

A survey of Bio-processor and its applications

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ABSTRACT: This article proposed to a survey of Bio-processor and its applications. A bio-processor is a collection of tiny sized test sites (microarrays) set on a solid substrate that permits experiment to perform at the equal time. It is a computer Processor can perform millions of mathematical operations and thousands of biological reactions in few seconds. Bio-processor, Where Bio stands for any biological entity like protein, DNA etc., Processor stands for computer IC. It is an assistant between biological entity and computer IC. New type of computer logic bio security device implanting in our body that can discover us uniquely and used to track our location. It is the ending of the fields of computer science, electronics and biology. Bio-processor inserted in to the body with a hypodermic syringe. It is an accurate, fast, and tiny sized. The bio-processor space lies at the intersection between processor manufacturing, molecule biology, genomics, and signal processing. The market for Bio-processor and its applications increased in a number of core research regions.

KEYWORDS: Bio-processor, types, comparison and its applications.

I. INTRODUCTION

An American company invented the first bio-processor namely Affymetrix, and the product of this company is Gene Processor (DNA microarrays). These products include the number of individual DNA sensors used for sensing defect. Figure1 shows the bio-processor platform. The actual sensing component or "processor" is one piece of analysis system. Transducer to translate the actual sensing DNA binding, oxidation, reduction into a format by a computer (voltage, light intensity, mass, current) additional analysis and processing to produce a final, human readable output.

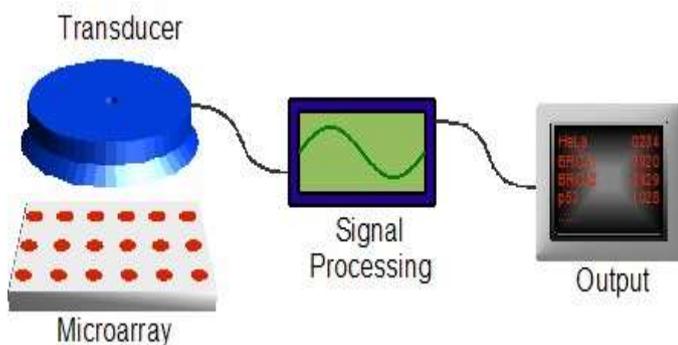


Figure1. Bio-processors platform

The development of bio-processor mainly includes the combination of molecular biology, biochemistry, and genetics. Bio-processors used for analyzing organic molecules connected with a live organism. It is an accurate, fast, and tiny sized. The bio-processor space lies at the intersection between Processor manufacturing, molecule biology, genomics, and signal processing. Bio-processors and its applications increased in a number of core research regions.

II. WHAT IS A BIO-PROCESSOR?

A bio-processor is a set of diminished microarrays placed on a strong substrate that allows many experiments to execute at the same time to obtain a high throughput in less time.

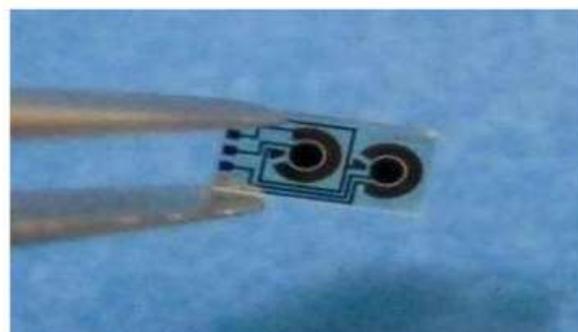


Figure2. Bio-processor

This device contains thousands of feeler elements or bio-feeler. Not like microprocessors, these are not electronic devices. Each bio-processor considered as a micro reactor that can detect particular analyses like an enzyme, protein, DNA, biological molecule or antibody. The main function of this processor is to perform hundreds of biological reactions in a few seconds like decoding genes (a sequence of DNA).

III. WORKING PRINCIPLE OF A BIO-PROCESSOR:

The operator generates a low-power EM field through radio signals, ranges from 2inches to 12inches, size of uncooked rice, grain size.



Figure3. Size of Bio-processor

The activated processor transmits the identification code reverse to the operator through radio signals. Receiver strengthens the received code to change it into digital form and finally exhibits it on LCD.

IV. COMPONENTS OF BIO-PROCESSORS

The Bio-processor are two components such us transmitter and receiver. This transmitter consists of four parts such as antenna coil, computer microprocessor, glass capsule, and a tuning capacitor. The receiver means a receiving coil for receiving the ID number or transmitted code sent back from the excited implanted bio-processor.

