Advance Security warning system: Wireless technologies

Dr. Hameed Ullah Khan

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***Abstract*- This Article Communicated An Approach For Determining The Precise Position Of The Person By Applying Smart Card Contactless And Wireless Communication Technologies. To Accomplish This Idea The Whole Scenario Is Divided Into Three Phases. In The First Phase Data Is Collected From The Area, In The Second Phase Data Activation Takes Place From The Area, Whereas In The Third Phase Data Is Processed To Obtain The Required Results For The Target(S). This Paper Provided Details On The Second Phase. The Concept Of Wireless Communication And Smart Card Is Taken Into Account For The Activation Purpose. It Is Faster In Gathering Data About The Exact Location Of The Target. It Is Also Worth Noticing That This Approach Is Efficient, Accurate And Requires Very Less Processing Time As It Is Very Specific In Activation And Yield Results For Quick Actions.**

Keywords-Information technology, security system, wireless communication

I. Introduction

This is a proven fact in the modern medical sciences that all human bodies develop from a combination of stem cells, which matures to form a fetus and so on into a neonate. This procedure is natural, (until and unless, under certain circumstances where it may not be able occur naturally) the medical sciences adopt methods, such as that of a test tube baby, but still its final stage of conception is same as the natural process. Similarly, the processes of death or decay by different means are also same. Besides this, it is an established fact that every human on earth lives under the rules of law and secondly has the right of self defense. Than the question arises, that under what situation/circumstances, this human decides to commit this nonreversible evil act which is called suicide? Every person condemns this act. As it is said very correctly, those who commit suicide are abnormal humans, as normal human cannot accomplish such an act. So the basic difference is between normal and abnormal humans. Normal humans can control their emotions which are link to the limbic cortex systems in his brain, where as abnormal are not able to control his emotion. Many reasons may push him to this last decision/choice, such as, economical conditions, stress & tension from society, religious radicals' pressures, weak personality, mentally ill, drug addicts, uneducated, deprived [1 - 7]. In the war against terrorism, the immediate short-term objective is to reduce the incidence of terrorism by using counter-force. To successfully do so, access, collection and timely interpretation of intelligence information is critical. Technology can be deployed to secure, control, and deny critical access and information, in order to reduce the capabilities to inflicting damages. The current trends in technological development point toward a combined use of several technologies such as biological technologies, robotics, information technology, and nanotechnology in the fight against global terrorism. Developments in information technology facilitate data collection, analysis, security, and integration; robotics can facilitate remote surveillance, the distancing of dangerous substances from human control, while biotechnologies can facilitate identification of biological hazards, provide forensic tools [8 - 10].

Similarly, there is a budding collection of research in the computer and information sciences domains that addresses new algorithms, techniques, models, and methods for engaging in the battlefield with insights on everything from sensor and laser technologies to complex information discovery models. Research on terrorism is housed in the legal domain, philosophical studies (especially in ethics and law), management (especially crisis management), health sciences, and engineering sciences. There is, however, a dart of cross-disciplinary research that involves meshing of two disciplines, e.g., computer science and public policy [11, 12].

In this paper three major fields are brought under discussions together. Prime work is based on wireless communication and its implementation from the application point of view. Secondly, the response or echo from the object by using laser beam and problem associated with obstacles are observed. Thirdly, the proposed approach is introduced which is different from the existing techniques and technologies. Also the proposed approach will provide advanced information irrespective of the hazards or obstacles.

II. Background Study

The information communicated in this section is based on wireless communication and application of laser technology:

A. Wireless Communication

In wireless communication, the data applications with affordable Quality of Service (QOS) over wireless networks are the demand in present and future generations. Scheduling at packet level in wireless networks is an important issue to be dealt. This motivates development of schedulers that can deliver the required QOS and being resource efficient. Wireless network, resource allocation

About-Department of Information Systems,
College of Computer & Information Sciences,
King Saud University, Kingdom of Saudi Arabia
E-mail;- hukhanafridi@yahoo.com E-mail;-hkhan@ksu.edu.sa

schemes and scheduling policies are roles in providing service performances guarantees, such as throughput, delay, delay-jitter, fairness, and packet loss rate [13].
Scheduling algorithms are studied in detail [14]. Various scheduling schemes are developed – A common objective isto improve/maximize system performance, e.g., throughput under various fairness and QOS constraints [15].

Wireless fair scheduling policies are discussed [16]. Several non work-conserving disciplines have been proposed: Jitter Earliest-Due-Date (Jitter-EDD), STOP-AND-GO Queuing (SGQ), Hierarchical Round Robin (HRR), and Rate-Controlled Station Priority (RCSP). Varieties of scheduling algorithms have been proposed for data services [17 - 21]. Scheduler's main task is to distribute the available bandwidth in a fair manner, among different simultaneous data flow scheduling policies of wire line networks are extended to wireless networks, where burst of errors in wireless channels are taken into account.

