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Scheduling Algorithms for 3GPP LTE Downlink Transmission

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Abstract:

Studying manipulation and manufacture of extremely minute machines or devices is the basic definition of Nanotechnology. To form materials, these devices are so small to the point of manipulating the atoms themselves. We can make computers billions of times more full than todays and new medical capabilities that will heal and cure in cases that are now viewed as utterly hopelessly, by using this Nanotechnology. With respect to those atoms are arranged the properties of manufactured product depends. If we know about exactly how many dopant atoms are in a single transdistor and exactly where each individual dopant atom is located and placed roughly the right number in roughly the right place, we can make a working transistor. Self-replication is another improvement in Nanotechnology. To truly low cost manufacturing self-replication makes an effective route. Our intuitions about self-replicating systems learned from biological systems that surround us are likely to seriously mislead us about the characteristics and properties of artificial self-replicating systems designed for manufacturing purposes. Wide range of non-biological products like diamond were able to made by Artificial systems under programmatic control are likely to be less adaptable and more brittle in their response to changes in their environment than biological systems. At the same time they should be simpler and easier to design. Thus around the world has already given us less expensive, more precise manufacturing technologies that can make an unprecedented diversity of new products, due to the progress of technology. The major reason why people should research and develop Nanotechnology because a computer is required everywhere.

Keywords — **3GPP , LTE , Transmission, Network.**

INTRODUCTION

What is Nanotechnology? Nanotechnology is the engineering of practical system at the molecular scale. This covers both current work and concepts that are more advanced. In its original sense, 'nanotechnology' refers to the expected ability to construct items from the bottom up, using techniques and tools being residential today to make complete, high performance products.

The Meaning of Nanotechnology:

When K. Eric Drexler popularized the word 'nanotechnology' in the 1980's, he was talking about construction equipment on the scale of molecules, a few nanometres wide—motors, robot arms, and even whole computers, far smaller than a cell. Drexler spent the next ten years describing and analysing these incredible devices, and responding to accusations of discipline invention. Meanwhile, mundane technology was budding the ability to build simple structures on a molecular scale. As nanotechnology became an traditional concept, the meaning of the word shifted to encompass the simpler kinds of nanometre-scale technology. The U.S. National Nanotechnology Initiative was produced to fund this kind of nanotech: their meaning includes something smaller than 100 nanometres with novel properties.

Much of the work person done today that carries the name 'nanotechnology' is not nanotechnology in the unique meaning of the word. Nanotechnology, in its traditional sense, means building things from the foot up, with atomic precision. This theoretical capability was envisioned as early as 1959 by the renowned physicist Richard Feynman.

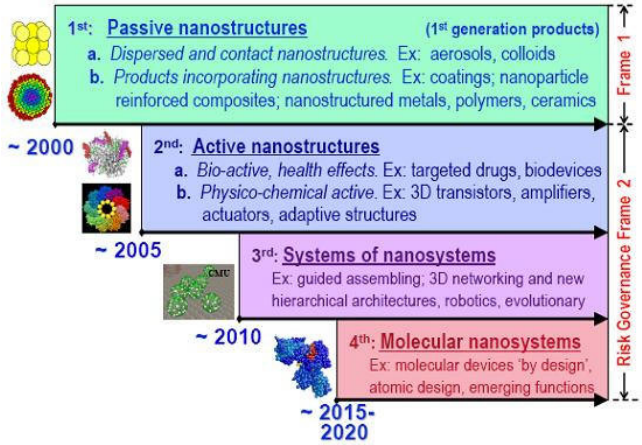
Based on Feynman's vision of miniature factories using Nano machines to build difficult products, advanced

nanotechnology (sometimes referred to as molecular manufacturing) will make use of positionally-controlled mechanochemistry guided by molecular machine system. Formulating a roadmap for development of this kind of nanotechnology is now an objective of a broadly based machinery roadmap project led by Battelle (the manager of several U.S. National Laboratories) and the Foresight Nanotech Institute.

Shortly after this envisioned molecular machinery is created, it will result in a manufacturing insurgency, probably causing severe disruption. It also has serious economic, social, environmental, and military implications.