Transmitter

Transmitters are two types namely active and passive Transmitter. This is a passive Transmitter, which means that it does not contain any of its own energy or battery whereas in passive, it is not active until the operator activates it by giving it a low electrical charge.

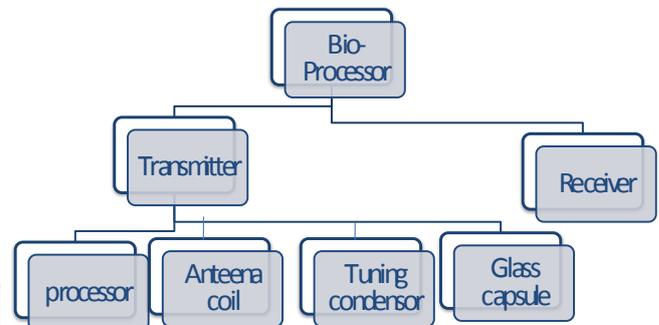


Figure4. Components of Bio-processors

Computer Microprocessor: It Stores a unique identification number (UID). The UID encoded via laser Contains electronic circuitry to transmit ID number to the receiver.

Antenna Coil: It is a coil of copper lead around an iron lead. This tiny radio antenna receives and sends signals from the receiver.

Tuning Capacitor: It stores the electrical charge send by the receiver to activate the transmitter. The capacitor tuned to the same frequency of the radio wave send from the receiver.

Glass Capsule: It made up of soda lime glass. After assembly, the capsule is air tightly scaled so no boldly fluids can enter in to the circuit inside.

Receiver

It consists of an exciter coil creates an electromagnetic field through radio signals. It offers the required energy (<1/1000 of a watt) to activate

the bio-processor. The receiver carries a receiving coil that receives the transmitted code or ID number from the bio-processor. Receiver decodes the received code and display the result in the LCD display.



Figure5. Transmitter and Receiver

V. TYPES OF BIO-PROCESSORS:

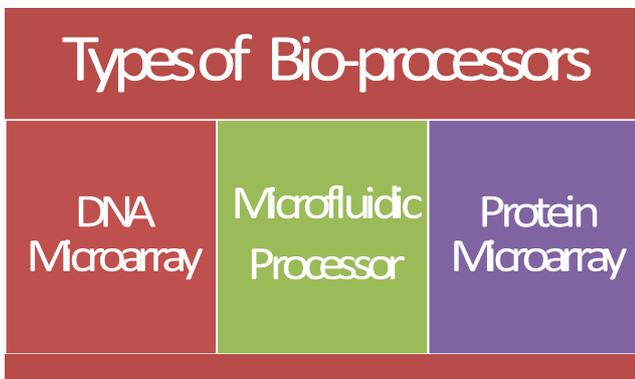


Figure4. Components of Bio-processors

There are three types of Bio-processors available namely DNA microarray, micro fluidic processor, and protein microarray.

DNA Microarray

A DNA microarray or DNA bio-processor is a set of tiny DNA spots fixed to a strong surface. Every DNA mark comprises micromoles of particular genes are termed as probes. These can be a small section of a genetic material under high rigidity situations. Innovative arrays of nucleic acid were macro arrays about 9 X 12 cm and first computerized icon based study was available in the year 1981.

Micro fluidic Processor

Micro fluidic bio-processors or lab-on-a-processor are a choice to usual biochemical laboratories and are transforming several applications like DNA analysis, molecular biology procedures, proteomics that known as the proteins and diagnostic of diseases (clinical pathology). These processors are becoming more complex by using 1000's of components, but those components designed physically called as bottom-up full-custom plan, which is a very large workforce.

Protein Microarray

A protein microarray or protein processor method is to follow the actions as well as connections of proteins, and to find out their function on a large scale. The benefit of protein microarray is that way a large number of proteins in parallel. This protein processor comprise of a surface for supporting like microstate plate or drop, nitrocellulose membrane, the glass slide. These are computerized, fast, inexpensive, very sensitive, consumes less number of samples. The first methodology of protein processors introduced in antibody microarrays of scientific publication in the year 1983. The technology behind this processor was quite easy to develop for DNA microarrays, which have turned into the most generally used microarrays.

Wherever is injected?

It inserted in hands or in the forehead. The bio-processor uses radio frequency identification (RFID) system that uses low frequency radio signals to communicate between a bio-processor Transmitter and receiver.

Simple effective and biometric identification method.

- ✦ Having an Aging, Weight gain or loss
- ✦ DNA tests an identification technique.



