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AUTOMATIC HUMAN DEFENCE SYSTEM USING NANOIDS

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Abstract: Nano-biotechnology is now becoming an emerging field that is going to bring a lot of changes in the current century of technological revolution. It is a one part of NANO-TECHNOLOGY.Apart from its participation in all fields, the part of Nano's in human science and medicine is large. Nano medicine is the process of diagnosing, treating, preventing disease and traumatic injury, of relieving pain, and of preserving and improving human health, using molecular tools and molecular knowledge of the human body. Our paper mainly concentrates on implementing Nano robots in detecting human physiology and human security. This paper mainly concentrates on implementing nanorobots in securityusing communication between nanorobots and macro machines. In this paper we have two ideas.One is using nanorobots for internal security of human body(providing artificial immunity) by introducing Nano sensors and nanorobots.The second part of our paper mainly deals with providing external security using an instant transmitter for emergency communication in both manual and automatic (nanorobot) modes.Sensorsareemployedin nanorobots to form a network among themselves without anyexclusive infrastructure, tocommunicatewithother nanorobots and with the centralized computer system.The sensorused here is created by combining sensing material with integrated circuitry, they consume limited power andpossess excellentcomputational ability. In case of any failure in the centralized computer system or in nanorobots they are pre-programmed for this exceptional case to move to the excretory organ of the body from which they can be easily taken out and sends information to the human (user).

Keywords*:* Nano-Technology, Nanorobots, DNA PROFILING, Human security Nanoids.

I. INTRODUCTION

Security is the degree of resistance to, or protection from, harm. It applies to any vulnerable and valuable asset, such as a person, dwelling, community, nation, or organization. Security can be provided in many ways using various technologies, but to provide security to human, in this paper we choosenano technology Using nano technology security for human can be provided in two ways i.e1. Internal security 2. External security. Nanotechnology is "Research and technology development at the atomic, molecular and macromolecular levels in the length scale of approximately1-100 nanometer range, to provide a fundamental understanding of phenomena and materials at the nanoscale and to create and use structures, devices and systems that have novel properties and functions because of their small and/or intermediate size."

NANOROBOTS

A nanorobot is a specialized nanomachine designed to perform a specific task or tasks repeatedly and with precision. Nanorobots have dimensions on the order of nanometers (a nanometer is a millionth of a millimeter, or 10-9 meter). Three microns is

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about the maximum size for bloodborne medical nanorobots, due to the capillary passage requirement.

In this paper we use DNA profiling for providing optimum human security in terms of both crime and sympathetic conditions

DNA PROFILING

DNA profiling (also called DNA testing, DNA typing, or genetic fingerprinting) is a technique employed by forensic scientists to assist in the identification of individuals by their respective DNA profiles. DNA profiles are encrypted sets of numbers that reflect a person's DNA makeup, which can also be used as the person's identifier. DNA profiling should not be confused with full genome sequencing. It is used in, for example, parental testing and criminal investigation.

Fig1: DNA profiling

Although 99.9% of human DNA sequences are the same in every person, enough of the DNA is different to distinguish one individual from another, unless they are monozygotic twins. DNA profiling uses repetitive ("repeat") sequences that are highly variable, called variable number tandem repeats (VNTRs), particularly short tandem repeats (STRs). VNTR loci are very similar between closely related humans, but so variable that unrelated individuals are extremely unlikely to have the same VNTRs.

INJECTION OF NANOROBOTS

Nanorobots can be injected into the body by means of one-centimeter cube needle(containing billions of nanorobots).If theinjection of nanorobotsare not possible to inject directly into the affected region the nanorobots are injected in the nearby region and they are pre-programed to move to the particular region. Virtually all of these billions of nanites (in the 1 cm3) will be smart enough to show up at the correct group of cells that are targeted for destruction, so delivery efficiency is virtually 100%. Onboard sensors can test for ambient levels of the chemical agent, to prevent overdose.

Fig 2: Injecting Nanoids Sensors

We need two types of sensors. Long-range sensors will be used to allow us to navigate the site of the unwanted tissues and victims.These would be used during actual operations, to allow the device to distinguish between healthy and unwanted tissue and detects the changes in the body.