In this section, the detailed information is communicated regarding scheduler performance, function, operation of algorithm, classification, etc.

B. Networks and Performance

Schedulers are designed to multiplex a diverse set of packet flow and still be able to provide QOS [15]. In general, problem of scheduling in communication system are with possible exception of transmission errors (high error rate & burst errors, location-dependent and time-varying wireless link capacity, scare bandwidth, user mobility & power constraint of mobile hosts) [15]. Scheduling disciplines and associated performance problems have been widely studied in packet-switched networks [22].
Switch/router which buffers the traffic on the out port, the buffered packets are scheduled, or multiplexed for transmission on the shared common line. In the above case scheduler has updated information of all the parameters that effect scheduling decision, e.g., Buffer states, QOS parameters, which show quickness, react on any event. Thus, performance is essentially determined by packet arrival process, queuing discipline & packet transmission time. Best-effort traffic is equally important to study performance parameters; throughput & fairness are special interest.
Wireless communication network consists of nodes that communicate with each other over a wireless channel. "In fracture wireless network", such as cellular networks, are widely prevalent, typically consist of wired infrastructure of controllers (base stations), with nodes connected over wireless link. "Infrastructure-less networks", such as ad-hoc networks, consists of purely wireless links.
Ad-hoc wireless networks allow speedy deployment, low cost & low maintenance, which lead towards applications such as sensor networks, personal area networks & military battle-field communications.
Scheduling is dealt in design of wireless network, at the link layer & relaying on data packets (routing) at network layer. Medium Access Control (MAC) is the process of scheduling the shared wireless channel between competing nodes.

C. Scheduler Components and Properties

In Wireless environments, the scheduling task becomes more difficult if channel conditions are taken in account, scheduling algorithms provide mechanisms for bandwidth allocation and multiplexing at packet level. Wireless scheduling algorithms, specifies algorithms consisting of five components [23, 24].
Algorithms can be used for any of the listed below mechanisms:
1) Error-free service model
2) Lead & Lag model
3) Compensation model
4) Slot Queues & pack Queues
5) Channel monitoring and perdition

Scheduling algorithms are important to provide guaranteed quality of service parameters such as delay, delay jitter, packet loss rate, or throughput.

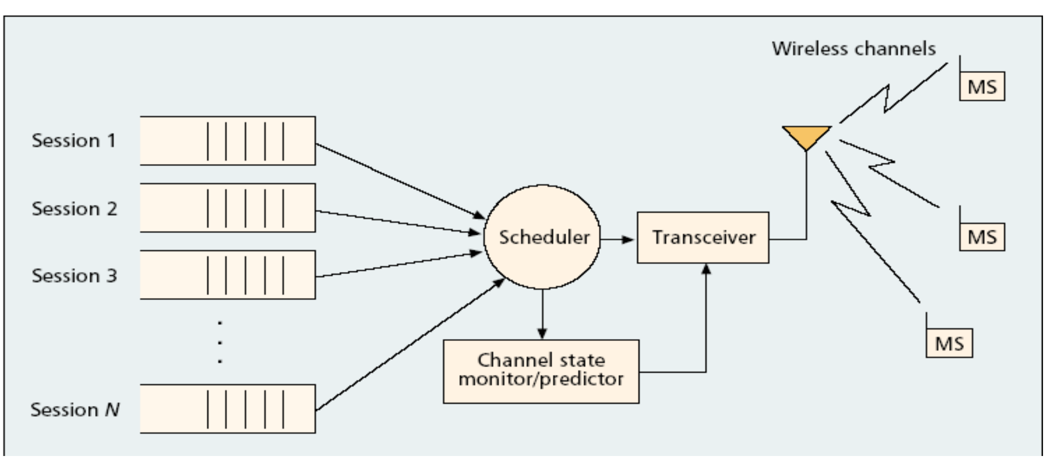

Figure 1: Typical Scheduler

In Figure 1, the scheduler operates across different sessions (connections or flows) in order to ensure that reserved throughputs are met. Main function of a scheduling algorithm is to select the session whose head-of-line (HOL) packet is to be transmitted next [22].

D. Classification of Schedulers

Schedulers can be classified as *work-conserving or non-work-conserving* [23, 24].

