[JI Prolog/JikesRVM-Research Virtual Machine/Java-NLP/Java-Genetic Algorithms] & its Important Uses in the R&D Domains of [Bio-informatics] – A Simple Suggestion Once Again in the Context of Complex Systems by Adding Java based AI Dimension.

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[I] Inspiration + Introduction :

http://www.scienpress.com/Upload/JAMB/Vol%202_2_6.pdf – Nucleic Acids Data Sequencing using Higher Order Logic-A Suggestion of Basic Computational Framework Towards Bio-Sensors and Gene-Chips Design, Implementation and Verification – **D.N.T.Kumar et al**.

"Revisiting "Nucleic Acids Data Sequencing using Higher Order Logic-A Suggestion of Basic Computational Framework Towards Bio-Sensors and Gene-Chips Design, Implementation and Verification".Authors: D.N.T.Kumar/Category: Artificial Intelligence ". **[Source – http://www.vixra.org/abs/1907.0083]**

[Genetic Algorithms+Bayesian Networks] in the Context of Anticipatory Systems Using a Quantum Device/QRNG – An AI/ML/DL based [Java/JikesRVM(RVM – Research Virtual Machine)/Java Virtual Machine(JVM)/BNJ/Jenetics/JI Prolog/ jBNCSoftware] Approach – **by Nirmal Tej Kumar**

[Source – https://www.semanticscholar.org/author/Nirmal-Tej-Kumar/12354503/suggest]

**[II] R&D Informatics Framework to Probe Bio-informatics** :

R&D FRAMEWORK INVOLVING - JI PROLOG+JENETICS+JIKESRVM-RESEARCH VIRTUAL MACHINE -> NOVEL DESIGNS -> GENE CHIPS
ONE OF THE PIONEERING APPROACHES TO THE BEST OF OUR KNOWLEDGE
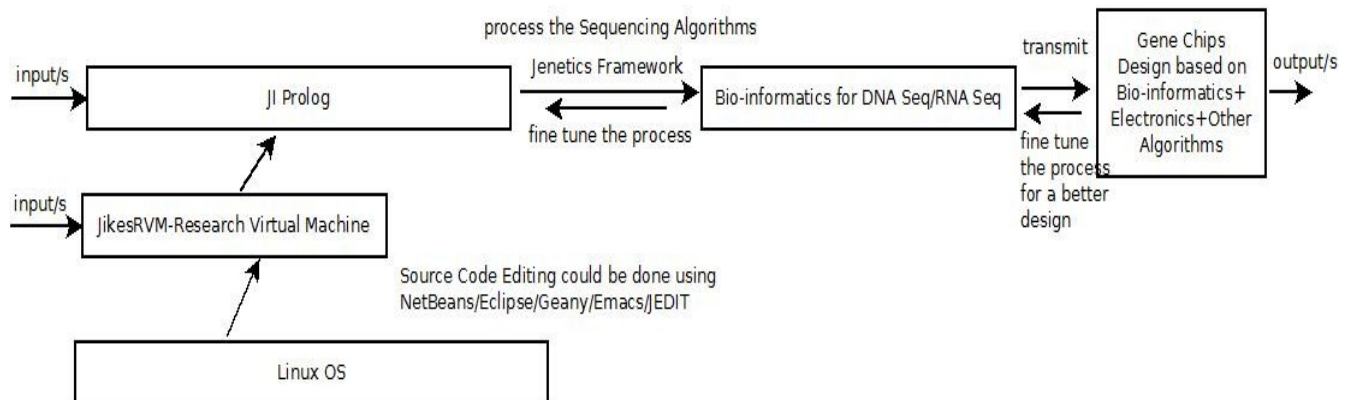
Algorithm I - Next Generation Bio-informatics R&D Framework Based on AI in the Context of Designing Gene Chips.
Actual Implementation Will Certainly Vary- Please Check&Satifsy Yourselves.
Thanks - Dr.Nirmal
Testing in Progress.