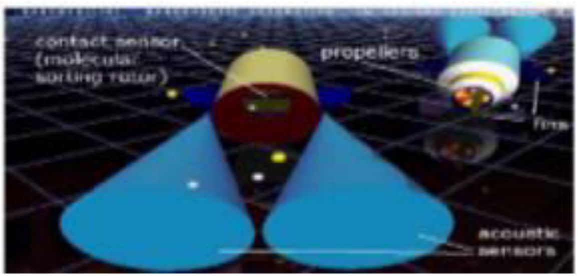

Fig 3: Appearances of Nano Sensors

Another important use for sensors is to be able to locate the position of the microrobot in the body. First, we will examine the various possibilities for external sensors. These will be at least partially external to the microrobot, and their major purpose will be twofold. The first is to determine the location of the operations site; that is, the location of the clot, tumor or whatever is the unwanted tissue. The second purpose is to gain a rough idea of where the microrobot is in location and what type of help a victim is need. This information will be used to navigate close enough to the operations site and to detect culprits that short-range sensors will be useful.

PROTOTYPEFORNANO-ROBOT DESIGN

Nanorobots, like their larger counterparts, can be categorized into two groups, called autonomous robots and insect robots. An autonomous nanorobot contains its own on-board nanocomputer, which controls the machine and allows it to operate independently. An insect nanorobot is one of a fleet of several, or many, identical units that are all controlled by a single, central computer. (The term insect comes from the fact that such robots resemble ants in an anthill or bees in a hive.)

II. INTERNAL SECURITY

Internal security involves in providing security for internal organs and circulatory system of a human being as an artificial immune system like detecting diseases, eliminating viruses, blood clots, cancer cells, tumors etc., because a entire nanorobot which freitas dubbed a respirocyte, consists of 18 billion atoms and hold up to 9 billion and molecules or just over 235 times the capacity of a human red blood cells. This is possible because of the diamond structure supports greater pressure than human cell.

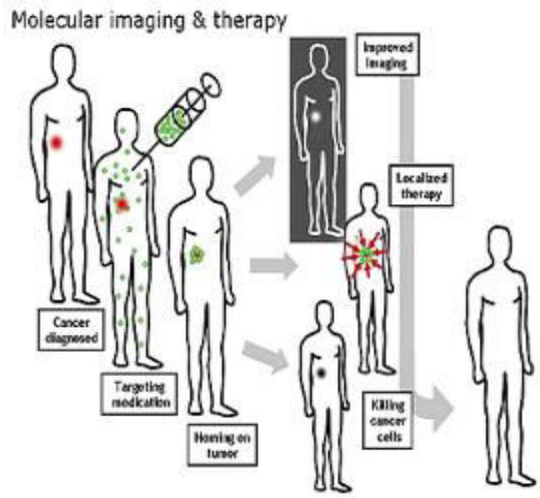

Fig4: Process of internal security movement ofdevice around the body

We start with a basic assumption: that we will use the circulatory system to allow our device to move about. We must then consider two possibilities: (a) carried to the site of operations,(b) to be propelled. The first possibility is to allow the device to be carried to the site of operations by means of normal blood flow. There are a number of requirements for this method.We must be able to navigate the bloodstream; to be able to guide the device so as to make use of the blood flow. This also requires that there be an uninterrupted blood flow to the site of operations. In the case of tumors, there is very often damage to the circulatory system that would prevent our device from passively navigating to the site. In the case of blood clots, of course, the flow of blood is dammed and thus our device would not be carried to the site without the capability for active movement. Another problem with this method is that it would be difficult to remain at the site without some means of maintaining position, either by means of an anchoring technique, or by actively moving against the current.

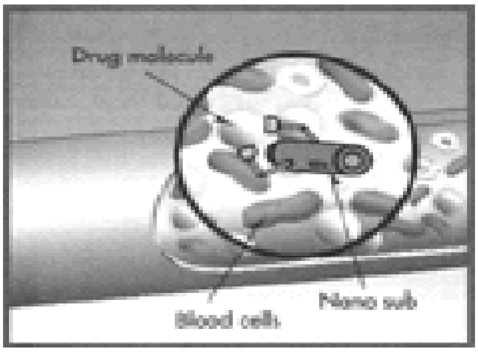

Fig 6: Nano Sub

There are a number of means available for active propulsion of our device.