***Work-conserving* scheduler:** is never ideal if there is a packet awaiting transmission, e.g., Generalized Processor Sharing (GPS), packet-by-packet GPS also know as Weighted Fair Queuing (WFQ), Virtual Clock (VC), Weighted Round-Robin (WRR), Self-Clocked Fair Queuing (SCFQ) and Deficit Round-Robin (DRR) [22].

***Non-work-conserving* scheduler:** may be ideal even if there is a back logged packet in the system because it may be expecting another higher-priority packet to arrive, e.g., Hierarchical Round-Robin (HRR), Stop-and-Go Queuing (SGQ), and Jitter-Earliest-Due-Date (Jitter-EDD). Non-work-conserving schedulers generally have higher average packet delays than their counter part work-conserving.

E. Scheduler performance

Following are a few main scheduler performances:

***Time-stamped* scheduler:** is one that serves packets according to their timestamp values. Incoming packets are time stamped before being placed in their respective session queues. The HOL packets are sorted in increasing order of their timestamps, and the packet with the lowest timestamp value is selected for transmission. Time stamped schedulers can provide better QOS guarantees.

***Round-robin* schedulers:** do not use timestamps and can be more easily implemented.

***Sorted-priority* scheduler:** each session has a different priority level and packets are chosen for transmission according to their session priority, e.g., VC, WFQ, and Jitter-EDD.

***Frame-based* scheduler:** time is divided into frames of fixed or variable size. Each session reserves a portion of the frame for transmitting its packets.

F. Cell-structured wireless networks

In these networks, the service area is divided into cells, and each cell has a base station. Cell mobile hosts communicate via the base station, and base stations are connected via wire line networks.

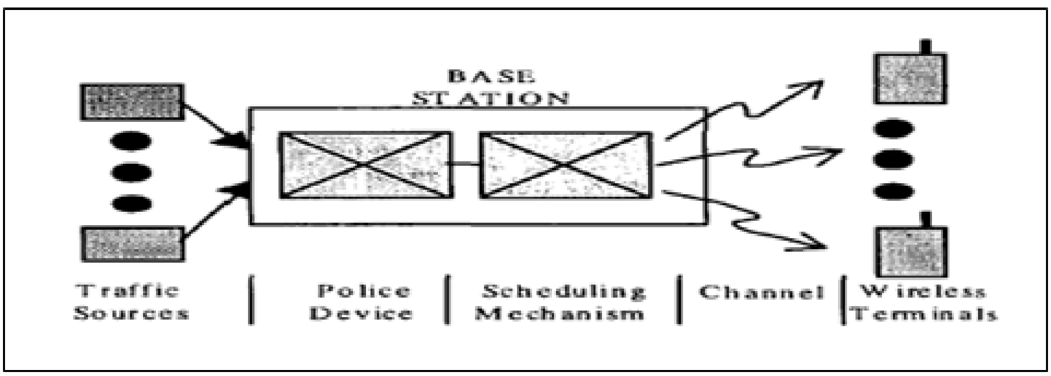

Figure 2: Base Station

In Figure 2, the base station is responsible for scheduling both downlink (from base station to mobile hosts) and uplink (from mobile hosts to base station) packet transmission between the mobile hosts and itself. The communication between a mobile host and a base station may consist of more then one traffic flow (or session). The wireless links between a base station and each of the mobile hosts are independent of each other.

Wireless links are subject to burst errors. A two-state Markov channel model is used for the state of wireless link, which is either of the two states: *good state (error-free)* or *bad state (error)* [23].

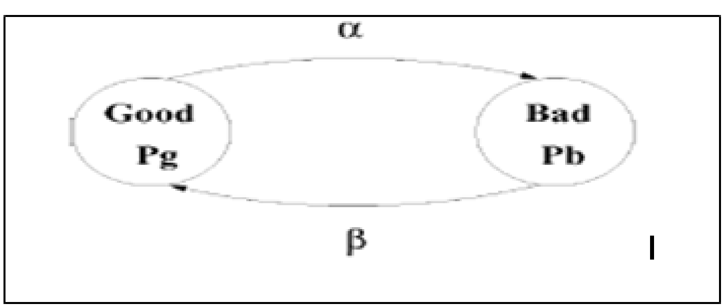

Figure 3: Good/Bad states

In Figure 3, the transmissions between the two states occur randomly. In a *good* state (Pg = Good packet), the wireless link is assumed to be error-free. If a link is in *bad* state (Pb = Bad packet), packets transmitted on the link will be corrupted with very high probability.

G. Application of Laser Technology

The use of LASER **C**ertainty for detection in every encounter, even if that reduces the possibility of advance warning. One must choose between these alternatives since they turn out to be mutually exclusive. A blend of both is possible if it accept that neither will be maximized [25].
In the real world, every laser encounter is different. The complicating factors are:

- The amount of sunlight (direct, reflected, or scattered) in the detector's field of view,
- The color of the human/vehicle in which the detector is installed,
- The distance from the laser gun,
- The location of the laser trap, and
- The space between the laser trap and the detector.

