logic remains the same regardless of the threat. However, and regarding the very dangerous threat of robbery, it is first necessary to consider the nature of the robber himself.

Robbers generally fall into three categories: the amateur, the intermediate, and the professional.

System level understanding

Threat of robbery

The method of attack will vary but it will usually correspond with the degree of experience, discipline and available resources that the robber has.
These methods can range from the lone gunman who passes a note, to the gang who takes the lobby over for a period of time, to the coordinated attackers who may take the Bank Manager and his family hostage to effect a "morning glory" attack.

> Generally stated, the more experienced, competent and calculating the robber and his attack method, the safer the situation will be for the victims.

Because **most bank robberies are committed by solitary, unarmed and undisguised offenders**, **they can be considered the work of amateurs rather than professionals.**
In contrast, it is the less common armed bank robberies that more often involve multiple offenders and the use of disguises.
Distinguishing bank robberies as the work of amateur or professional robbers provides important insight about the risks of robbery at a branch, and thus guidance in selecting crime prevention strategies most likely to be effective.

System level understanding

Threat of robbery

Targets that attract amateur robbers may discourage professional robbers while targets that are attractive to amateurs will often hold little appeal for professionals. Further, although discouraging an amateur robber is much easier and the approach different than thwarting a committed team of professionals, the measures that might deter an amateur may well increase the likelihood of violence by professional robbers.

Impact on Design:

The different types of robbers show that the threat to the person operating the system under he robbers influence may vary. While on one hand a professional robber may disable all the cameras and may even try electronic deactivation an amateur wont mind pulling the trigger even at a smallest brink that he gets about an alarm being set.

System level understanding

Scene of Crime

Bank robbery is not just an American concept. Although not heard about these days since not many are reported in press but the Indian scene of bank robbery is not silent. There have been many bank robberies across major cities in India of major banks too. However these are not reported out of the fear of notoriety to the name of the bank.
Some recent incidents in major cities like Mumbai and Delhi show detailed outlook of the scene of crime. These are **mostly reported by people present at the scene** of crime, or when the criminals are caught.

The interesting part to study in the context of our design is the process of a bank robbery.
It is observed that most money kept in bank vaults is accessed by simple keys. These can be snatched by the robbers and the vaults are easily opened.

Even after having shown hi-tech security in films many banks still own normal security vaults either due to cost cuttings or due to complexity of use.

System level understanding

Scene of Crime

What happens in a bank robbery?

A bank robbery can either be silent or a violent one depending on the robber's expertise.
Most of the reported cases in India show that the robberies have been with armed weapons since they are done by amateur robbers.
If the robbery occurs in broad day light it is seen that the robber basically comes in silently and proclaims the scene inside the bank.
The bank barricade that is used to avoid the person to get in is used to close from inside after injuring the gate guard.
The first location that is aimed at by the robbers after initial threat is established is the cashier's transaction zone.

Depending on the scale of the robbery and the planning involved the robbery may have details such as turning off the cameras, or trying to disable the telephone lines.
Vulnerable targets which are held by the robbers to increase fear among the other people present in the proximity.

System level understanding

Scene of Crime

But however one of the major details of any robbery is informed to the police via the first phone call from one of the person present at the location of the crime.
The major details explained during such a phone call are the color of clothes of the robber; the details of the weapons carried by the robbers and the no. of robbers at the scene of crime. Also the vehicle used for exit from the location is considered.

Impact on Design:

The process carried out during a robbery helps in understanding the modus operandi of the crime and hence the information that a police needs from the scene of crime. The design needs to record specifics when it comes to securing the place and informing the police.

System level understanding

Access Control

It is observed that any access control device needs an authentication which can be based on something that the Authorized person:

1. Knows
2. Owns/ Has
3. Is

The first condition can be considered as cases where there are passwords or secret questions.
The second one is based on cases like a lock and key or a card access type scenario
The third one is based on the basic identity of the person in itself which cannot be physically separated easily.

The first two are more or less can be trespassed easily however the third one becomes more difficult. It is also called as the biometric method because it uses the biological inputs as a key to access the secure area.

Contextual Inquiry

Since the major part of the project was security based not many bank managers agreed to talk about the situation. Some of them did not want their data to be disclosed outside.
After Interviews with Bank Managers and a few police officials it is observed at a general scale that banks still use age old techniques of protection. And more or less many banks are devoid of any security plans or measures.

Some of the study was done using printed media like newspaper articles.

Design Considerations

Based on the brief and the primary research the system needs to do the following functions:

1. To identify the person who is accessing the system.

2. To identify his current mental/ physical state for panic situation (directly or indirectly)

3. To allow access if authentic access data is provided

4. To disallow if no such data is provided

5. To trigger internal alarm in case of panic situation.

6. To hide the display of internal alarm from the robbers (hence protect the life of the person at gunpoint)

7. To collect local data to be send to be sent to the security in case of panic situation.

Design Considerations

Two major methods were identified that can be used to satisfy the requirements:

Natural Method: Here the system will naturally identify the state of the person accessing the system and trigger an alarm state.