1.Propeller:

An electric motor that fit within a cube 1/64th of an inch on a side is used. This is probably smaller than we would need for our preliminary microrobot. One or several of these motors could be used to power propellers that would push (or pull) the microrobot through the bloodstream. We would want to use a shrouded blade design so as to avoid damage to the surrounding tissues (and to the propellers) during the inevitable collisions.

2.Cilia/flagellae:

we are using some sort of vibrating cilia (similar to those of a paramecium) to propel the device. A variation of this method would be to use a fin-shaped appendage. While this may have its attractions at the molecular level of operation,

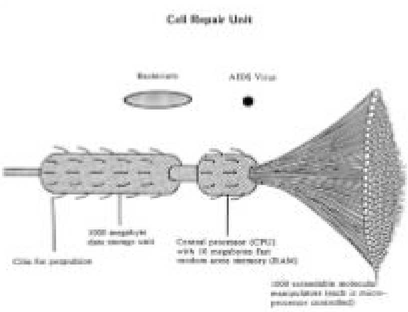

Fig 6: CELL REPAIR UNIT

3.Crawl along surface:

Rather than have the device float in the blood, or in various fluids, the device could move along the walls of the circulatory system by means of appendages with specially designed tips, allowing for a firm grip without excessive damage to the tissue. It must be able to do this despite surges in the flow of blood caused by the beating of the heart, and do it without tearing through a blood vessel or constantly being torn free and swept away.

Fig 7: Along the Wall of Vessel

For any of these techniques to be practical, they must each meet certain requirements:

The device must be able to move at a practical speed against the flow of blood. The device must be able to move when blood is pooling rather than flowing steadily. The device must be able to move in surges, so as to be able to get through the heart without being stuck, in the case of emergencies. The device must either be able to react to changes in blood flow rate so as to maintain position, or somehow anchor itself to the body so as to remain unmoving while operating.

we consider the case of internal sensors. When we say internal sensors, we mean sensors that are an integral part of the microrobot and are used by it to make the final approach to the operation site and analyze the results of its operations.These sensors will be of two types. The first type will be used to do the final navigation. When the device is within a short distance of the operation site, these sensors will be used to help it find the rest of the path, beyond what the external sensors can do. The second type of sensor will be used during the actual operation, to guide the microrobot to the tissue that should be removed and away from tissue that should not be removed.

(1) Chemical: Chemical sensors can be used to detect trace chemicals in the bloodstream and use the relative concentrations of those chemicals to determine the path to take to reach the unwanted tissue. This would require several sensors so as to be able to establish a chemical gradient, the alternative would be to try every path, and retrace a path when the blood chemicals diminish. While it is not difficult to create a solid-state sensor for a given chemical, the difficulty increases greatly when the number of chemicals that must be analyzed increases. Consequently, we would probably need a series of microrobots, one for each chemical, or at least a set of replaceable sensor modules

(2)Spectroscopic:

This would involve taking continuous small samples of the surrounding tissue and analyzing them for the appropriate chemicals. This could be done either with a high-powered laser diode or by means of an electrical arc to vaporize small amounts of tissue. The laser diode is more practical due to the difficulty of striking an arc in a liquid medium and also due to the side effects possible when sampling near nerve tissue. The diode could be pulsed at regular intervals, with an internal capacitor charging constantly so as to provide more power to the laser diode than the steady output of our power source.

(3)TV camera

This method involves us having a TV camera in the device and transmitting its picture outside the body to a remote-control station, allowing the people operating the device to steer it. One disadvantage of this technique is the relatively high complexity of the sensors. On the other hand, solid-state television sensors are an extremely well developedtechnology, and it should not be difficult to further develop it to the level needed. This could be combined with the laser diode at low power.