Sunlight interferes with laser reception. You can regard sunlight as the equivalent to background noise while trying to listen for weak sounds. Laser gun photons and the near-infrared components of sunlight are indistinguishable. Detrimental sunlight can be directly shining into the detector (the worst), or reflected and scattered by the world at large. The V1 has a specially tailored field of view to exclude "background glow" from areas that are unlikely to contain laser signals (obstacles, way high, way low, or off to the side).
The color of the human dress or vehicle can influence the amount of sunlight reflected from the hood into the detection optics. White, silver, and bright or metallic colors in general are 100 times more likely than to reflect competing light into the detector.
The pencil-thin beam of the laser gun expands with distance. The actual beam is only several feet wide at 500 feet, but "aiming wobble" introduced by the human holding the bulky gun make the detectable beam at least three times larger. Even without the wobble, it covers most of the place/roadway after a mile. This means it is actually much easier to find a fragment of the beam at greater distances from the laser trap. At short ranges, the beam may be so concentrated that a detector mounted away from the aim point on the human/vehicle may not be able to pick up enough stray energy to activate an alarm [26].
The detector needs a fragment of the direct laser beam, or at least a low angle reflection or glint of it. The beam is a straight line. If, for example, the laser is measuring human, the beam cuts across the obstacles, touching it only briefly. If the obstacle is even moderately tight, all laser energy that misses the target will soon be off the location and therefore out of play for the detector in any other person. While that setup may sound ideal as an enforcers' strategy, it also increases the probability of phony readings because of swiping error.

Obstacles ahead may block (bad), or reflect (good), the laser energy from a distant laser trap. The chances of blockage are considerably greater than a lucky reflection. Light obstacle is an advantage because there are other obstacles ahead serving as bait for the laser. A shot at them is a chance for detector to warn. Heavy obstacles, especially if dominated by any material, is bad because there can be nearly 100% line-of-sight blockage until its turn to be the target.
Now that we have the facts, let’s put them into a defense system. If one's objective is never to miss a laser encounter, it is recommend for mounting the detector as close to the typical laser aiming points as possible. Here in the US, most laser operators aim at the front license plate since it is usually made with a special reflective treatment to aid night-time visibility (works great for laser visibility too, day or night). If there's no front plate, then a piece of bright metal can be the next most promising aiming point.
Advanced warnings (a warning in time to do some good) are more likely if one can avoid some problems caused by the low position. Advance warnings require the greatest possibility of receiving a weak fragment of the beam while it is being used on a good distance ahead. To maximize reception of weak signals, one must reduce blockage and interference.
Mounting high on the position the detector to "see" through the windows of most buildings/vehicles. Glass is a good thing for the detector to see; it can scatter reflections in direction. Sometimes it develops a glow, or a bloom, when the beam strikes, giving yet another chance for advanced warning.
Mounting high on effect of sunlight reflected from the hood, which increases the detector's ability to find weak beam fragments. Daytime warning sensitivity is completely dominated by how one manages the sunlight.
Mounting high behind reduces the laser signal somewhat, but it reduces the sunlight contamination by the same amount. The result is an unchanged laser-to-sunlight ratio from the scene beyond, but with reduced hood reflections owing to a higher vantage point—a net gain.
The downside of the move away from the most common aiming points, this means that in bright sunlight, you may miss the occasional direct hit from very close range—no detection at all! But that's possible with a low obstacle as well, just not as often. Finally, a warning too late is the same as no warning.

The proposed approach will pass on the information irrespective of the above hazards or obstacles mentioned above while facing in the use of laser approach [27 - 29].

III. Proposed Approach

Many countries, are using different approaches, such as scanning machines, introduced identity cards, walk through gates and passports with a fingerprint and facial (eye) biometric/facial-recognition and fingerprint-biometric technologies for their immigration control, etc., but it gives only the information, whereas advance actions have not been developed yet to stop the attacker. The attacker always assaults before the security personal reaches him or during the search. Another experience is also reported which is common among these attackers is that they don't leave any identity such as social security card, national identity card, etc, so it's not possible to find his nationality, address, etc. Let suppose, Figure 4 below represent's a crowd, where every small circle represents a single entity, as a human. The size of Figure 4 may be any it will not reduce the efficiency of algorithm, only the number of Main-Grids will increases which will cover the size of crowd.

