DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

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Junctionless Transistor Revolutionize Chip Industry

Transistor junction, what's your function now..??

Inside this issue:

The first transistors built in 1947 4were over 1 centimeter in size . The smallest transistors today are less than 30 nanometers long over three hundred thousand times smaller. The result of these efforts is billion-transistor processors where a bill ion or more transistor-based circuits are integrated into a single chip. But this development cannot continue for much longer. One of the increasingly difficult problems that chip designers are facing is that the high density of components packed on a chip makes inter-connections increasingly difficult; and as conventional chip structures continue to shrink.

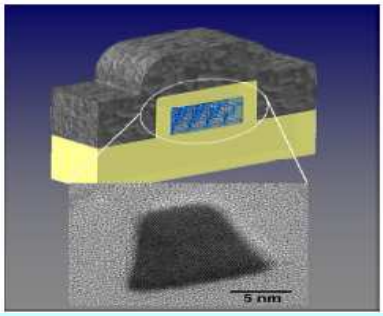
The challenge over past decades has been to keep up with Moore 's Law by cramming more and more transistors into the limited real estate provided by silicon chip fabrication methods. But as future tech leans more heavily on smaller, lighter, more mobile devices with increased computing power, the imperative to slim down chip design while increasing efficiency has grown increasingly greater.

Unfortunately, existing transistor

junctions - two pieces of silicon with opposite polarities that allow the current to be switched on and off within the transistor are not all that efficient. Current can leak from junction s, upcoming power consumption and causing overall inefficiency in devices that increases with the number of transistors. Junctions are also a major factor in driving up costs in the chip manufacturing process; as gateways for current, they are the key mechanisms in transistors, and manufacturing high quality junctions can quickly become very expensive. In modern transistors, a negative positive-

negative (black-white-black)

structure needs to be created, where the width of the positive (white) region is only a few dozens of a toms wide, and the coloring has to be done with a paint brush. It is very difficult to avoid the black paint from smudging



into the white region. By contrast, a junction less transistor is entirely painted white or black. This is much easier to fabricate, especially at very small dimensions.

The junction less transistor circumvents the need for junctions by pumping current through a thin silicon wire just a few atoms in diameter. A component nicknamed the "wedding ring" regulates the flow of current by electrically "squeezing" the wire to stop the electron flow, much in the way you might crimp a drinking straw to stop liquid from moving through it.

The architecture of the junction less transistor is simple enough that it can be cheaply produced even at very small

sizes, means, that the tech could contribute to significantly cheaper transistors in future. And because the current is moving straight through a silicon wire, it leaks very little current, making these new structures a good deal more efficient.that is thin and narrow enough to allow for full depletion of carriers when the device is turned off. The semiconductor also needs to be heavily doped to allow for a reasonable amount of current flow when the device is turned on. Putting these two constraints together imposes the use of nano-scale dimensions and high doping

concentrations.

Design by
M.MOUNIKA

Green Laser

A laser works on the principle of Light Amplification by Stimulated Emission of Radiations. Traditional lasers were of red color which offered less strength, versatility and brightness as compared to the advanced green color lasers. A green color laser can be generated within the small body of a miniature flashlight. The green color lies in the visible range and moreover, can easily travel long distances. Therefore, amateur astronomers often use this laser to point at stars and galaxies which are far away in space.

In green laser the devices create coherent green light in a three step process. A standard laser diode first generates near infrared light with a wavelength of 808nm. This is focused on a neodymium crystal that converts the light into infrared with a wav elength of 1064nm. In the final step, the light passes into a frequency doubling crystal that emits green light at a wavelength of 532 nm. All these are easily be assembled into a cigar sized packet and powered by a couple of AAA batteries. And power output is 10 mW.
Green laser pointers are significantly brighter (about 60 times) than a red laser pointer and because of its unusual color it is much more noticeable.

FEATURES OF GREEN LASER

- Extremely bright green laser at 532 nm wavelength.
- Output power <5mW (Class IIIa Laser Product).
- Range of approximately 12,000 ft in darkness.
- 1.1 mm beam diameter at source.
- Momentary push button switch.
- Solid, heavy duty construction.
- Constant wave output (as opposed to pulse output).
- Takes 2 “AAA” batteries (included).
- Class IIIa Laser.
- Can be used for sky pointing, astronomy.

