Available online at: http://www.advancedscientificjournal.com
http://www.krishmapublication.com
IJMASRI, Vol. 3, issue 7, pp. 1006- 1010, July -2023
https://doi.org/10.53633/ijmasri

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY ADVANCED SCIENTIFIC RESEARCH AND INNOVATION (IJMASRI)

ISSN: 2582-9130 **IBI IMPACT FACTOR 1.5** **DOI: 10.53633/IJMASRI**

RESEARCH ARTICLE

FUTURE GENERATION OF ARTIFICIAL INTELLIGENCE: UPCOMING SAFEGUARD SELF-RESEMBLANCE ROBOTS

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Abstract

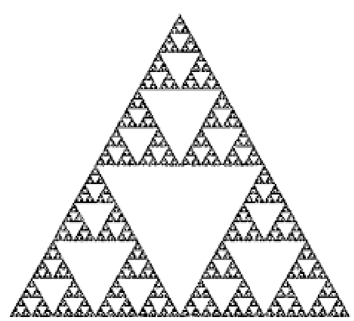
An up-and-coming new service called Fractal Robots claims to revolutionise all facets of human technology. A computer can control fractal robots, which are composed of cubic bricks and are capable of changing shape and rearranging themselves into various configurations. These motorised cubic bricks can be programmed to move and rearrange themselves in order to change shape and possibly construct items like a house in a matter of seconds. Every aspect of human endeavour, including fields like construction, medicine, science, and others, could be affected by this technology. Buildings may be constructed in a single day thanks to fractal robots, which can also help with delicate medical procedures and scientific investigations.

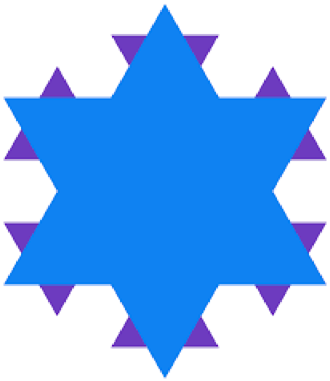
Keywords: Fractal, Fractal Robots, L- Streamer, N- Streamer**,** Self-Repair

Introduction

What is Fractals?

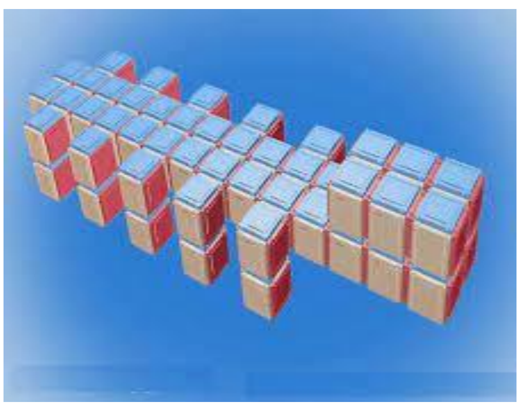
A fractal is a pattern that never ends. Fractals are infinitely intricate patterns that resemble one another at all scales. They are made by repeatedly performing a straightforward technique in a never-ending feedback loop. Geometrically, they exist in between our familiar dimensions. As an illustration, consider trees, rivers, beaches, mountains, clouds, seashells, and hurricanes.





Fractal Robots

Anything with a significant degree of perfect self-resemblance —meaning any section of its body will be similar to the entire object—is considered a fractal.



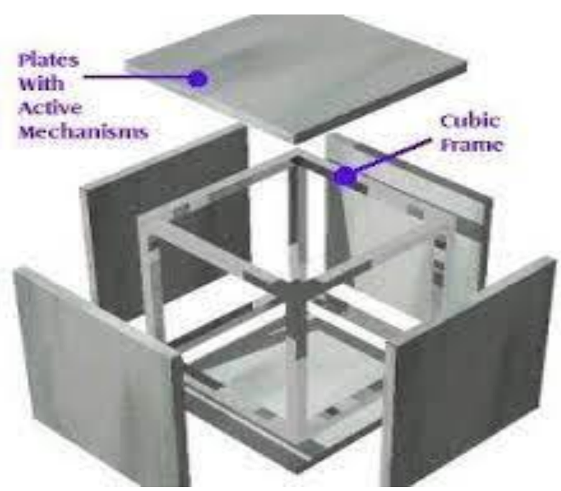
Cubic bricks with embedded mechanical and electronic components make up fractal robots. They are computer-controllable and capable of self-reconfiguration. These devices have the ability to transform into other objects. As it has the ability to perform like people in every industry, including research, medical, construction, etc., this technology is gradually gaining popularity. Digital matter control and implementation is another name for fractal robot technology. Some Fractal Robots can also repair themselves, reducing the need for human intervention.