[Figure I : Java-AI Algorithm I – Simple & General R&D Approach to Designing Next Generation Gene-Chips]
[** Approximate Implementation Only. Please Make a note – Testing in Progress]

R&D FRAMEWORK INVOLVING - JI PROLOG+JENETICS+JIKESRVM-RESEARCH VIRTUAL MACHINE -> NOVEL DESIGNS -> GENE CHIPS
ONE OF THE PIONEERING APPROACHES TO THE BEST OF OUR KNOWLEDGE
[in this approach we fine tuned information processing with Core NLP Java Tool]
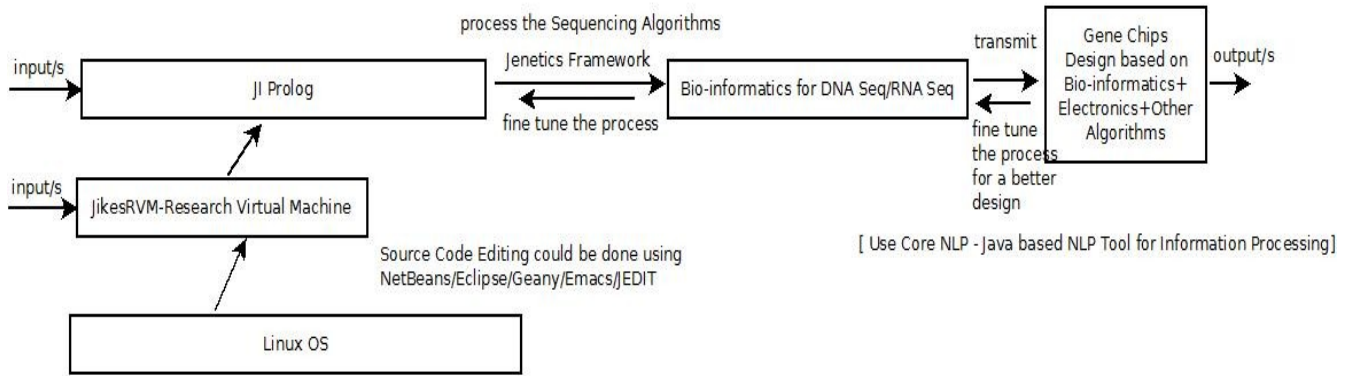
Algorithm II - Modified Algorithm I With Core NLP Tool/NLP - Natural Language Processing in Java developed by Stanford Group USA
Actual Implementation Will Certainly Vary -Please Check.
Approximate Implementation Only.
Thanks - Dr.Nirmal
Testing in Progress.Needs lot of Testing.

[**Figure II : Java–Genetic Algorithms–AI Algorithm II – Simple & General R&D Approach to Designing Next Generation Gene Chips]**
[**Approximate Implementation Only. Please Make a Note –Testing in Progress]**

Jenetics – "Jenetics is an Genetic Algorithm, Evolutionary Algorithm and Genetic Programming library, respectively, written in Java. It is designed with a clear separation of the several concepts of the algorithm, e.g. Gene, Chromosome, Genotype, Phenotype, Population and fitness Function. Jenetics allows you to minimize and maximize the given fitness function without tweaking it. In contrast to other GA implementations, the library uses the concept of an evolution stream (EvolutionStream) for executing the evolution steps. Since the Evolution Stream implements the Java Stream interface, it works smoothly with the rest of the Java Stream API.

Implementation Using other languages :

- Jenetics.Net: Experimental .NET Core port in C# of the base library.
- Helisa: Scala wrapper around the Jenetics library. "

[**Source** – https://github.com/jenetics/jenetics]

JIProlog – "offers a high degree of compliance with official and de facto Prolog standards. It also supports built-in predicates and other features common to major Prolog systems. JIProlog enhances the Java platform by adding the power of Prolog language and extends Prolog by adding the Java framework. JIProlog integrates Prolog and Java languages in a very fascinating way. It allows calling Prolog predicates from Java without dealing with native code (JNI) and allows invoking Java methods from Prolog as they were predicates. JIProlog supplies a complete API to link Prolog and Java languages from both sides. The API is composed by three parts: Java calls Prolog; Prolog calls Java; Prolog links JDBC databases. By design, JIProlog is compliant with Web 3.0 and the mobile world ".