SPECIFICATION

- Body color – black.
- Coverage range 12,000 feet.
- Wavelength of 532 nm.
- Power =<5mw
- Body made of metal, no plastic is use.
- Up to 60 times more powerful than red laser pointer.
- Lifetime of 3000 hrs.

HOW TO CHOOSE GREEN LASER POINTER

Till a few years ago, laser light technology was the exclusive domain of the technological shrinks. Today laser light is destroying everything which is trenched by them. The ‘Star War’ scenario, where different planets go to war, throwing laser beams at e ach other, is not far from the mind as well. Now a day, laser light devices c an be found in almost all stationary, gift, and hobby shops. The most widely used color in such pointer are green and red. Then go through the lines that follow and explore tips on how to choose green laser pointers?

- High-powered green laser pointers are categorized by power, which is measured in milli watts (mW). Another measurement used is wavelength. Power is the most important feature of a laser pointer. The more power a pointer has, the more expensive it will be.
- For teachers, professors and people who give presentations on a regular basis, a laser pointer is something that is required for everyday use. Such people should select a green laser pointer that has the power of about 5mW.
- In case of green laser pointer to burn or melt something, its power should be above 100mW. The more power a pointer has, the faster it will burn and

melt. Nowadays, you can buy green laser pointers with power more than 500mW as well, but they can be very expensive.

- While choosing green laser pointers, check and make sure that it has an infrared filter to remove the damaging radiation, when in use.
- Also check the battery type of laser pointer (AAA BATTERIES) As for the switch, a push button will allow you greater control as against a sliding one, so it is better to select the former.
- It will be checked that the focusing lens of the pointer is plastic or glass. Always go for glass one s, as plastic deteriorates with time and clouds the laser beam.

USES OF GREEN LASER

- Astronomers pointing out constellations and stars in the night sky
- Bird watching
- Tour Guides
- Construction engineers and workers pointing out points of interest on a project
- Camping This is an AMAZING survival tool. Its beam is so strong; rescuer s and search personnel could spot you from 2 miles away if you were ever lost. The actual beam is visible in darkness.

DANGER OF GREEN LASER POINTER

Cheap green laser pointer can emit dangerous level of infrared radiation Green lasers are much more dangerous as compared to red lasers and should be used with all safety precautions. Never point a laser in the direction where it can encounter pe ople, pets and vehicles. Even a quarter of a second expose to a green laser can permanently damage the retina of an eyeball. Therefore, purchase l asers with a minimum strength required for its usage, and keep it out of the reach of children.

APPLICATIONS

- Green beam laser
- Green light laser
- Green laser flash light
- High powered green laser
- Powerful green laser

Design by
M.Ravi Theja

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To access the personality trade of any candidate, the interview is taken by the HR manager. In today's cut-throat competition an employer is not supposed to having only technical knowledge, but should be equipped with some personality trades such as a team player, leadership ability, adaptability, grasping ability and high tolerance of stress. In order to check these qualities in a candidate interviews are conducted by HR manager. For a fresher level entry like engineering graduates there are two types of interviews has been conducted.

- Technical interview
- HR interview
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TECHNICAL INTERVIEW

A technical interview for a job such as engineering, not only requires more preparation more in depth of knowledge the interviewee must demonstrate his ability to solve problems. While it may be easy to feel overwhelmed about what technical question will be asked during the interview,
the key to doing well in a technical interview is being able to confidently demonstrate your knowledge.

HOW TO PREPARE FOR A TECHNICAL INTERVIEW

Make a list of the technical s kills that you will need to review and study. Read the job description and learn as much as you can about the company with which you are interviewing. Determine what qualification that the company is looking for and what skills you need to have to do the job successfully. Your research will give you
an idea of what questions might be asked during the interview and what you need to study.

SAMPLE QUESTIONS

Difference between big endian and little endian? What is race around condition? WAP to display fibonacciseries. They will check some basic knowledge in our core subjects and some programming languages. They will also check your confidence level. So be cool there.