This machine is a robotic cube, and the technology as a whole is referred to as fractal robot technology. It is known as digital matter control. Fractal Robots can also function without human involvement thanks to built-in self-repair.

Fractal Robot Mechanism

After the innovation was conceived, a lot of effort was put into making the robotic cubes as easy as possible. The design makes the fewest number of moving parts possible so that they may be produced in large quantities. The specifications for the materials have been made as flexible as possible so that they can be constructed from ceramics and clays, which are more readily available and environmentally friendly in poor countries, as well as from metals and plastics, which are inexpensive and widely available in industrialized countries. With the help of a motor, the petals are pushed into and out of the slots. One motor may be used to directly drive each petal, or two petals could be driven together using a flexible metal strip.

The petals' serrated edges engage with the adjacent robotic cube through slots that are 45 degrees apart. Either a gear wheel or a lengthy screw thread that runs the length of the slot used to move the cubes along engages the petals' serrated edges.



As a result, the cube is hollow and all the mechanisms are on the plates. Electrical contact pads on the face plates of robotic cubes enable the transmission of power and data signals. One robotic cube can lock to its neighbour thanks to 45-degree petals that protrude from the surface of the face plates to engage the neighbouring face. The contact pads may be installed on the plates themselves or separately on a specially designed solenoid-operated pad.

Implementation Of Computer Control:

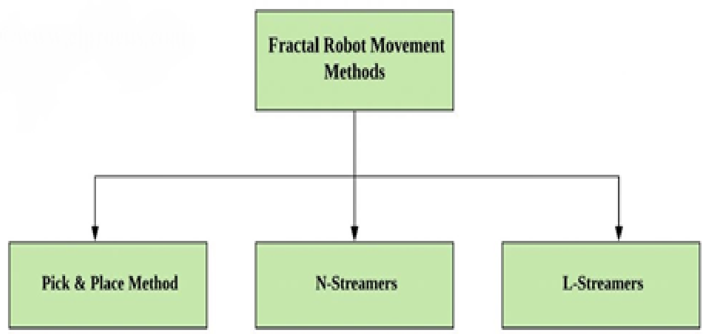
Every active robotic cube has a small microprocessor that can only handle the most fundamental tasks, such communication and internal mechanism control. The commands used to control a fractal robot are all movement-related, such as move left, move right, and so on. As a result, the computer programme used to control the robot is greatly streamlined because whatever software is created for a large-scale robot also works for a smaller scale without changing the command structure.

The software makes up the lion's share of the Fractal Robot system. Shape-changing robots are fractals, thus everything surrounding them—tooling, software, operating systems, etc.—must also be fractally organised if they are to benefit from the fractal operation. Hardware for Fractal Robots is made to work with software data structures as seamlessly as feasible. To ensure compatibility and interoperability, the unifying Fractal architecture must be strictly adhered to. The basic OS functions, data structures, device implementation, etc. are all dominated by fractal architecture. Everything that is available to the OS is containerized into fractal data structures, which opens the door for potential conversion and compatibility problems.

Fractal O.S:

The system integration is seamless and practical thanks in large part to the Fractal O. S.Hardware and software can meld into one cohesive data structure with the help of a fractal bus. It aids in the transmission and reception of data under fractal control. The message is transmitted to a local machine that manages a very modest number of cubes—usually around 100 cubes—in order to lessen the flow of instructions. The no: communication protocol is used by all cubes. Each is given a number after being recognized beforehand. The first time, only the number is transmitted; the second time, the entire message is sent.