Wit full Method: Here the person accessing the system at gunpoint provides a trigger to the system by following an alternate method which informs the system about the panic situation

Design Considerations

Here are the pros and cons of the system:

Natural Method

The person in state of shock may not remember any other condition or alternate method when in shock since the memory goes weak during a flight/ fight situation.

Natural Execution from the system helps since the identification of the state is done by the system.

The Person doesn't have to change his normal interaction with the system.

The robbers may not be able to identify that the process of the alarm getting triggered.

WitFull Method

The system does not need be intelligent hence saves implementation costs.

Scopes of false Positives are less.

The unique method of activation/ trigger acts as a second level trigger.

Hi tech Robbers may get into intelligent systems and change its general process but witful method may be with the authorized person only.

Hence no type of intrusion is possible.

Explorations and Ideation

Considering the Primary research and understandings many concepts were generated in the process some of them are as follows:

Concept 1: Keypad Based interface with a passcode. (Wit Full Method)

This method is basically based on what u know technique of access control.

The interface will have two alternate passcodes. One used in general scenarios while the other in special scenarios.

The second passcode may have

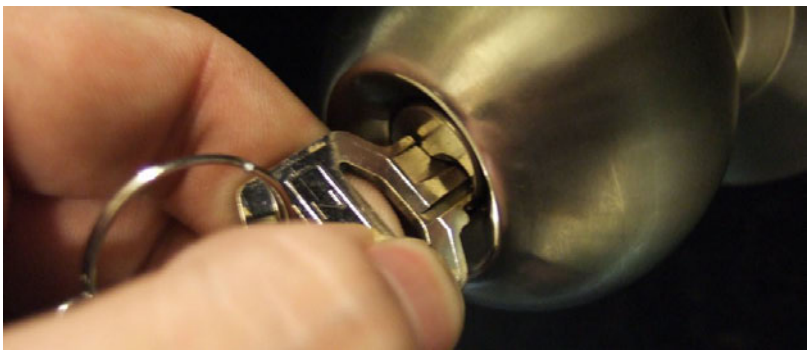
1. Multiple pressing of a particular button to activate

2. Special placement of a particular button say “0” and not involving the button in general combination however this button can be pressed in panic situation. The Display in such a case may provide feedback by changing the hidden password symbol. For eg. Replacing “*” by “X” hence allowing the person at gunpoint about the alarm being set but not the robber

Explorations and Ideation

Concept 2: Key+ Combination Based method. (Wit Full Method)

This method is basically based on what u own plus what you know technique of access control.
In this method **u open the vault by a key** and turning the key in particular pattern.
(For eg. Three times left four times right.)



Again this will have two combinations. One for normal access and other for special access.
The second combination:

1. May be long enough for to add to the time limit in processing.
2. It may also contain coded message like morse code to send particular message.

Explorations and Ideation

Why WitFul Method is not the best?

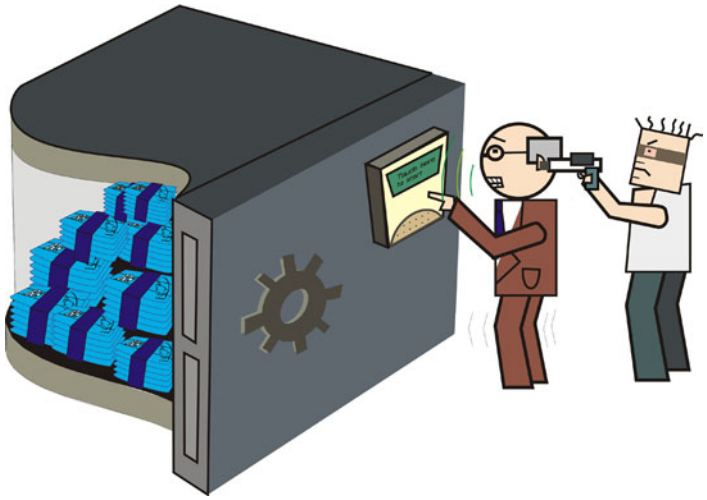
Witfull method are indicative and quick to implement. However they still have certain flaws considering the context:

In case of a flight and fight situation (Refer to Human Side Above) the person triggering the alarm (bank manager) generally will get conscious when he actually triggers an alarm. Since he knows that the system is triggering an alarm because of his direct actions he may get more scared to actually perform the act which depends on his courage. Further if he actually does do it successfully he may fear the idea of the robbers coming to know about the method and hence he may behave in a sort of strange manner which may invoke the robbers about some change in the scenario and hence the robbers may end up killing the
Bank manager.