HR INTERVIEW

When it comes to Human Resources Management, the personality of the candidate is gauged at the HR interview with a rather simple, logical set of questions. And the key to success is mainly your honesty in answering the question from your own experience and knowledge. You don't have to cover a big syllabus or master text books to prepare for the interview. Let us divide the questions into sets

PERSONAL INFORMATION

"Tell us about yourself" This probably the first question at an HR interview where they would judge the following:

- Your language fluency and presentation style.
- Your family background and attitude towards family, etc.
- Your priorities, values and beliefs.
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It is a good practice to make yourself clear about your personal life before you start to think about who are sitting in front of the panel. Details like your family, your parent's where about, your brother and sister, etc.
and a little information about your schooling, college with dates, values of faith of religion, etc. could be organized in a step by step manner, to summarize in about two minutes , it would be enough.

CARRIER OBJECTIVE

Be specific about your carrier objective and the objective of t he interview. "In what way is this job going to help you in your carrier objective?" could be the most likely question. If you are not convinced about
the positive impact of the job , you are sure to lose the job too. However, a little extra information like the profile of the company general knowledge and current affair in politics, sports, etc. might also come up during the discussion. You might as well know that most of the HR manager are tired of interviewing candidates. and if you can really keep engaged with your answers not leaving much of silence waiting for them to dig out information from you, you have better chances to getting the job. If the interview lasts for longer, the chances of you getting appointed are higher.
Why should I hire you? Believe it or not, this is a killer question because so many candidates are unprepared for it. By now you can see how critical it is to apply the overall strategy of uncovering the employer's need before you answer the que stion.
Whether your interviewer asks you this question explicitly or not, this is the most important question of your interview because he must answer this question favorably in is own mind before you will be hired. Walk through each of the position's requirements as you understand them, and follow
each with a reason why you meet that requirement so well.

SOME IMPORTANT TIPS FOR INTERVIEW

- Do not smoke, chew gum, or eat garlic beforehand.
- Wear suitable interview clothes.
- Take copies of your CV with you.
- Arrive on time for your job interview.
- Any applications handed before the interview begins, are to be filled in as accurately as possible, make sure they match the information in your CV and Cover Letter.
- Always greet the interviewer by his/her last name and try to pronounce it correctly.

he/she doesn't need to know th at.
Use replies such as-

I'm fine thank you, and you?

I'm very well, thank you.

Avoid these because these replies express a careless attitude-

So, so

OK

Not so well

While you are interviewing jus t keep these things in your mind and rest will be good. Don't bother about result. Just give your 100%.

Design by

M.Pavani

Electronics Unborn

PLASTIC ELECTRONICS

Polymers that conduct electricity without the assistance of fillers are quickly emerging as the basis for future devices, such as electronic paper, light weight solar cells and inexpensive. Compounded conductive polymers will play a critical role in the successful proliferation and miniaturization of electronic devices, as they provide inexpensive protection against electrostatic discharge and el ectromagnetic or radio frequency interference. Conducting polymers also have the potential to become alternative to silicon based electronics. It is believed that plastic electronics, based on thin film transistors fabricated by organic films, will create a new range of products that could not be manufactured using conventional CMOS approaches. Flexibility of thin films also suggests a new product line, including rollup display, low cost RFID tags, flexible sensors and photovoltaic arrays. Plastic electronics also generates less heat and use less power, thus alleviating two major problems bothering conventional electronics.

GRAPHINE TECHNOLOGY

New research findings suggest that use of graphine in microchip could make them faster in comparison to the standard silicon microchips. Thus, use of this technology in future cell phones and other communication systems will mean much faster transmission of data. With conventional silicon-base d electronics, frequency cannot be increased, but graphine technology could help in developing systems in the 500 to 1000 gigahertz range. Graphine, a pure form of carbon is the strongest material ever discovered. It also has a number of unique electrical properties, such as mobility the ease with which electron can start
moving in the materials- which is 100 times more than that of silicon. Researcher have already used the one-atom-thick layer of carbon atoms to make prototype transistors and other simple devices. Frequency multipliers are being widely used in radio communications and other applications. But existing system requires multiple components, signal filtering, and they consume more power. Whereas the graphene system has just a single transistor and produces a
clean output efficiency.