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Figure 4: Crowded area

As the Main-Grids used on top of the crowded areas, through which each Mini-Grid will be activated and then the cells in-side will be activated, which is the source of information. Each Main-Grid composed of 10 Mini-Grids, starting from 00 and terminating at 09. In return each Mini-Grid comprising of 10 x10 cells. Each cell will be reporting for 100 people. Therefore, the complete one Mini-Grid will have the capacity of 100 x 100 people for reporting [29].
The proposed approach has to find the exact location of the attacker(s). For this purpose the algorithm is applied to collect information from the crowded area by using Mini-Grid, as shown in Table 1.

Table 1: Main Grid & Mini-Grids with Sub-sections

Main-Grid-0												
Mini-Grid-00			$Column_0$	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
	Sub-Section 0	Row_0	$G_{00}R_0C_0$									
	Sub-Section 1	R_1										
	Sub-Section 2	R_2										
	Sub-Section 3	R_3										
	Sub-Section 4	R_4										
	:	R_5										
	:	R_6										
	:	R_7										
	:	R_8										
	Sub-Section 9	R_9										

To achieve information, Table 1 is traced on top of Figure 4. The division of crowd will be reported as shown in Table 2.

Table 2: Combined representation

Main-Grid-0												
Mini-Grid-00			C_0	C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9
	Sub-Section 0	Ro	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
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			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	Sub-Section 1	R_1	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	Sub-Section 2	R_2	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	Sub-Section 3	R_3	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	Sub-Section 4	R_4	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	:	R_5	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	:	R_6	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	:	R_7	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	:	R_8	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
	Sub-Section 9	R_9	0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00
			0000000000	0000	00	00	00	00	00	00	00	00

As explained earlier, each cell has the capacity of 10x10 people to cover. For example, notice at position Row-9 and Column-0 (R_9C_0) it records 100 people. Therefore the total capacities of one Main-Grid for only one Mini-Grid will have 100 x 100 people. In case if an area is large enough and can not be covered by one Mini-Grid, then another Mini-Grid will be applied to cover the area. And if one Main-Grid is not sufficient, then more Main-Grids are applied with the same structure but different Main-Grid addresses.

A. Mobile Technology and Smart Card

Mobile phones are the backbone of mobile communications and have experienced explosive growth. Currently, the third-generation mobile phones (3G mobiles) that aims to offer high-speed 2M/second communication using a greater transmission efficiency in the high frequency 2GHz band and more. This will allow multi-media communication (such as animated images), a typical example of which is viewing TV on a mobile phone.

Imminent is the practical application of new technology called "3.5G" which realizes further high-speed data communication by developing the technology base of the 3G mobile. This not only realizes maximum 12Mbps transmission speed but was developed with fixed-rate communications in mind, so together with the high transmission speed of maximum 12M bits/second, a cheaper and more comfortable mobile environment is about to be realized.

There are many different names for the smart card, for example IC-card, microprocessor card, electronic card, etc. Nowadays Smart card contains semiconductor device (chip) and a data link for data communication between the smart card and databases. Based on needs and use smart card is of two types as explained below.

B. Schematic of Contact Smart Card

Contact smart cards have a contact area, comprising several gold-plated contact pads, that is about 1 cm square. When inserted into a reader, the chip makes contact with electrical connectors that can read information from the chip and write information back. Figure 5 shows a common version of a contact smart card. A cavity is produced in the card body and into this cavity a chip module is bonded with an adhesive. The chip which is connected to the outer side contacts through thin gold wires. The contacts are defined by international standards in their number, size and position, hence the function of each smart card reader is guaranteed over the world [30].