Means of treatment:

The treatment for each of the medical problems is the same in general; we must remove the tissue or substance from the body. This can be done in one of several ways. We can break up the clump of substance and rely on the body's normal processes to eliminate it. Alternately, we can destroy the substance before allowing the body to eliminate the results. We can use the microrobot to physically remove the unwanted tissue. We can also use the microrobot to enhance other efforts being performed, and increase their effectiveness. The unwanted matter in the body is directed to excretory organs of body to discharge. The different ways of removing unwanted matter are as follows.

a. Heat:

The use of heat to destroy cancerous tumors would seem to be a reasonable approach to take. There are a number of ways in which we can apply heat, each with advantages and disadvantages of their own. While the general technique is to apply relatively low levels of heat for prolonged periods of time, we can apply much higher levels for shorter periods of time to get the same effect.

b. Microwave:

Microwave radiation is directed at the cancerous cells, raising their temperature for a period of time, causing the death of the cells in question. This is normally done by raising the temperature of the cells to just enough above body temperature to kill them after many minutes of exposure.

c. Ultrasonic:

An ultrasonic signal, which can be generated by a piezoelectric membrane or any other rapidly vibrating object, is directed at, and absorbed by, the cells being treated. This energy is converted to heat, raising the temperature of the cells and killing.

d. Power from the bloodstream:

There are three possibilities for this scenario. In the first case, the microrobot would have electrodes mounted on its outer casing that would combine with the electrolytes in the blood to form a battery. This would result in a low voltage, but it would last until the electrodes were used up. The disadvantage of this method is that in the case of a clot or arteriosclerosis, there might not be enough blood flow to sustain the required

Power to Nano Robot:

In this case, the power would be transmitted to the microrobot from internal sources available for every human being naturally like heat of the body,pressure due to flow of blood, chemicals available in the body. So,we need not to provide any external energy sources to nanorobots. Network formation between the nanorobots can be achieved by DNA programming of given nano robot or nano organism (organic nanoids)

III. EXTERNAL SECURITY

External security for a human being involves in providing information about the problems facing by the victim at that instant to an appropriate official(cops,paramedics…) by using an instant transmitter in wearable form. In our paper external security can be provided using two modesa) MANUAL MODE b) AUTOMATIC MODE.

a. MANUAL MODE

The type of control device that requires an individual to manually press a button or turn a switch. Pushbuttons and selector switches are types of manual inputs. This device is used to send the emergency signal to the control room for indicating the location of the victim through the signal from that device. In self defence itprovides a sudden shock to culprit by pressing manually.

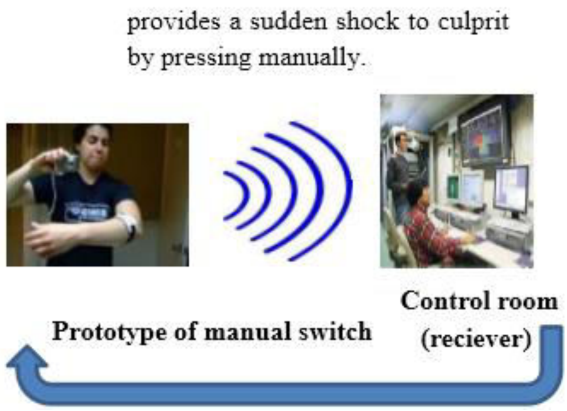

Fig 9: Process of Manual Mode

Calls to victim/family

This type of security can be easily implemented using present day technology. But there are many limitations are to be overcome in this mode they are

 Frequent pressing of manual buttonunnecessarily(switching for entertainment). Accidentally activating the switch.

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 Lack of security for that device.

 No identity of victim. Due to above drawbacks it may leads to wastage of time and money of the rescue officers. Inorder to overcome thesedrawbacks, we move on to automatic mode.

b. AUTOMATIC MODE

An automatic machine or device is one which has controls that enable it to perform a task without needing to be constantly operated by a person. Automatic methods and processes involve the use of machines like robots.

In order to provide human security automatically we require the size of machine in small scale that is in nano scale. The robot that provide automatic security to the human in small scale is known as NANOIDS(NANO ROBOTS)

Communication with Nanorobots

There are many different ways to do this. One of the simplest ways to send broadcast-type messages into the body, to be received by innanorobots, is acoustic messaging. A device similar to an ultrasound probe would encode messages on acoustic carrier waves at frequencies between 1-10MHz.Thus the supervising physician can easily send new commands or parameters to nanorobots already at work inside the body. Each nanorobot has its own power supply, computer, and sensorium, thus can receive the physician's messages via acoustic sensors, then compute and implement the appropriate response. The other half of the process is getting messages back out of the body, from the working nanodevices out to the physician. This can also be done acoustically. However, onboard power requirements for micron-scale acoustic wave generators in water dictate a maximum practical transmission range of at most a few hundred microns for each individual nanorobot. Therefore, it is convenient to establish an internal communications network that can collect local messages and pass them along to a central location, which the physician can then monitor using sensitive ultrasound detectors to receive the messages. Such a network can probably be deployed inside a patient in less than an hour, may involve up to 100 billion mobile nanorobotic network nodes, and may release at most 60 watts of waste heat (less than the 100-watt human body basal rate) assuming a (worst case) full 100% network duty cycle.