The process of setting up the initial passcode may cause a human error. The chances of other false positives are also high.

Final Concept

Voice based Security System (Natural Method)

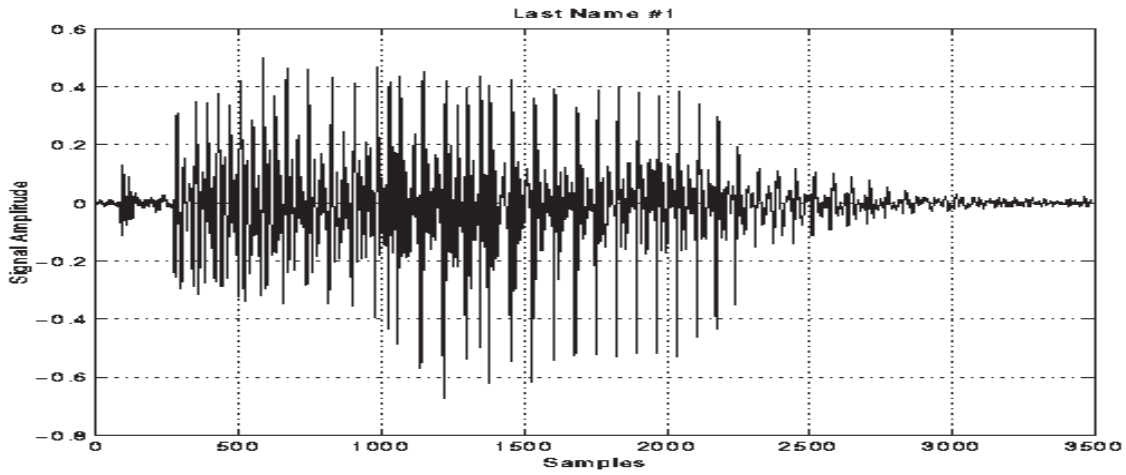


Considering the requirements and the drawbacks of the witful method, a system that itself identifies the mental or physical state of the user can help in being more effective in the situation provided .

It is observed that in **state of anxiety humans produce certain physiological and psychological conditions** which are common across all human beings.

Fear of life is one of the epitomes of fear and produces the maximum anxiety.
These characteristic patterns can easily be captured by the system and hence act as an input data in triggering the signals for security alarm.

Final Concept
Voice Based Security



Speech recognition is one of the most natural methods to use in biometrics.

The human voice is the carrier of speech, but also an 'auditory face' that conveys important affective and identity information.

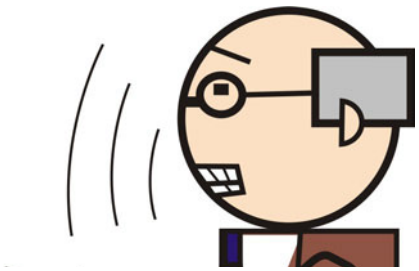
Speech allows remote identification of complex musculature of a person's vocal system. In this technique, individual's identity is ascertained based on the unique way that he or she speaks, which includes variable parameters like pitch, speed, energy density and wave form.

Final Concept
Voice Based Security

What should be noted is that each individual has a voice pattern and a speech pattern. The speech pattern changes as per circumstances and situations while the voice pattern is a constant parameter. Fear changes the speech pattern of the device not the voice pattern.

Hence Voice pattern can be used as a biometric tool to recognize a person. Although each individual also has a speech pattern which is unique. So no two speech and voice patterns of a person will ever be same.