MAJOR CHALLENGES

In spite of all the advantage electronics there are some challenges which electronics have to face in future. Some of these are:

ELECTRONIC WASTE:

Electronics should not have any adverse effect on the environment. Through responsible use, reuse and recycling Of electronic products, the electronic industry and consumers can protect and preserve our environment. The rapid pace of technological advancement in the field of electronics

has made electronics gadgets both affordable and widely used. This result in large quantities of electrical and electronic equipments being added to the waste stream called electronic waste , also known as 'E- waste.' These equipments are made up of a multitude of components, some containing toxic substances which can have adverse effect on human health and environment Often, these hazards arise due to the improper recycling and disposal processes used.

GREEN TECHNOLOGY:

Green technology emphasis on using electronic products in a manner such that it has minimum adverse effect. Best practices like how to stop wastage of energy, which zioms are greener than others, and e-waste management are the prerequisites for moving towards green technology solution.

QUALITY AND QUANTITY CONCERN: To cope up with market and fulfill customer requirement in a lim-

ited budget, electronic manufacturers compromises with quality of product. Increasing number of electronic product either discarded or being repaired indicates their poor quality. There are billions of circuit board enter the global market every year, and there are evidences to indicate that there are only 5-10% are as per current IPC standards. Thus, quality and reliable products will play important role in shaping future of electronics. We must have to learn to produce them in quantity with reasonable market price without compromising quality. There should be appropriate relation between production and application.

Design by
N.Suneel

Genetic algorithms

GENETIC algorithms are one of the best ways to solve a problem for which little is known. They are a very general algorithm and so will work well in any search space. All you need to know is the solution to be able to do well, and a genetic algorithm will be able to create a high quality solution. Genetic algorithms use the principles of selection and evolution to produce several solutions to a given problem.

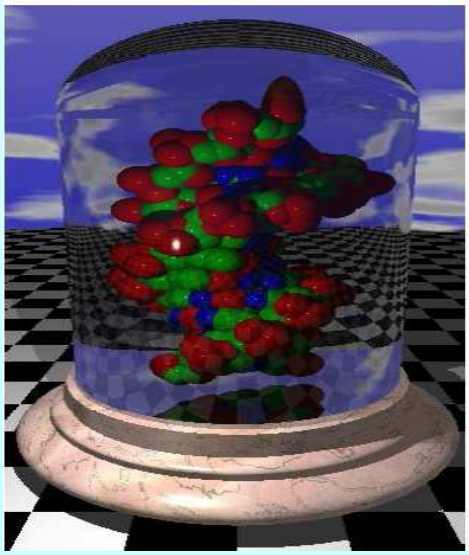
Genetic Algorithms are a way of solving problems by mimicking the same processes which Mother Nature uses. They use the same combination of selection, recombination and mutation to evolve a solution to a problem. Genetic algorithms tend to thrive in an environment in which there is a very large set of candidates solutions and in which the search space is uneven and has many hills and valleys. Genetic algorithms will do well in any environment, but they will be greatly outclassed by more situation specific algorithms in the simpler search spaces.

Therefore, you must keep in mind that genetic algorithms are not always the best choice. Sometimes they can take quite a while to run and are therefore not always feasible for real time use. They are, however, one of the most powerful methods which quickly create high quality solutions to a problem. Now, before we start, I'm going to provide you with some key terms so that this article makes a sense.

- Individual - Any possible solution
- Population - Group of all individuals
- Search Space - All possible solutions to the problem
- Chromosome - Blueprint for an individual
- Trait - Possible aspect of an individual
- Allele - Possible settings for a trait
- Locus - The position of a gene on the chromosome
- Genome - Collection of all chromosomes for an individual

FOUNDATIONS IN SCIENCE

I n the mid 1800s, 1859 to be exact, a British naturalist named Charles Darwin published a book that changed the humans view to the world. In this book, The Origin of Species, Darwin proposed that humans, and in fact all creatures, were not put on this planet by God and made unchanging, but rather that they evolved from other creatures. At the time, the idea sounded preposterous, but later we have discovered that he may be correct. Advancement in technology have made it possible for us to read our DNA and that of other creatures, and what it has shown us is that we aren't as different from other creatures as we think. Over time, creatures change to adapt to their environment to survive and thrive.