HISTORY:

Mihail (Mike) Roco of the U.S. National Nanotechnology Initiative has described four generation of nanotechnology growth (see chart below). The current era, as Roco depicts it, is that of reactive nanostructures, materials designed to perform one task. The second phases, which we are just entering, introduce active nanostructures for multitasking; for example, actuators, drug relief devices, and sensors. The third making is predictable to begin emerging around 2010 and will feature nanosystems with thousands of interacting mechanism. A few years after that, the first included nanosystems, functioning (according to Roco) much like a mammalian cell with hierarchical system within systems, are predictable to be residential.



Some experts may still insist that nanotechnology can refer to quantity or visualization at the scale of 1-100 nanometers, but a consensus seems to be forming around the idea (put forward by the NNI's Mike Roco) that control and reorganization of matter at the Nano scale is a essential element. CRN's definition is a bit more precise than that, but as work progresses through the four generation of nanotechnology foremost up to molecular nanosystems, which will comprise molecular manufacturing, we think it will become increasingly obvious that "engineering of practical system at the molecular scale" is what nanotech is actually all about.

Conflicting Definitions

Unfortunately, conflicting definition of nanotechnology and blurry distinctions between considerably special fields have complex the effort to understand the differences and develop sensible, effectual policy.

The risks of today's nanoscale technologies (nanoparticle toxicity, etc.) cannot be treated the same as the risks of longer-term molecular developed (economic disruption, unstable arms race, etc.). It is a mistake to put them collectively in one basket for procedure thought—each is significant to address, but they offer similar problems and will require dissimilar solutions. As used today, the expression nanotechnology generally refers to a broad group of mostly disconnected fields. Essentially, anything suitably small and interesting can be called nanotechnology. Much of it is harmless. For the rest, a lot of the harm is of familiar and narrow quality. But as we will see, molecular manufacturing will transport unfamiliar risks and new classes of troubles.

General-Purpose Technology

Nanotechnology is every so often referred to as a general-purpose machinery. That's because in its difficult form it will have significant brunt on more or less all industries and all areas of the public. It will offer better built, longer lasting, cleaner, safer, and smarter products for the home, for transportation, for medicine, for transportation, for agriculture, and for industry in common.

Imagine a checkup machine that travels during the human body to seek out and destroy small cluster of cancerous cells after they can reach. Or a box no bigger than a sugar cube that contain the whole contents of the documentation of senate. Or materials much lighter than steel that enjoy ten times as a lot power. — U.S. National Science Foundation

Dual-Use Technology

Like power or computers before it, nanotech will offer very much better effectiveness in roughly every facet of life. But as a general-purpose equipment, it will be dual-use, connotation it will have many commercial uses and it also will have a lot of military uses—making far more powerful weapons and tools of surveillance. Thus it represents not only wonderful benefits for compassion, but also grave risks.

A key thoughtful of nanotechnology is that it offer not just better goods, but a vastly enhanced developed procedure. A computer can make copies of data files—fundamentally as many copies as you want at small or no cost. It may be only a substance of time until the structure of goods becomes as cheap as the replication of files. That's the real importance of nanotechnology, and why it is sometimes seen as "the next manufacturing revolution."

My own judgment is that the nanotechnology insurgency has the possible to change America on a scale equal to, if not better than, the computer revolution. — U.S. Senator Ron Wyden (D-Ore.)

The power of nanotechnology can be encapsulated in an in fact simple machine called a personal Nano plant that may sit on your countertop or desktop. Packed with small substance processors, computing, and robotics, it will manufacture a wide-range of items quickly, cleanly, and inexpensively, building goods honestly from blueprints.

Nanotechnology Applications: A Variety of Uses

The Understanding Nanotechnology Website is committed to providing clear and concise explanation of nanotechnology application. Scan the schedule below to find an request of interest, or use the navigation bar above to go straight to the page discussing an request of interest.

Nanotechnology Applications in:

Medicine

Researchers are budding personalized nanoparticles the size of molecules that can deliver drugs straight to sickly cells in your deceased. When it's perfected, this system should greatly condense the damage action such as chemotherapy does to a patient's in the pink cells.

Electronics

Nanotechnology holds some answers for how we strength enhance the capabilities of electronics devices while we decrease their weight and command consumption.