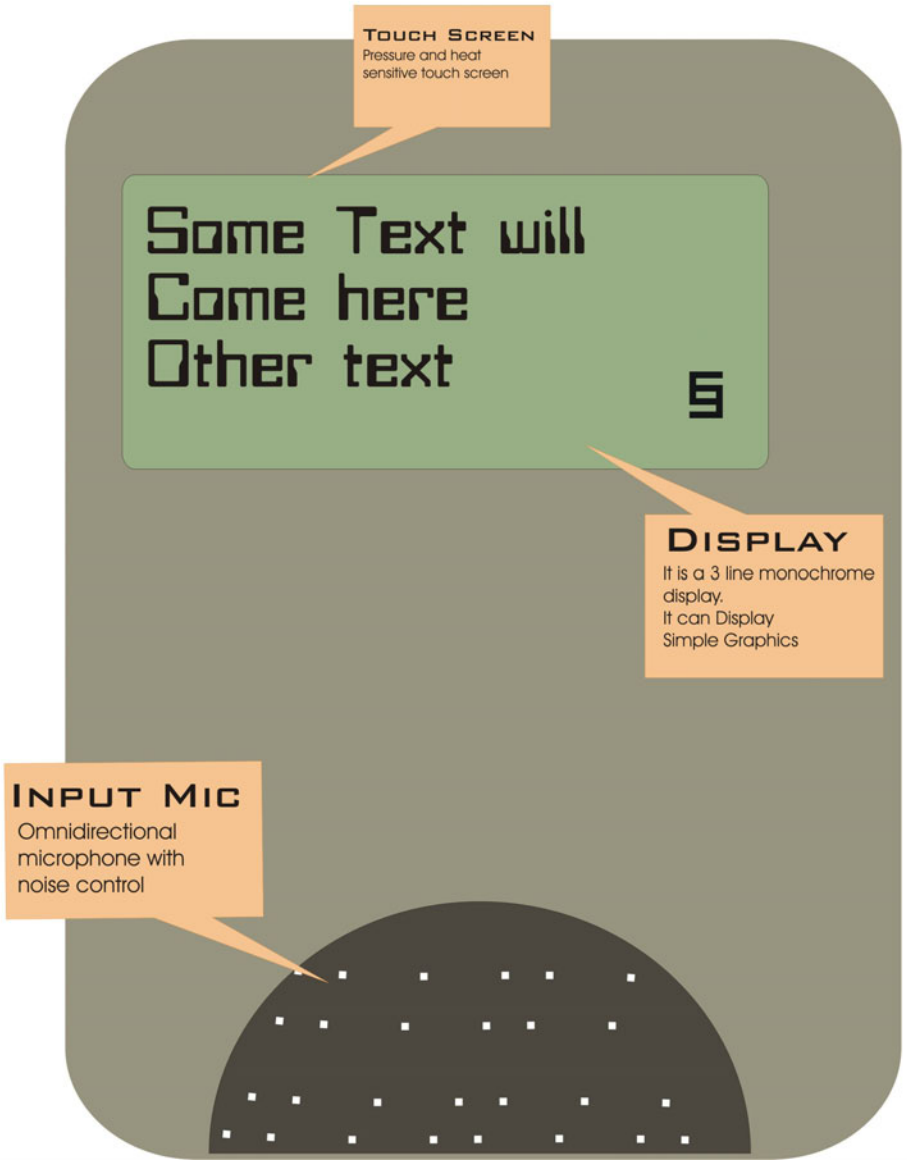
VOICE D.N.A.



Final Concept
Voice Based Security

What is the system?

It is a Voice+ Touch Activated Security System that allows Authorized access on the basis of Voice pattern Matching. It also identifies emotion of the Authorized person by Touch and Speech Pattern and triggers security alarm for quick identification of bank burglars if a panic situation is identified.

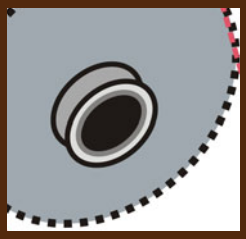


Final Concept
Voice Based Security

How does it work?

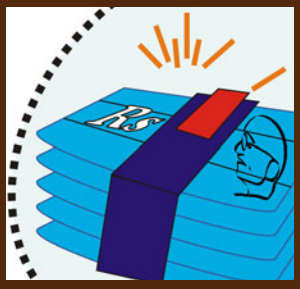
The Security System Strategy will have Four major components.

1. Electronic Lock: Voice and Emotion Identifying Biometric Electronic Access control Device.



2. Hidden Cameras: outside and inside the vault which are not connected to the main CCTV cameras.

3. Secret Location Identifier: On one of the note bundles inside the vault will have a transmitter (RFID or some other technology) which will get enabled on the caution trigger.



Final Concept
Voice Based Security

4. Police alarm service that collects the information from the Electronic Vault system and displays it.

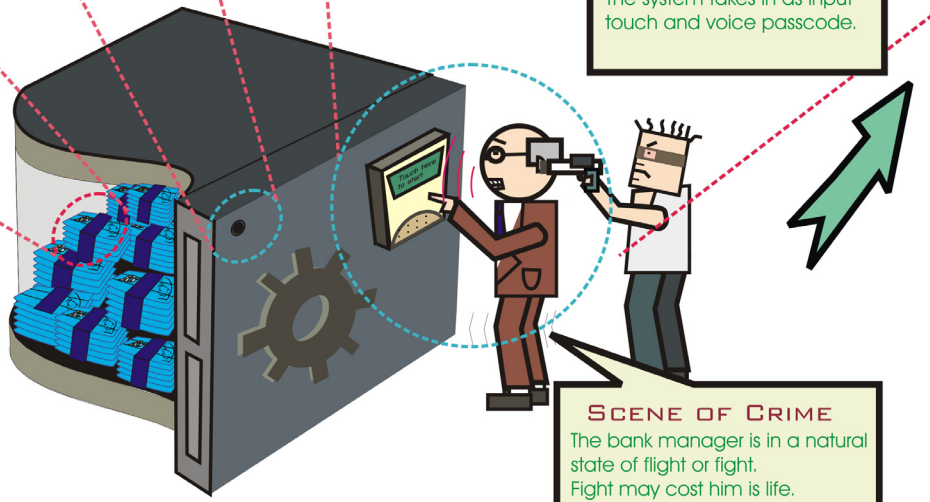
The complete system functions will function as follows:

1. The bank manager is in a state of fight/flight at the gunpoint.
2. He inputs to the system via touch and voice passcode.
3. The system verifies the voice type and voice pattern.
4. The system also verifies voice emotion for fear.
5. If the system identifies the fear state it triggers panic situation. It alarms the nearest police unit.
This alarm is not seen on the interface specifically hence any burglar cannot identify it is set.
6. It activates the hidden camera and records footage to be sent to the police.
7. It activates the RFID tags on the bundle which transmits the location based information.
8. The police gets camera pictures and location at the scene of crime.
9. The robbers can now be caught easily.

Voice Based Security System

Scene of Crime
The bank manager is in a natural state of flight or fight.
Fight may cost him is life.
Flight is possible by opening the vault

1

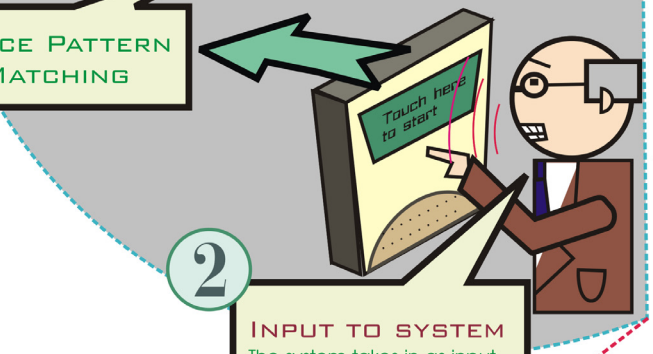


Input to system
The system takes in as input touch and voice passcode.

2

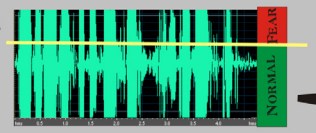
Voice Pattern Matching

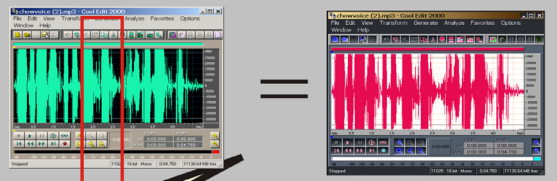
3



Voice Emotion Match

4





System Identifies fear Hence triggers caution

5

Condition = FEAR

Hidden Camera Gets Activated
This camera is not connected to the other security cameras
It takes pictures of the scene and sends it to the police

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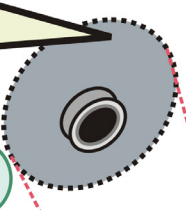

RFID tag
On one of the note bundle RFID gets activated. This starts transmitting location specific data

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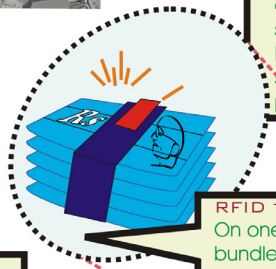
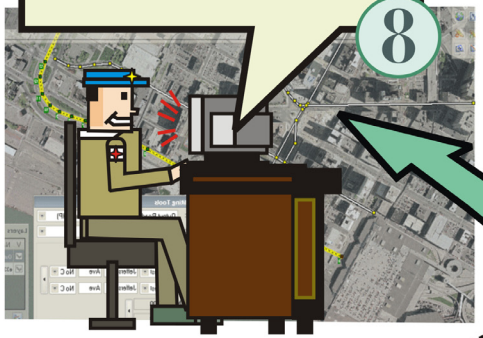


Information Transferred
The Police gets an alarm with:
- Pictures from hidden camera
- RFID tag detects location of the scene of crime

8



Tracked and Caught
The System thus allows the police to catch hold of the police easily and effectively

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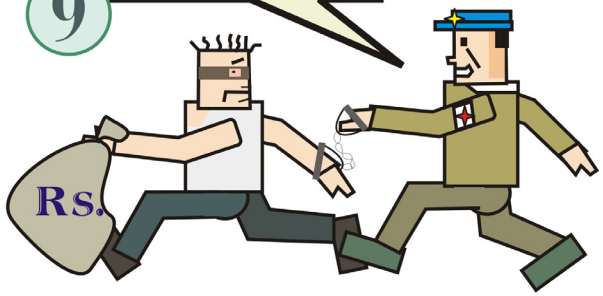


Voice Based Security
Interface Elements
Electronic Lock

It is a multimodal system since it allows access and control to the system via

Display

The display is used for visual feedback along with voice supporting the same.

Voice

The input is taken via Voice since authentication is based on voice.

Touch

A short experimental input of touch is also taken, however it is not a major player in the whole execution.