One of the most striking examples of this is the Galapagos Islands, located in the Pacific Ocean, off the coast of Ecuador, this series of islands is one of the most prominent examples of evolution and adaptation. The island contains many species which are not found anywhere else on the planet, including several species of birds that share many characteristics; too many for it to be a coincidence. It is believed that many birds were blown to the islands by winds and were unable to get back Over time, the birds spread throughout the island and began survive in the differing environments of the islands. Some birds developed large, strong beaks suited to crack nuts, others long, narrow beaks more suitable for digging bugs out of wood.

The birds that had these characteristics when blown to the island survived longer than other birds. This allowed them to reproduce more and therefore have more offspring that also had this unique characteristic.

WHY A GENETIC ALGORITHM?

Advances in computer technology have made molecular dynamics simulations more and more popular in studying the behavior of complex systems. Even with modern-day computers, however, there are still two main limitations facing atomistic simulations: system size and simulation time.

While recent developments in parallel computer design and algorithms have made considerable progress in enlarging the system size that can b e accessed using atomistic simulations, methods for shortening the simulation time still remain relatively unexplored.

Methodology

Optimization problems

population of candidate solutions (called individuals, creatures, or phenotypes) to an optimization problem is evolved toward better solutions. Each candidate solution has a set (its chromosomes or genotype) which can be mutated and altered; traditionally, solutions are represented in binary as strings of 0s and 1s, but other encodings are also possible.[2]

The evolution usually starts from a population of randomly generated individuals, and is an iterative process, with the population in each iteration called a *generation*. In each generation, the fitness of every individual in the population is evaluated; the fitness is usually the value of the objective function in the optimization problem being solved. The more fit individuals are stochastically selected from the current population, and each individual's genome is modified (recombined and possibly randomly mutated) to form a new generation. The new generation of candidate solutions is then used in the next iteration of the algorithm. Commonly, the algorithm terminates when either a maximum number of generations has been produced, or a satisfactory fitness level has been reached for the population. a genetic representation of the solution domain, a fitness function to evaluate the solution domain.

APPLICATIONS OF GENERIC ALGORITHM:

Genetic algorithms are a very effective way of quickly finding a reasonable solution to a complex problem. Granted they aren't instantaneous, or even close, but they do an excellent job of searching through a large and complex search space. Genetic algorithms are most effective in a search space for which little is known. You may know exactly what you want a solution to do but have no idea how you want it to go about doing it. This is where genetic algorithms thrive. They produce solutions that solve the problem in ways you may never have even considered.

A standard representation of each candidate solution is as an array of bits.Arrays of other types and structures can be used in essentially the same way. The main property that makes these genetic representations convenient is that their parts are easily aligned due to their fixed size, which facilitates simple crossover operations. Variable length representations may also be used, but crossover implementation is more complex in this case. Tree-like representations are explored in genetic programming and graph-form representations are explored in evolutionary programming; a mix of both linear chromosomes and trees is explored in gene expression programming.

GENETIC OPERATORS

The next step is to generate a second generation population of solutions from those selected through a combination crossover (also called recombination), and mutation.For each new solution to be produced, a pair of "parent" solutions is selected for breeding from the pool selected previously. By producing a "child" solution using the above methods of crossover and mutation, a new solution is created which typically shares many of the characteristics of its "parents". New parents are selected for each new child, and the process continues until a new population of solutions of appropriate size is generated. Although reproduction methods that are based on the use of two parents are more "biology inspired", some research suggests that more than two "parents" generate higher quality chromosomes.

These processes ultimately result in the next generation population of chromosomes that is different from the initial generation. Generally the average fitness will have increased by this procedure for the population, since only the best organisms from the first generation are selected for breeding, along with a small proportion of less fit solutions. These less fit solutions ensure genetic diversity within the genetic pool of the parents and therefore ensure the genetic diversity of the subsequent generation of children.