Food

Nanotechnology is having an impact on more than a few aspects of food science, from how food is grown-up to how it is packaged. Companies are budding nanomaterial's that will make a discrepancy not only in the taste of food, but also in food security, and the healthiness remuneration that food delivers.

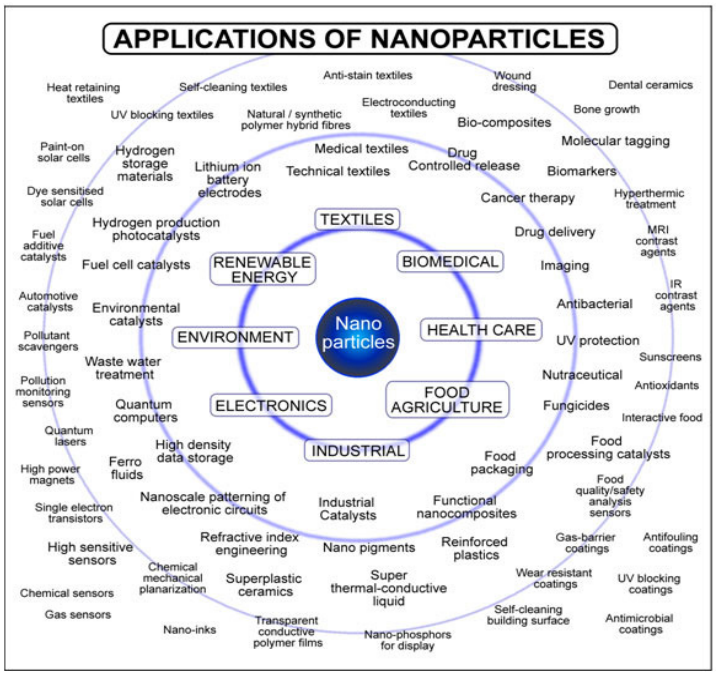
Fuel cells

Nanotechnology is person used to reduce the cost of catalysts used in fuel cells to construct hydrogen ions from fuel such as methanol and to get better the competence of membranes used in fuel cells to break up hydrogen ions from other gases such as oxygen.

Solar Cells

Companies have residential nanotech solar cells that can be affected at significantly lower cost than straight solar cells.

Batteries: Companies are presently budding batteries by means of nanomaterials. One such battery will be a fine as new after sitting on the shelf for decades. Another battery can be rejuvenated considerably faster than conventional battery.



Space

Nanotechnology could hold the key to building space-flight more convenient. Advancement in nanomaterials make lightweight spaceship and a cable for the space winch possible. By considerably reducing the amount of rocket fuel necessary, this advance could lower the cost of attainment orbit and roaming in space.

Fuels

Nanotechnology can address the deficiency of fossil fuels such as diesel and gasoline by manufacture the invention of fuels from low grade raw materials economical, growing the mileage of engines, and making the manufacture of fuels from common raw materials more professional

Better Air Quality

Nanotechnology can pick up the presentation of catalysts used to change vapors escaping from cars or industrial undergrowth into harmless gasses. That's because catalysts through from nanoparticles have a better surface area to relate with the reacting chemicals than catalysts ready from larger particles. The larger surface area allow more chemicals to cooperate with the catalyst simultaneously, which makes the catalyst further useful.

Cleaner Water

Nanotechnology is individual used to build up solutions to three extremely different troubles in water superiority. One challenge is the elimination of industrial wastes, such as a clean-up solvent called TCE, from groundwater. Nanoparticles can be used to alter the contaminating chemical during a chemical feedback to make it harmless. Studies have shown that this system can be used effectively to reach contaminates dispersed in underground ponds and at much lower cost than method which require pumping the water out of the ground for management.

Chemical sensors

Nanotechnology can allow sensors to detect very small amounts of chemical vapors. Various types of detect elements, such as carbon nanotubes, zinc oxide nanowires or palladium nanoparticles can be used in nanotechnology-based sensors. Because of the little size of nanotubes, nanowires, or nanoparticles, a few gas molecules are enough to modify the electrical properties of the sensing basics. This allows the discovery of a very squat concentration of chemical vapours.

Sporting Goods

If you're a tennis or golf fan, you'll be pleased to hear that even generous goods has wander into the Nano realm. recent nanotechnology application in the sports arena contain increasing the force of tennis racquets, filling any imperfection in club shaft supplies and reducing the charge at which air leaks from tennis balls.