Movement Algorithms:



Although cubes exist in a variety of sizes and mechanical configurations, the actual movement mechanism is always the same. Regardless of complexity, the cubes only respond to directions to move left, right, up, down, ahead, and backward. They also only move between integer places. If it is unable to complete an operation, it just goes backward. If it is unable to perform that task as well, the software launches self-repair algorithms. There are just three fundamental ways to move.

- Pick and place
- N-streamers
- L-streamers

Choose and put is simple to comprehend. A group of cubes receive commands that specify where each cube should go. When "cube 517 move left by 2 positions" is ordered, the entire machine moves just one cube. The entire set of motions required to carry out a certain operation is calculated and recorded in the same way that movement pathways are typically kept by robots.

This method is employed by robots that spray paint.

There are, however, more organized techniques to store movement patterns. The N-streamer and L-streamer are two fundamental schemes that are variations of all other movements, including pick and place.

N-streamer is simple to comprehend. A cube is moved into the open space left by a rod that was previously propelled away from a surface. The fresh cube is pushed out once more while being attached to the developing rod's tail. The rod's function is to develop a "tentacle." opposite robots can be sent to a growing tentacle and climb on top of it to reach the opposite side after it has fully developed. The tentacles are developed vertically to create tall pillars for use in bridge construction.

Applications of Fractal Robots

1. Bridge construction:

Getting enough bridges built as quickly as feasible for mass transit and the quick growth of an economy is one of the toughest challenges in civil engineering. For building every type of bridge, from the smallest to the biggest, shape-changing robots are perfect. The shape-shifting robot creates a suspension bridge by extending a rod and feeding the rod with L-shaped streamers from underneath the rod. The basic, mass-produced repeating cubes that move automatically and quickly change shapes into various scaffolds are the main component of the bridge assembly machine.

2. Firefighting:

Robots that combat fires can enter a structure through, possibly, very tiny entrances. The machines themselves might be rather enormous, but they still need to fit through, and while inside, they might need to hold the building up in case it starts to crumble. Firefighting is largely an art and does not solely rely on technology. There are instances when a specific situation can only be saved by machines whose powers are much beyond what we now possess.

3. Defence Technology:

The usage of fractal shape-changing robots in defence applications will fundamentally alter how war is fought in the twenty-first century. Even at moderate speeds, the machines can open a hole in any direction to dodge oncoming shells at a distance of 2 km. This machine can avoid being hit and return fire within 2 km, while carrying a formidable array of fractal weapons integrated into a true multi-terrain vehicle, making them totally lethal to any passing War fighters, aircraft, tanks, and armored personnel carriers; surviving shelling, rockets, and missiles. This is in contrast to most tanks and aircraft, which must maintain a 4 km distance to avoid being hit surviving missiles, rockets, and shelling. Shell avoidance is possible at almost point blank range as hydraulic and pneumatic technology advance. Nothing in a conflict zone has an extended warranty because everything is self-repairing.

4. Applications in Medicine:

Through a 2 mm pinhole, a fractal robot system with 1 mm cubes may squirt into a person's body, reassemble itself as surgical tools, and conduct the procedure without having to cut the patient open.

For the smallest point of entry into the injury site from the surface to undertake extremely difficult surgery to remove malignancies, cysts, blood clots, and stones, a size 1 mm is just about sufficient. The machine passes major blood vessels by threading itself around them or, if they are not negotiable, pinching and cutting them to get to its target from the closest geometric point of entry. The more easily it can be used to operate straight from the closest entry point with the smaller the machines are least amount of wounding to the patient. A machine like this could operate on shrapnel victims.

Limitations

1. The state of technology is still young.
2. The price is now relatively high ($1000 for the first generation of cubes; after that, it will drop to about $100 per cube).
3. Requires very accurate and adaptable controlling software.

Conclusion:

The introduction and global testing of this technology may take roughly four to five years. But once the initial step is done and its benefits are clearly understood, it won't take long until we start using it in our daily lives. Fractal robots can be employed for even the most delicate jobs, helping to save money, time, and other resources.

Additionally, the low cost of the necessary raw ingredients makes it affordable for developing countries as well. This has the potential to undergo an unprecedented revolution in technology.

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