Voice Based Security
Scenarios of Use

The system can be used in three major scenarios

Panic State

When the Authenticated user is accessing the vault under the influence/ threat of an external entity, hence is in panic state

Normal State

When Authenticated user is accessing the vault in general manner

Setting State

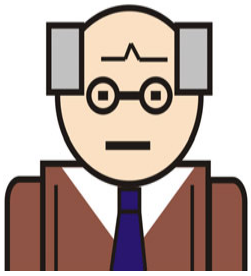
When the Authenticated user is setting the system with his credentials for access. For example: Setting the password.

Scenarios of Use
Personas

Lets consider the following personas for better understanding use scenarios.

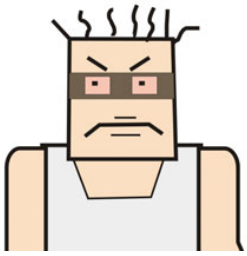
Bank Manager

He will be the person who will be authorized to open the vault. (Although the Cashier is also authorized, but lets assume one person for the time being.)



Gun Holder

The gun holder is the person who holds the Bank Manager at gun-point and asks for emptying the cash.



Police Monitoring Guy

This is the person who monitors for any alarms from registered bank. (or an intermediate service)

Scenarios of Use
Interaction

Normal State:

It's a normal Friday when cash is being transferred from another bank. The bank manager needs to open the vault. He follows the following steps:

1. He touches the screen

2. The system now generates a string of text for eg. " This is a Cat" (This is for the Voice Pattern Identification)

3. With the Display on the screen as well by a voice over the system now asks the user to read the generated text on the screen. This process ends after a beep.

4. The user now reads the text and waits for the feedback

5. If the system finds the voice pattern matching the system it gives a confirmation of acceptance on screen as well as with sound. Else it gives a feedback of
access denied and goes back to first screen.

6. If accepted it now transits to next screen after a short delay of 1 sec to show the display of the confirmation.

7. On the next screen the system asks the user to enter the voice pass-code. This is done via a screen display " Enter Voice Code" plus the voice over in the back ground. Followed by a beep sound.

Scenarios of Use
Interaction

8. The user now enters the voice pass code.

9. The system now verifies the passcode.
(this is for the Speech Pattern Identification)

10. If the passcode is verified then it allows the access. A visual and audio feedback is generated for the access verified.

11. The system triggers the latch (which may be magnetic or mechanical) and opens the latch.

12. The user enters the vault and transacts accordingly

13. The system display in the meanwhile changes to " press here to lock". Within 2 secs.

14. While closing the vault after the manual closure the user has to touch the screen again.

15. This will invoke a message on screen "Please enter voice passcode to close the vault". Beep.

16. Once the user enters the correct voice passcode. The system gives feedback of the action with a display "Vault Secured". The system closes the vault. If the voice passcode is not accepted the system keeps the vault open and closes the vault automatically after a set time.

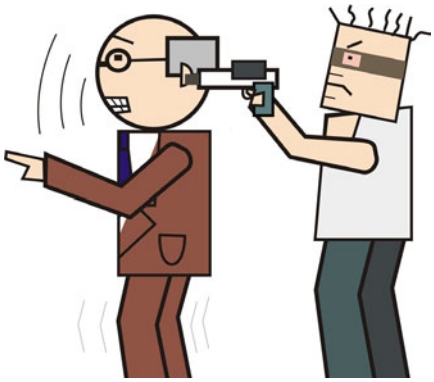
17) The system goes back to step one after 3 secs.

In a normal state since the voice emotion pattern is below the measured state of anxiety the system does not generated any panic state alarm.

Scenarios of Use
Interaction

Panic Situation:

The Robbery is announced and the bank manager is taken to the security lock after initial attempts of hardwire break in. After unsuccessful attempts the robbers try to get the manager at gunpoint to open the vault.
He follows the following steps:



1. He touches the screen

2. The system measures the body temperature and sweat indication of the bank manager.

3. If the temperature is higher than normal and sweat rate is high the system makes a record of the same.

4. The system now generates a string of text for eg. “ This is a Cat” (This is for the Voice Pattern Identification. The text is a unique text and allows the system to identify the voice modulation of the user).

5. With the Display on the screen as well by a voice over the system now asks the user to read the generated text on the screen.
This process ends after a beep.

6. The user now reads the text and waits for the feedback

7. If the system finds the voice pattern matching the system it gives a confirmation of acceptance on screen as well as with sound. It also checks for voice emotion ratio….if the voice pattern is above a particular frequency emotion like anxiety can easily be identified by the system. If identified by the system that the user is in panic situation. It records this. If Voice Pattern does not match it gives a feedback of access denied and goes back to first screen.

Scenarios of Use
Interaction

8.The system also indicates using a visual icon onscreen that the system has identified the state of panic. However this icon will be understood only by the manager as it is just a system icon for the burglar.