Fabric

creation composite fabric with Nano-sized particle or fibres allows progress of fabric property without a significant enhance in weight, thickness, or stiffness as might have been the case with previously-used technique.

How Nanotechnology is changing the Future of Medicine

Nanotechnology and Medicine:

The potential for nanotechnology, in the occupied Drexlerian sense, is exceptional. True universal assemblers, if we can number out how to assemble them, will usher in a thoughtful shift in the human situation. Of course, there's a long way to go. In a lot of ways, we aren't even close. In other ways, growth has been continuing in some shocking ways — and positive ones.

Moore's Law constantly drives advances in nanotechnology – we can now assemble transistors that factually exist on the Nano-scale, with diameters of hundreds of atoms.

Nanotechnology and Cancer:

Custom strand of DNA are construct such that they will fold into illogical shapes and can have proteins and enzymes bonded onto them, allow them to behave in intelligent ways and reply to changing situation in the human body. Daniel Levner, a bioengineer at Harvard, believes that this behaviour is very powerful.

DNA Nano robots could potentially carry out complex program that could one day be used to identify or luxury disease with unprecedented sophistication.

Nanotechnology and Neuroscience:

Nanotechnology as well has the potential to modify how doctors treat mind disorders. On the data-collection side of effects it may be feasible to use Nano-scale diamond particle, which light up in reaction to the brain's electrical activity, to convert brain activity into frequencies of light that could get away the skull and be registered by outdoor sensors.

Nanotechnology and Diagnostics:

Another area in which nanotechnology has the prospective to revolutionize the medicinal field is in medical data set. With nanotechnology, it is doable to distribute Nano-scale diagnostic policy all over the body that detect chemical change as they happen. This may allow closer real-time track of a patient's healthiness and status in ways that aren't otherwise feasible.

WAYS NANO-TECHNOLOGY IS CHANGING THE WORLD

Nanoparticle-Filled Ink Conducts Electricity:

Tiny bits of conductive metal are crucial apparatus of modern electronics, but prospect generation may not need high-precision equipment. Circuit boards could be drawn by furnish, enabling paper electronics, not reusable antennas and a wide range of other objects. Researchers at the University of Illinois at Urbana-Champaign (and many other teams) are building conductive ink from silvery nanoparticles, which they shrink, using acid. The nanoparticles are hanging in a cellulose solution, so they have a larger viscosity and can flow from a pen, quite plainly. A line drawing become a silver wire that can carry a recent, sufficient to influence an antenna or even a small LED display, like the light bulb at the top of the house in this lovely drawing. The pen allow circuits to be set in on uneven surfaces--and it enables a new type of original design.

Cancer Detectors:

Gold nanoparticles are used in a range of new "sniffers" for cancer and other disease. As cancerous cells grow, genes and proteins contained by cells modify, and this process emits volatile organic compound that can be detected--this is why several dogs can be educated to "smell" cancer. Nanoparticles can smell it, too, and in tiny concentration. Israeli researchers a couple of years ago report new gold nanoparticle sensors that can tell not only whether a someone has cancer, but which kind--lung, breast, prostate or colon cancer. The benefit of such a method is its early-warning facility.

Nano-Absorption:

Perhaps no other produce demonstrates more plainly the strange behaviour at nanoscales than rather called Osorb. An mistake of chemistry, the swellable glass substance was intended to react with trace molecules of explosive, which would have made it a valuable protection tool at places like airports. But rather very weird happen in the maturity practice, recalled Paul Edmiston, Osorb's designer and a chemistry lecturer at the College of Wooster in Wooster, Ohio. He and some graduate students were difficult to design nanostructured silica--glass--to change colors in the presence of vapors. "We serendipitously revealed a formulation by which the nanoparticles we were assemble into this porous glass film had grow to be flexible. Instead of being a solid, they had the facility to swell," he said. "Yeah, we had the color adjust, but it soaked up the entire volume of the test way out. We put more on and it sucked up more. It just expanded."