Opinion is divided over the importance of crossover versus mutation. There are many references in Fugal (2006) that support the importance of mutation-based search.

Design by
P.Neha

Artificial Passenger

The **Artificial Passenger** is a telemetric device, developed by IBM, that interacts verbally with a driver to reduce the likelihood of them falling asleep at the controls of a vehicle It is based on inventions covered by U.S. patent 6,236,968. The Artificial Passenger is equipped to engage a vehicle operator by carrying on conversations, playing verbal games, controlling the vehicle's stereo system, and so on. It also monitors the driver's speech patterns to detect fatigue, and in response can suggest that the driver take a break or get some sleep.The Artificial Passenger may also be integrated with wireless services to provide weather and road information, driving directions, and other such notifications systems.

Voice Control Interface

The Artificial Passenger was developed using the Conversational Interactivity for Telematics (CIT) speech system which counts on the drivers natural speech instead of the use of hands. The CIT relies on a Natural Language Understanding (NLU) system that is difficult to develop because of the low powered computer systems available inside cars . IBM suggests that this system be located on a server and accessed through the cars wireless technologies. IBM also says they are working on a "quasi-NLU" that uses fewer resources from the CPU and can be used inside the car . The CIT system includes another system called the Dialog Manager (DM). The DM takes the load of the NLU system by interacting with the vehicle, the driver, and external systems such as weather systems, email, telephones and more. The NLU system receives a voice command from the driver and looks through a file system to come up with an action to be performed and executes that action.

Speech Recognition

The speech recognition process relies on three steps. The front-end filters out any unwanted noise such as noise from the car, background music, or background passengers. It gets rid of all low energy and high variability signal being recognized . The labeler breaks apart the speech and searches in a data base to recognize what is being said. It starts broad by seeing what subject the driver is speaking of. Then goes into more details of what the driver is truly asking. The decoder next takes all this information and formulates a response .

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The main part of the Artificial Passenger is the Disruptive Speech Recognition. This technology keeps a conversation with the driver and analyzes what the driver is saying and how s/he is saying it. It can recognize fluctuations in the driver's voice to determine if the driver is sleepy, upset, or in a good mood through different vibration patterns in the driver's speech. It also record the time it takes for a driver to respond in the conversation and from that determine if the driver is nodding off or being distracted by something.

Driver Drowsiness Prevention

When the computer recognizes that the driver is dozing off, it sends a signal to interfere. The computer will step in by changing the radio, trying to play games with the driver, or by opening window to wake the driver up. The computer wants to improve their alertness by doing these. If it finds that the driver is nodding off over and over, the computer system is programmed to ask to call a nearby hotel and book a room

or suggest the driver take a break.

The Artificial Passenger will try to read jokes, play games, ask questions or read interactive books to stimulate the driver. Drivers that show more drowsiness will be given content that is more stimulating than a driver who is not as drowsy.The speech recognition process relies on three steps. The front-end filters out any unwanted noise such as noise from the car, background music, or background passengers. It gets rid of all low energy and high variability signal being recognized . The labeler breaks apart the speech and searches in a data base to recognize what is being said. It starts broad by seeing

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The DM works with questions asked by the driver such as "How far is The Gallatin Field Airport from here?" The NLU system will still not be able to understand everything a driver says. Reasons for that are the different idioms and dialects of different regions. IBM is working on developing a system that recognizes where the driver is and acknowledge the regional diction used in that area. Another system used within this technology is the Learning Transformation (LT) system which monitors the actions of the occupants of the car and of the cars around it, learns patterns within the driver's speech and store that data, and learns from such data to try to improve the performance of the technology as a whole.

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Distributive User Interface Between cars

IBM recognizes that there are more dangers to a driver than him/herself. Artificial Passenger is proposed to work between cars by relaying information to one another.

Features of Artificial Passenger:

- Conversational Telematics
- Improving speech Recognition
- Analyzing Data
- Sharing Data
- Retreiving Data on Demand

Applications:

- To avoid crashes.
- To analyze the temperature in the vehicles.
- To monitor the environment of the vehicle

Design by
P.Sathish