WIRELESS INTERFACE

Wires are typically used for power and data transfer between the implant and the outside world,are a primary source of infection,failure,manufacturing cost and discomfort to the patient.Wirelesstransmission of power and data circumvents all these problems.Power and data signals can be transmitted using electromagnetic radiofrequency(RF),infrared or acoustic energy.The antennas used are polarized to receive signals from a particular direction.

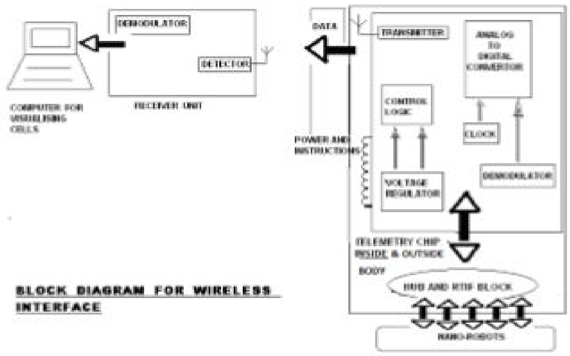

Fig10:Block Diagram of Wireless Interface

Chemical Elements with Which Nanorobots Will Be Made

Carbon will likely be the principal element comprising the bulk of a medical nanorobot, probably in the form of diamond or diamondoid/fullerene nanocomposites --

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largely because of the tremendous strength and chemical inertness of diamond. From a medical standpoint, it makes sense to regard the nanorobot as having two spaces which should be considered separately --its interior and its exterior. It is true that the nanorobot exterior will be exposed to the diverse chemical brew that makes up our human biochemistry. But the interior of the nanorobot may be a highly controlled environment, possibly a vacuum, into which external liquids cannot normally intrude. Ofcourse,it may often be necessary for a nanorobot to import external fluids in a controlled manner for chemical analysis or other purposes. But the important thing is that the device will be watertight and airtight. Body fluids cannot get into the interior of the device, unless these fluids are purposely pumped in for some specific reason.

RESPONSE OFIMMUNESYSTEM

Immune system response is primarily a reaction to a "foreign" surface. Nanorobot size is also an important variable, along with device mobility, surface roughness, surface mobility, and other factors. Yet the problem of nanodevice biocompatibility is in principle no more difficult than the biocompatibility of medical implants generally. In some ways it may even be an easier problem, because many medical nanorobots will have only temporary residence in the body. Even today, application of immunosuppressive agents during the treatment period would allow poorly-engineerednon-bioinactive nanorobots to perform their repair work without trouble.

Passive diamond exteriors may turn out to be ideal. Several experimental studies hints that the smoother and more flawless the diamond surface, the less leukocyte activity and the less fibrinogen adsorption you will get. So, it seems reasonable to hope that when diamond coatings can be laid down with almost flawless atomic precision, making nanorobot exterior surfaces with nearnanometer smoothness, that these surfaces may have very low bioactivity. Due to the extremely high surface energy of the passivated diamond surface and the strong hydrophobicity of the diamond surface, the diamond exterior is almost completely chemically inert and so opsonization should be minimized.

IV.OPERATION OF EXTERNALSECURITY

Fig 11: Operation of External Security Flowchart

In this technology the operation can be mainly done by keeping limits as heart beating, pressure on body, vocal changes, detects new stones, cells& viruses in the body and coded in to the millions of nanoids.

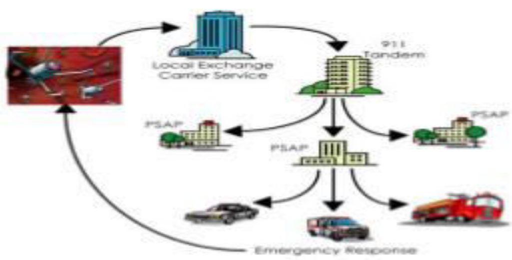

Fig 11: Process of External Security

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V. APPLICATIONS

These nanoids are very useful in many applications for external security like

a) In detecting thieves and culprits.