Figure6. Injector and Bio processor

Combine the protein Processor and the implant processor with the addition of a password or PIN to create a three-layer security of PIN, DNA, Implant processor

VI. ADVANTAGES AND DISADVANTAGES

Advantages of Bio-processors:

- ✦ The bio-processor to save the sick people and size in very small, powerful and faster.
- ✦ Bio-processors are useful in finding the lost people.
- ✦ Bio-processors perform thousands of biological reactions in a few seconds.

Disadvantages of Bio-processors:

- ✦ Bio-processor raises dangerous problems of individual privacy.
- ✦ Bio-processor marks the end of human being liberty and self-respect.
- ✦ Bio-processors are expensive.
- ✦ There will be a chance of revolving every human being into a restricted person.
- ✦ It can fixed into the human’s body without their interference.

VII. APPLICATION OF BIO-PROCESSORS

- ✦ By using this processor, we can trace a person or animal anywhere in the world.

- ✦ This processor used to store and update the information of a person. A bio-processor leads to safe E-commerce systems



Figure7. Injected of bio processor

- ✦ These processors are effective in restoring the records of medical, cash, passport, etc.
- ✦ The bio-processor can be applicable in the medical field as a BP sensor, glucose detector, and oxygen sensor.
- ✦ In addition to genetic applications, toxicological, protein, and biochemical region.
- ✦ In use, bio-processors rapidly detect chemical agents used in biological warfare.
- ✦ Motorola, Hitachi, IBM, Texas Instruments have the bio-processor business.

Table1. Comparisons of Bio/Micro/Nano/Pico Processors

Funci ons	Bio processor	Micro processor	Nano processor	Pico processor
Invent ed Or devel oped Or Found ed, Comp any and	Portable, chemistry-based sensors were the glass pH electrode, invented in 1922 by Hughes.	In 1959, Kilby of Texas Instruments received tiny sized electronic circuits and Semicondu ctor Corporatio	The Ameri can Physicist Richard Feynman, on December 29, 1959, field of nanotechno logy.	Pico processor developed a multi-core digital signal processor, was a venture backed fabl es

year		n received a silicon-based IC.		semiconductor company based in Bath, England, founded in 2000.				and manufacturing at very low cost or no cost. In medical field end of illness (Cancer, heart diseases)	
Basic concept	It is a collection of tiny sized (microarrays) arranged on a solid substrate. Area is no larger than a fingernail.	It is an integrated circuit, begins with an element called silicon. A set of electronic circuits on a small platter (chip).	It is a tiny sized of electronic and computer components have always been a primary goal of engineers.	It is an independent "encapsulation", This architecture is also related to object-oriented programming concepts.	uDisadvantages	They spot the end of human liberty and distinction. Not be supported by bulky people. A danger of turning each person.	Expense: RFID costs more to implement than a barcode system is more expensive and more efficient. Collision: Tag and reader collision RFID technology gives increase to several safety concerns.	Health and safety issues Mass production in food and oil could become worthless. Loss of jobs in manufacturing and farming etc. Atomic weapons could be more accessible and destructive. Nano pollution is created by toxic waste	Pico chip was to be active in femto cells and SoCs into the small cell market and 70% share of HSPA market according to data. The communication flows are permanent at collect point, not enthusiastically at run moment.
Advantages	To rescue the sick and find lost people. To identify person uniquely. In monitoring health condition of individuals	Micro chipping is safe, easy, effectively reunites.	It can create unique materials and products, which are stronger, lighter, cheaper, and durable, billion time faster and millions time smaller. Automatic pollution cleanup	Easy of development, improved reliability of code and software-reuse. Pico array architecture is DSP application, the wireless infrastructure.					

VIII. CONCLUSION:

Bio-processors are one of the latest emerging technologies. The use of bio-processors may posture an alternative to biometric identification. As mention in the “Guide to Biometrics”, DNA detection is the critical biometric. Finally, conclude that bio-processors are accurate, fast, and tiny sized. The bio-processor space lies at the intersection between processor manufacturing, molecule biology, genomics, and signal processing. The market for Bio-processors and its applications has increased in a number of research regions. Because a Pico processor used to support SOCs into the small cell, market and 70% share of HSPA market according to data. The communication flows are permanent at collect point, not enthusiastically at run moment. Hence, each type of processor has its own advantage and disadvantage that helps to understand efficiently the cost and the requirement of the Processor.

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AUTHOR’S BIOGRAPHIES



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