

A New Concept of Replicators in Nano-Technology

Akhil Kumar Das

Assistant Professor

Department of Computer Science

Gour Mahavidyalaya, West Bengal, India

Abstract— Sometime it is impossible to repair most ship damage without having to return to a starbase as a solution we can give a new concept about replicator in nanotechnology. Using this technology it is possible to produce spare parts that can repair most ship damage without having to return to a starbase. In nanotechnology replicator is very different in so many senses, known as “Star-Trek” machine. According to our new concept, replicators can convert matter into energy. Following that principle, the device can dismantle any object into subatomic particles. The ensuing energy can then be stored for future use or immediately applied in a subsequent replication. This process is referred to as "recycling", and is applied to everything from dirty dishes to outgrown children's clothes.

Keywords: Replicator, Nanotechnology, Starbase, Star-Trek, Energy, Recycling

I. INTRODUCTION

The first use of the concept found in 'Nano-technology' was in "There's Plenty of Room at the Bottom", a talk given by physicist Richard Feynman at an American Physical Society meeting at Caltech on December 29, 1959. Feynman described a process by which the ability to manipulate individual atoms and molecules might be developed, using one set of precise tools to build and operate. Another proportionally smaller set and so on down to the needed scale. The term "nanotechnology" was defined by Professor Norio Taniguchi in Tokyo Science University, 1974.

The Paper is as follows: “Nano-technology mainly consists of the processing, separation, consolidation and deformation of materials by one atom or by one molecule”. In 1980s, the basic idea of this definition was explored in depth by Dr. K. Eric Drexler.

Engines of Creation: The Coming Era of Nanotechnology is considered as first book on the topic of nanotechnology. In 2000, the United States National Nanotechnology Initiative was founded to coordinate Federal nanotechnology research and development.

The general concept of artificial machines is capable of producing copies of themselves dates back at least several hundred years. An early reference is an anecdote regarding the philosopher René Descartes, who suggested to Queen Christina of Sweden that the human body could be regarded as a machine. Samuel Butler proposed in his 1872 novel *Erewhon* that machines were already capable of reproducing themselves.

In 1802 William Paley formulated the first known teleological argument depicting machines producing other machines. A detailed conceptual proposal for a physical non-biological self-replicating system was first put forward by mathematician John von Neumann in lectures delivered in 1948 and 1949, when he proposed a kinematic self-reproducing automaton model. In 1956 mathematician Edward F. Moore proposed the first known suggestion for a

practical real-world self-replicating machine, also published in *Scientific American*. The next major development of the concept of self-replicating machines was a series of thought experiments proposed by physicist Freeman Dyson in his 1970.

Klaus Lackner and Christopher Wendt developed a more detailed outline for such a system. In the spirit of the 1980 "Advanced Automation for Space Missions" study, the NASA Institute for Advanced Concepts began several studies of self-replicating system design in 2002 and 2003. In 2005, Adrian Bowyer of the University of Bath started the RepRap Project to develop a rapid prototyping machine which would be able to manufacture some or most of its own components, making such machines cheap enough for people to buy and use in their homes.

II. SELF-REPLICATING MACHINE

A self-replicating machine is, as the name suggests, an artificial self-replicating system that relies on conventional large-scale technology and automation. A self-replicating machine would need to have the capacity to gather energy and raw materials, process the raw materials into finished components, and then assemble them into a copy of itself. A self-replicating machine is an artificial construct that is theoretically capable of autonomously manufacturing a copy of itself using raw materials taken from its environment. A replicator works by rearranging subatomic particles, which are abundant everywhere in the universe, to form molecules and arrange those molecules to form the object. For example, to create a pork chop, the replicator would first form atoms of carbon, hydrogen, nitrogen, etc., then arrange them into amino acids, proteins, and cells, and put it all together into the form of a pork chop. This process requires the destructive conversion of bulk matter into energy and its subsequent reformation into a pre-scanned matter pattern. In replicators, atoms and molecules stick together because they have complementary shapes that lock together, or charges that attract. Just like with magnets, a positively charged atom will stick to a negatively charged atom. As millions of these atoms are pieced together by nano machines, a specific product will begin to take shape. It is called molecular manufacturing and goal of molecular manufacturing is to manipulate atoms individually and place them in a pattern to produce a desired structure.

III. NANO-TECHNOLOGY

Nanotechnology, shortened to "nanotech", is the study of the controlling of matter on an atomic and molecular scale. Generally nanotechnology deals with structures of the size 100 nanometers or smaller in at least one dimension, and involves developing materials or devices within that size. Nanotechnology is a broad term for the application of scientific understanding towards fabricating devices and

materials at the nanometer scale. Nanotechnology takes its name from a unit called nanometer-NM, which means it's the one billionth of a meter. [1nm = nanometer (1,000,000,000 nm per m, or 10^{-9} m)]. The Nano-world exists at the level of single molecules and atoms-the size of a millionth of a millimeter. Nanotechnology involves building sophisticated products from the molecular scale. Essentially, anything sufficiently small and interesting can be called Nanotechnology. Nanotechnology is sometimes referred to as a general-purpose technology. That's because in its advanced form it will have significant impact on almost all industries and all areas of society. It will offer better built, longer lasting, cleaner, safer, and smarter products for the home, for communications, for medicine, for transportation, for agriculture, and for industry.

A. Uses of Replicators:

One of the most important pieces of technology in the Star Trek universe, the replicator is used primarily to provide food and water onboard starships, thus eliminating the need to stock most provisions. Replicator is also used to provide breathable air on ships and starbases, thus providing an endless supply of oxygen and eliminating the need to carry air tanks. The technology is also used for producing spare parts, which makes it possible to repair most ship damage without having to return to a Starbase.

IV. STAR-TREK REPLICATOR IN THE WORKS

In the world of "Star Trek," machines called replicators can produce practically any physical object, from weapons to a steaming cup of Earl Grey tea. Replicators can also convert matter into energy. Following that principle, the device can dismantle any object into subatomic particles. The ensuing energy can then be stored for future use or immediately applied in a subsequent replication. This process is referred to as "recycling", and is applied to everything from dirty dishes to outgrown children's clothes. Space explorers have yet to get their hands on the replicator of "Star Trek" to create anything they might require. Electron Beam Freeform fabrication (EBF3), uses an electron beam to melt metals and build objects layer by layer. Such an approach already promises to cut manufacturing costs for the aerospace industry, and could pioneer development of new materials. EBF3 requires a few crucial components like power for its electron beam, a vacuum environment, and a source of metals. While "Star Trek's" replicator could work without a supply of subatomic particles, reality is a different story.

V. CONCLUSION

This paper give the idea about the nano-technology and how to use the concept of nano-technology. In this paper also discuss the concept of replicator.

REFERENCES

- [1] www.organic-system.org
- [2] en.wikipedia.org/wiki/Self-replicating_machine
- [3] www.wilsoncenter.org/events/docs/Effectsnanotechfinal.pdf
- [4] [Y arxiv.org/pdf/cs/0304022](http://arxiv.org/pdf/cs/0304022)

- [5] www.nanotechproject.org/process/assets/files/7316/pen-18.pdf
- [6] ccsl.mae.cornell.edu/papers/Nature05_Zykov.pdf.