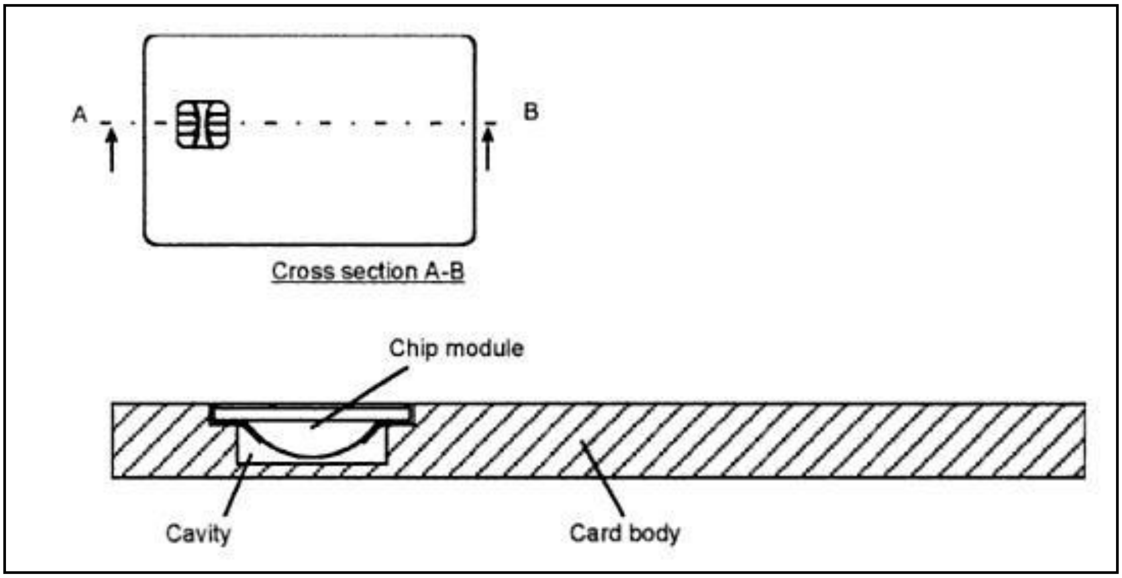


Figure 5: Schematic of Contact smart card

C. Schematic of Contactless Smart Card

A second type is the contactless smart card, in which the chip communicates with the card reader through RFID (Radio Frequency Identifier) induction technology. These cards require built-in antenna to complete transaction. They are often used when transactions must be processed quickly, such as on mass transit systems. Figure 6 shows a common version of wireless contact smart card. In these cards a subscriber identity module (SIM) for the identification of the user is made in the network. Typical applications are tickets for sports events, public transport systems and security checks [31].

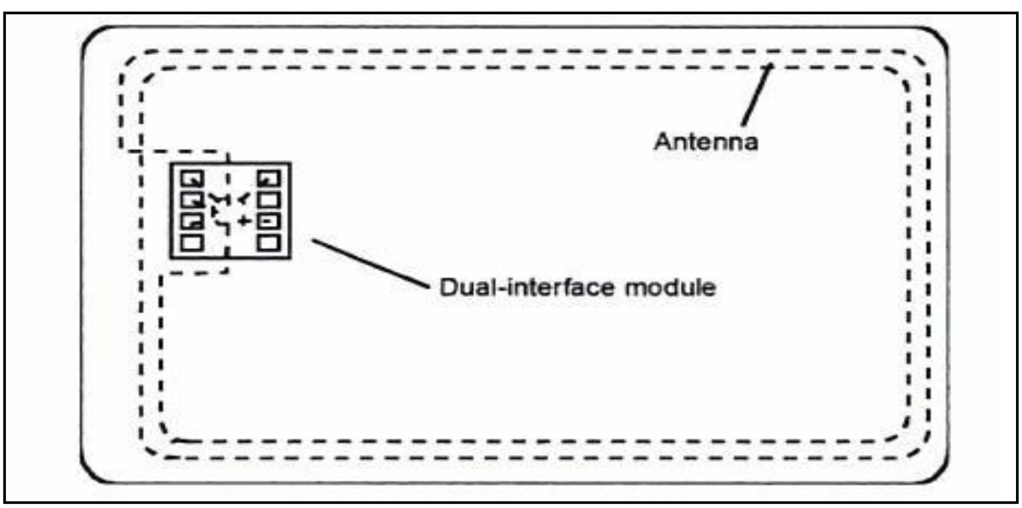


Figure 6: Schematic of smart card without contact

D. Proposed Approach

The proposed approach for activation information depending on the contactless smart card, as shown in Figure.7