9. The system now activates the hidden camera in the vault, which is not connected to the main set of cctv cameras.

10. It also activates the Secret Location Identifier on the note bundles.

11. Now this data is sent across to the nearest police station wirelessly using a GSM or CDMA network which can be secure coded.

12. On the screen in the mean time there is a progress of " processing" and the system takes more time then the original.

13. The feedback for the acceptance of the voice pattern detection now takes more time.

14. After showing the acceptance. The system goes to next screen in 1 sec.

15. On the next screen the system asks the user to enter the voice passcode. This is done via a screen display " Enter Voice Code" plus the voice over in the back ground. Followed by a beep sound.

16. The user now enters the voice pass code.

17. The system now verifies the passcode.(this is for the Speech Pattern Identification)

18. Along with this the system also verifies the Voice emotion pattern again. With the secret camera it now also does image processing to check the type of weapons the burglars are carrying and further details.

19. If the passcode is verified then it allows the access. A visual and audio feedback is generated for the access verified.

20. The system triggers the latch (which may be magnetic or mechanical) and opens the latch.

Scenarios of Use
Interaction

21. The user enters the vault and transacts accordingly

22. The system display in the meanwhile changes to “press here to lock”. Within 2 secs.

23. While closing the vault after the manual closure the user has to touch the screen again.

24. This will invoke a message on screen “Please enter voice passcode to close the vault”. Beep.

25. Once the user enters the correct voice passcode. The system gives feedback of the action with a display “Vault Secured”. The system closes the vault. If the voice passcode is not accepted the system keeps the vault open and closes the vault automatically after a set time.

26. The system goes back to step one after 3 secs.

All other steps remain the same however the process becomes slow since time is the biggest aspect which the burglars don’t have and the policemen need.

Scenarios of Use
Interaction

Setting State:

The authorization of the device is done by voice. Hence it requires a prior recording of the expected voice pattern so that it can be compared.
Note that the voice is not compared when there is a comparison. It's like a DNA of the voice is encoded in binary or hexadecimal and it is compared. Hence in order to make the DNA there needs to be a proper initation phase.
The voice code and pattern setting portion is one of the most important because of two reasons:
a) Proper initiation process helps in proper functioning of the product
b) It can be used as a method to tweak into the system.

It is almost a one time activity. It may be done regularly but not frequently.

The process of settings cannot be done directly on the device in itself. It is done by an external device (Lets call it "Setting Device"). Assuming that it is a laptop which is kept with the security company of the bank and is brought to the bank only when setting of the voice authorization is required.
Since both the devices are machine synchronized no other device can tweak into the system and change the voice pass code.

Scenarios of Use

Interaction

The interaction during this phase will be as follows:

1. The External device is connected to the device.

2. The settings button on the main device is pressed to inform the system to change to settings mode.

3. The display shows “Settings Device Connected” once connected for one sec.

4. The device screen now displays the mode is now settings mode. By the display of text “Setting” at the left corner. With a Settings icon on the left. With a text “Please enter password”.