[**Source** – http://www.jiprolog.com/]

Stanford CoreNLP –**Natural language software** – " provides a set of human language technology tools. It can give the base forms of words, their parts of speech, whether they are names of companies, people, etc., normalize dates, times, and numeric quantities, mark up the structure of sentences in terms of phrases and syntactic dependencies, indicate which noun phrases refer to the same entities, indicate sentiment, extract particular or open-class relations between entity mentions, get the quotes people said, etc."

[**Source** – https://stanfordnlp.github.io/CoreNLP/]

Jikes RVM (Research Virtual Machine) – " provides a flexible open testbed to prototype virtual machine technologies and experiment with a large variety of design alternatives. The system is licensed under an OSI approved license. Jikes RVM runs on many platforms and advances the state-of-the-art of virtual machine technologies for dynamic compilation, adaptive optimization, garbage collection, thread scheduling, and synchronization. A distinguishing characteristic of Jikes RVM is that it is implemented in the Java™ programming language and is self-hosted i.e., its Java code runs on itself without requiring a second virtual machine. Most other virtual machines for the Java platform are written in native code (typically, C or C++). A Java implementation provides ease of portability, and a seamless integration of virtual machine and application resources such as objects, threads, and operating-system interfaces. "

[Source – https://www.jikesrvm.org/ **]**

DNA Chip – **Genetic Testing of the Future** – "Genes, through the proteins they encode, determine how efficiently we process foods, how effectively we detoxify poisons, and how vigorously we respond to infections. In the past 20 years, amazing new techniques have allowed scientists to learn a great deal about how genes work and how they are linked to disease."

"DNA chips are finding applications throughout the field of molecular biology.Gene scanning techniques that are based on oligonucleotide arrays called DNA chips, provide a rapid method to analyze thousands of genes simultaneously. DNA chips are thus potentially very powerful tools for gaining insight into the complexities of gene expression, detecting genetic variations, making new gene discoveries, fingerprinting and developing new diagnostic tools."

"The production of DNA chips have evolved along two major pathways: one method uses nucleic acids that have been immobilized on the chip surface sequentially to form oligonucleotides and the other method involves complementary DNA from an individual with a known genetic mutation as a source of prefabricated oligonucleotides.In either case, the problem lies with how to attach the nucleic acids or cDNA to the chip."

[Source – https://www.ndsu.edu/pubweb/~mcclean/plsc431/students99/althoff.htm **]**

[III] Related Information on Mathematics + Software Used :

[a] https://www.swi-prolog.org/features.html

[b] https://sewiki.iai.uni-bonn.de/research/pdt/docs/start

[c] http://www.jiprolog.com/ && https://www.jikesrvm.org/ && https://stanfordnlp.github.io/CoreNLP/
http://illigal.org/ – Genetic Algorithms LAB – Very Useful Information.
https://www.baeldung.com/java-genetic-algorithm

[d] *https://www.slideshare.net/cmungall/experiences-with-logic-programming..*

[e] *https://link.springer.com/chapter/10.1007/978-3-319-72377-8_1*

[f] *https://sourceforge.net/projects/probelog*

[g] *https://www.quora.com/Where-can-I-find-a-good-tutorial-for-learning-Prolog*

[h] *https://www.aaai.org/Papers/ISMB/1993/ISMB93-015.pdf*

[i] *https://www.cs.nmsu.edu/wp/wp-content/uploads/2014/10/TR-CS-NMSU-2014...·*

[j] http://ceur-ws.org/Vol-1433/tc_74.pdf – Databases Programming With Prolog.

[IV] Acknowledgment/s :

Non-Profit R&D Only. Thanks to all WHO made this happen in my LIFE – Friends & Mentors .

[THE END]