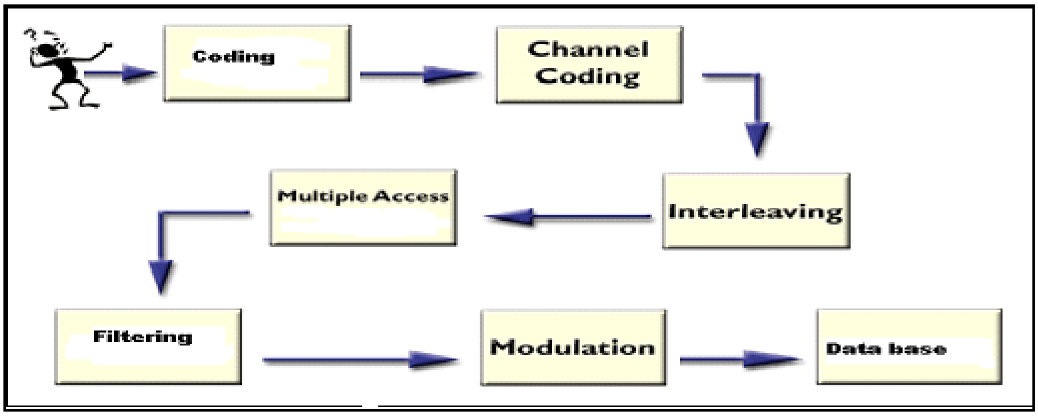


Figure 7: The proposed approach structure

Coding; is performed in a digital communication and therefore it must be converted to a digital bit stream and then uses the redundancy in the signal and achieve a bit rate. Channel coding; once the signal has been coded into a digital bit stream, extra bits are added to the bit stream so that then it can be recognized and correct errors which could have occurred during communication. Interleaving; is the processes of rearranging the bits, it also allows the error correction algorithms to correct more of the errors that could have occurred during communication. By interleaving the code, there is less possibility that a code can be lost. Multiple accesses; allow many codes at the same time. The transmission of the signal is continuous but the data is transmitted in series. The assembly operation takes the final encoded data before the database. Filters; are used to remove noise, which also give early indications for possible existence of targeted data. Modulation; Modulation changes the '1' and '0's in a digital representation to another

E. Smart Card Activation

Smart card is based on the mobile technology approach as shown in Figure 8. When the signal is sent; to the Main-Grids mainly people, the response monitored in shape of echo signal received then it is 100% clear place. Because on many occasions, the attacker doesn't leave any traces of information leading to his identity. They do not leave any record at all to give evidence/details of that person.

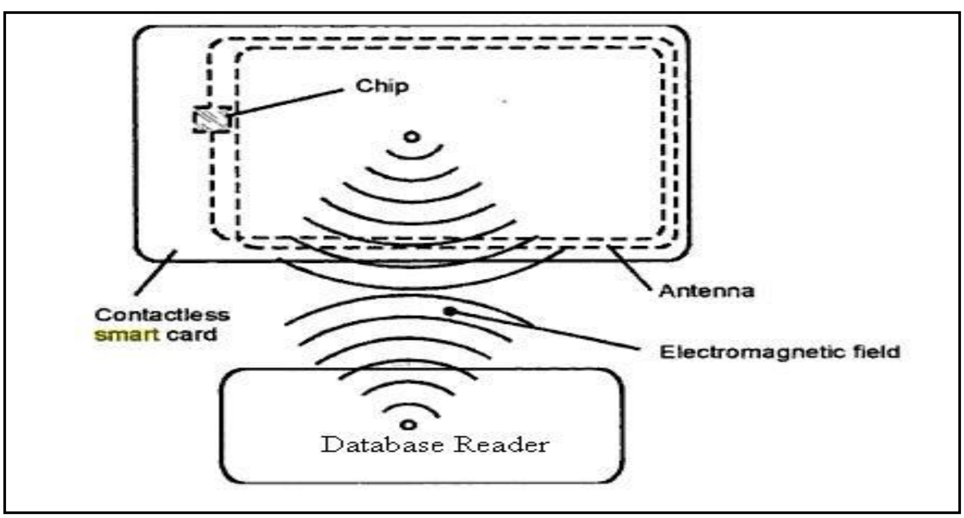
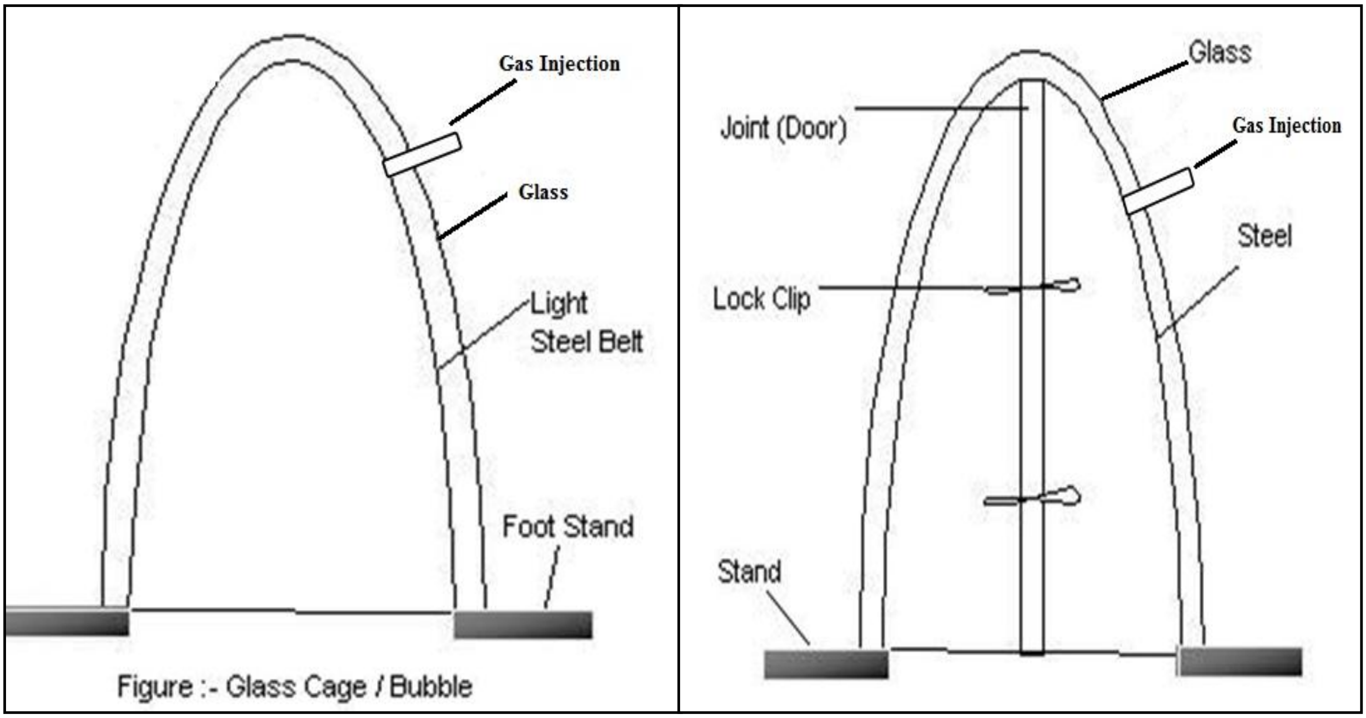