It is applicable to detect the thieves and culprits in the society. ATM robbery thieves' detections can be easily done by examine the DNA profiling and if there is no evidence to catch the culprits then by identifying the robbed time and nanoids roaming sheets at that location and examining the their nanoids behavior culprits can be easily detects in very less time.

Fig 12: ATM SECURITIES

b) In reducing human harassments

It is mainly applicable for providing security to women's in now days.It detects wheneverahuman/womenin hyper tension, rise/sudden fall of heart beats,vocal changes and trace victims nanoids and provide useful help to them from control rooms.

c) In providing alerts about human health.

Nanoids are applicable in providing good health to the human body. Up to now this nanoids are used in medical field andincluding this technology is useful to provide automatic healing. It is applicable to detect and prevent the human from AIDS,CANCER,TUMOR,RETINACORRECTION etc.,

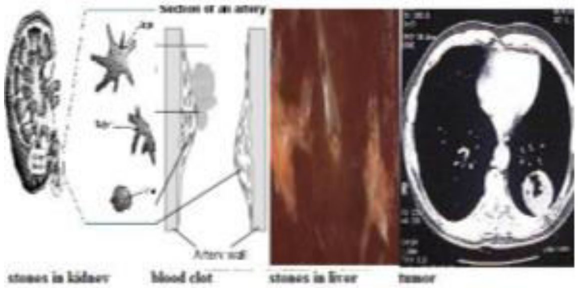

Fig 14: Applications in Medical Field

d) In navigation purpose.

Human Location tracking is a technology which is used to track any object we want. With the world becoming ever smaller through technology, hiding is increasingly difficult. Cameras peer down on us at red lights, in our workplaces, in stores and even at home. Now, those cameras are being augmented by new technologies that track humans, cars, cell phones and in military purpose. Hence by this human location tracking technology, one can easily find out about a particular person, vehicle or valuable things. And this technology is going to very useful in many aspects in near future.

VI. CONCLUSION

Human security Nanoids will eliminate virtually all internal common diseases and provide high security externally of the 20th century. Although nanoids applied for medical and security hold a wealth from eradicating diseases and provide security externally and these also candidate for industrial applications. In great swarms they might clean the air of and repairs the hole in the ozone layer.A major asset of nanorobots is the fact that the individual units require very little energy to operate. Durability is another potential asset. High speed is also a significant consideration. Nanoscale systems can operate much faster than their larger counterparts because displacements are smaller; this allows mechanical and electrical events to occur in less time at a given absolute speed. The paper is just a theoretical justification. But the recent advancement in the field of nanotechnology gives the hope of the effective use of this technology in medical field.This paper starts by giving an introduction to nanorobots and its importance as recognized by various other technocrats.

A nanostructured data storage device about the size of a human liver cell implanted in the brain could store a large amount of data and provides extremely rapid access to this information. But perhaps themost important long-term benefit to human society as a whole could be the dawning of a new era of peace. We could hope that people who are independently well fed, well-clothed, well-housed, smart, well educated, healthy and happy will have little motivation to make war. Human beings who have a reasonable prospect of living many "normal" lifetimes will learn patience from experience, and will be extremely unlikely to risk those "many lifetimes" for any but the most compelling of reasons.Finally, and perhaps most importantly, no actual working nanorobot has yet been built. Many theoretical designs have been proposed that look good on paper, but these preliminary designs could change significantly after the necessary research, development and testing has been completed.

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Author's Profile

Aravind B is anelectronics hobbyist,completed B. Tech inAudisankara College ofEngineering andTechnology in 2014. Whohas a love for creativity and enjoys experimenting with varioustechniques in both coding and designingcircuits. Being an electronics lover (Geek) he developed many mini projects for real-time applications and developed various theoretical concepts to implement in the practical world.

He always has an intention to do service to the world using his technological knowledge, because of that he raised few ideas and kept them as his short term and long-term goal. From 2013 onwards, he was showing his keen interest (researching)to develop a theoretical concept of Human Defense System using Nanoids. In the meanwhile, he successfully completed few projects in Image Processing and in the embedded system.