5. On the Settings device there is another interface which display which allows two major functions:

a) Setting Voice pattern Recording
b) Setting Voice Code Recording

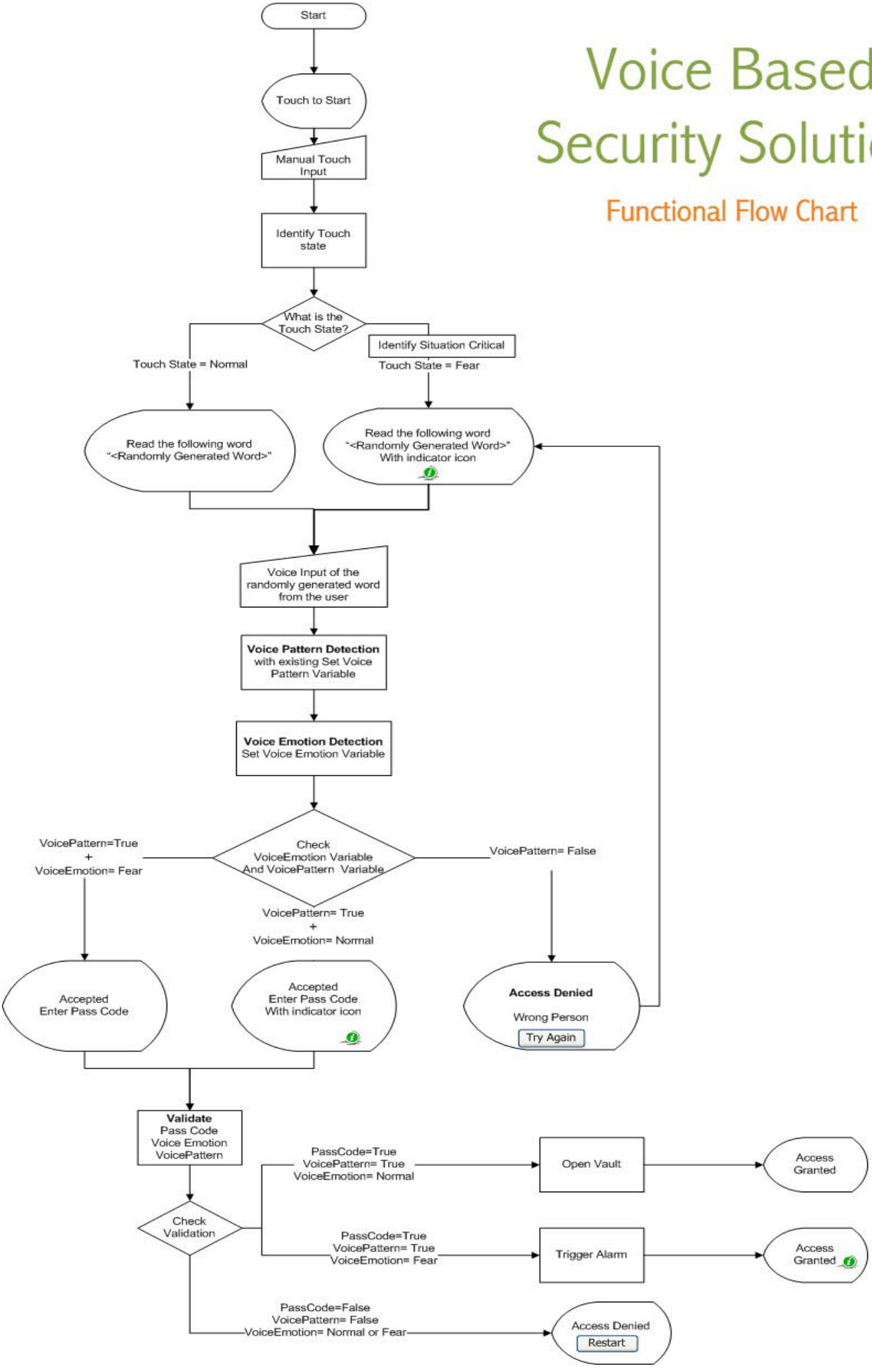
6. These tasks can now be controlled from the settings device.

7. The device screen now displays confirmation.

The combined interaction of the electronic lock can be seen in the flowchart alongwith.

Voice Based Security Solution

Functional Flow Chart



Design Details

Some of the components required to implement this design are:

1. Voice and Speech Recognition circuits.

2. Emotion processing through Speech recognition.

3. Temperature detecting touch screen.

4. The arrangement of electronic circuits for triggering the camera has to be thought over.

5. The technology for sending the location based information to the police.

6. The magnetic latch arrangement needs to be well understood.

Limitations and Drawbacks

1. Voice based emotion matching is still an upcoming field and hence implementation is difficult.

2. Testing such a device is a difficult task since the tests can be positive in only panic conditions.

3. The system needs to be trained for optimal performance.

4. Touch input plays an important role in identifying the way the system identifies the state of the user.

5. An electronic tweak needs to be handled

6. The system cannot exist standalone, it needs the support of manual system like key locks. Because these systems lay as the most important of all systems security wise.

Refrences

Web Based:

http://www.nationmaster.com/red/country/in-india/cri-crime&b_cite=1

http://findarticles.com/p/articles/mi_gx5205/is_1999/ai_n19125033

http://www.algy.com/anxiety/files/barlow.html

http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=122658

http://www.suite101.com/print_article.cfm/did/116939

http://www.kennish.com/robberythreat/

http://www.cops.usdoj.gov/

http://ezinearticles.com/?Physiology-of-Stress:-The-Way-the-Body-Responds-When-Stressed!&id=97310

http://www.cliving.org/stressthermometer.htm

http://instruct1.cit.cornell.edu/courses/ee476/FinalProjects/s2006/XL76_SL362/XL76%20SL362/

Refrences

Important Papers:

EMOTION AND COGNITION:
Insights from Studies of the Human Amygdala

Electronic Access Control Systems:
A new Approach:IISC Bangalore Janardhan Swamy

TRENDS in Cognitive Sciences Vol.8 134 No.3 March 2004

An Emotion-Aware Voice Portal
Felix Burkhardt*, Markus van Ballegooy*, Roman Englert**, Richard Huber***T-Systems International GmbH*, Deutsche Telekom Laboratories**,

Speech Emotion Recognition
DEA report by Julia Sidorova

Designing the Voice User Interface for Automated Directory
Assistance Amir M. Mané, Voice Advantage llc. Esther Levin, City University of New York

Emotion Recognition by Speech Signals
Oh-Wook Kwon, Kwokleung Chan, Jiucang Hao, Te-Won Lee