Figure 8: The proposed smart card activation paradigm

]On the other hand the damage is not stopped. Moreover, he got out of the situation and his mission was accomplished. Our concern is to reverse the situation by stopping him from both destruction and to catch the attacker alive; the later case is not yet possible. But if the signal received is negative from one or more locations than these are the expected places of such individuals.

F. Controlling the attacker

The proposed approach gives the concept of cage/bubble to be used at the time of search and to curb the attacker. It is reported that attacker normally blows himself up at the spot while security personnel are busy in searching his body. To control such situations it is suggested to use the cage to cover the attacker first. The cage is designed in two types as shown in Figure 9.



Design (a)

Design (b)

Figure 9: The cage/babble design (a) & (b)

The inner side in both types are made up of light weight, fire protected steel and the outer side is made up of bullet, chemical, heat and shock proof glass. So the search carried out inside the glass cage while the security person is standing out side on the foot stands out side the cage to search the attacker by asking him to take off his shirt because jacket/explosives are always placed on the abdominal part of the body and occasionally a small fire arm that can be seen easily from the out -side as the cage is transparent. Normally the attacker attitude is very non-cooperative, therefore a gas tube is places on the top of the cage so if he refuses to obey the orders then mild gas (injected as an inhaler to give anaesthesia) will be injected through the inlet in the cage to make the attacker unconscious for a short period and it will be possible to curtain him without causing any damage [32].

The design of cage is of two types: one is in single piece and other in two pieces. Two pieces means that it opens when one stretches his arms in outer direction and if you wanted to close then press the arms in inner direction. There are hinges so it is half open and when engulf some one it is closed.

IV. Conclusions

The use of cage seems to be impossible. In case if the attacker is not stopping then the security can injure him by shooting him on his legs and can then place a cage on top of him. So if he is for sure an attacker, than he is incapacitated while inside the cage.

The foremost approach is to look into the problems of such people, whether it's their economical problems, it's a stress based, religious based or else, but it must be resolved rather than using force to eliminate. If one is finished then many other emerge. Deaths of such individuals only serve to inspire others of like mind and also as rallying calls for others. This is a very wrong strategy by using force; matters must be resolved at grass roots level by dialogue and try to use psychology rather then force on human. This has also been noticed that during the attack, he is mentally ready to blow up his life/body and give maximum damage. The situation is to handle a surprise which is almost impossible to know beforehand what is in his mind. Therefore the use of modern approaches and technology must come in use to reduce damage as surprise on the attacker is reverted so he will be curtailing beforehand. As someone said very correctly, do it to them before they do it to us. That's why the quick action along with prior awareness to handle the prevailing conditions and warning, they must combine together to handle such sudden situation. Again someone said wisely, a warning late is the same as no warning.

V. Future Directions

Scheduling in Wireless Networks is applied in the latest technologies of wireless communication, such as Bluetooth, Infra Red, etc. It can be used and enhanced in other related areas of communication. The proposed approach will apply in many other areas for information gathering even helping police departments to reduce the crime rate.

VI. Acknowledge

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