Fighting Cancer at the Source:

If cancer does take hold, nanoparticles can help with this, too. The dog in this CT scanner is a prostate cancer serene, undergoing a clinical trial to establish the safety of radioactive gold nanoparticles to treat his disease. Dogs develop an forceful form prostate cancer much like creature men, and a recent study at the University of Missouri could eventually lead to targeted treatment for the human form of the infection. Sandra Axiak-Bechtel, an junior professor of oncology at the MU College of Veterinary Medicine, said the study's main goals were to find out whether the gold nanoparticles were safe--and they were. Dogs show no swelling, toxicity or changes in their livers, kidneys or bone marrow. The dogs undergo CT scans to find out the sizes of their tumors, and then radiologists injected them with a purple liquid contain radioactive gold nanoparticles.

Gene Therapy and Drug Delivery:

Practically every week, scientists announce a new breakthrough in the ability of nanoparticles to deliver genes, drugs or chemical messengers inside cells. Nanoparticles of different shapes and chemical makeup can track down and target specific cells of a chemist's choosing, and perform a variety of tasks. This image depicts DNA molecules (light green), packaged into nanoparticles by using a polymer with two different segments. One segment is positively charged, which binds the polymer to the DNA. This is shown in teal. The brown portion shows a protective coating on the nanoparticle's surface. By adjusting the solvent surrounding these molecules, researchers at Johns Hopkins and Northwestern universities were able to control the shape of the nanoparticles. The team's animal tests showed that a nanoparticle's shape can dramatically affect how well it delivers gene therapy. This is possible because DNA behaves strangely among Nano scale particles, explained Chad Mirkin of Northwestern.

Protective Coating for Your Skin:

Cancer therapy and gene healing are still principally lab-based uses for nanoparticles, with new papers publish often, but few if any FDA approvals. That doesn't mean the tiny particle aren't ubiquitous, however--one prime example is rather you use every day in the summer (or at least should). Sunscreen contains nanoparticles of titanium dioxide and zinc oxide, which are extremely reflective and can prevent harmful solar radiation from penetrating your skin. This has been contentious for some time, conversely, with several ecological groups arguing for a pause on

nanoparticle-containing sunscreens. But even sunscreens with micro-particles hanging in their salve may restrain Nano-ones, inadvertently rendered Nano by the mechanized procedure.

Nanomaterials in the Food Supply:

The most contentious and possibly least well understood blow of nanotechnology is its impact on our food supply. Nanoparticles may perhaps be used as a bug killer or as a fertilizer, but some explore shows they could damage crops and can even be fatal. Zinc oxide--that sunscreen ingredient, also establish in tons of cosmetics and electronic devices--can accumulate in plant tissues, according to a study of soybeans available in August by _ procedures of the National Academy of Sciences_. Plant roots and root nodules can take up and store high concentration of nanoparticles, and at high exposure levels, the plants were unable to fix nitrogen, Science Now report at the time. "Is this an indication we should be worried about the food supply? I don't know," study author Patricia Holden told Science Now. "It's central that the scientific community asks these questions in advance." To that end, the federal Agricultural examine Service, part of the U.S. sector of Agriculture, is in the middle of a three-year lessons investigating the use of silver nanoparticles for pest control. While some studies have addressed toxicity of nanoparticles in marine environment, there's very little examine on the force of silver nanoparticles on worldly creature, the ARS points out. Much more work still needs to be prepared.

FUTURE OF NANO-TECHNOLOGY

In the world of star Trek machines called replicators can turn out basically any physical object, from weaponry to a torrid cup of Earl grey tea. Long careful to be totally the creation of science fiction, today some people believe replicators are a very real prospect. They call it molecular developed, and if it ever does become a reality, it could significantly adjust the world.

Atoms and molecules stick mutually because they have matching shapes that lock simultaneously, or charge that attract. Just like magnets, a positively exciting atom will fuse to a negatively stimulating atom. As millions of these atoms are pieced together by Nano machinery, a specific creation will begin to take shape. The goal of molecular developed is to manipulate atoms separately and place them in a pattern to generate a desired construction.

CONCLUSION

To achieve innovatory things during every field in the day today life can be ready using Nano-Technology. Using Nanotechnologies and its application assorted efficient things were done in the fields like medication, electronics, food, tools etc. Nano technology become a grand aspect in this modern era. lots of Incredible Nanotechnologies like Super Condoms, Molecule Printers, Artificial Muscles, and Stain-repellent Fabric Coating etc. truly exist today.

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