

## CV of Srinivasan Kannan (alias) Ka.Shrinivaasan (alias) Shrinivas Kannan

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### Permanent Address:

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### Name spellings in

consultancy/employer/academic

records : Srinivasan Kannan (academics, BaaN,Sun  
Microsystems,Verizon, PiQube),  
Shrinivas Kannan(webMethods/SoftwareAG and  
CMI), Ka.Shrinivaasan (Global Analytics)

Personal website(research) :- <https://sites.google.com/site/kuja27/>

Krishna iResearch Open Source: [https://sourceforge.net/users/ka\\_shrinivaasan](https://sourceforge.net/users/ka_shrinivaasan),  
[https://www.ohloh.net/accounts/ka\\_shrinivaasan](https://www.ohloh.net/accounts/ka_shrinivaasan)

Date of Birth as per records: 19 May 1977

Marital Status: Unmarried, Single

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## COMPLETE ACADEMIC AND WORK HISTORY

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### ACADEMICS

1. Elementary Schooling, RC Morning Star, Kumbakonam (1982-1987)
  2. Higher Secondary, Town Higher Secondary School, Kumbakonam (1987-1994) (SSLC -470/500 and Plus Two 1115/1200)
  3. Bachelor of Engineering (Computer Science & Engg) (1995-99),  
PSG College of Technology, Coimbatore-641004 INDIA (CGPA/Percentage: 8.8/87.75)
  4. M.Sc (Computer Science), Chennai Mathematical Institute, Chennai (2008 – 10) CGPA 8.08
  5. Ph.D (Research Scholar in Computer Science), Chennai Mathematical Institute, Chennai (August 2010 – August 2011) – resigned
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### COURSES DONE IN M.Sc and Ph.D and Self-study

#### M.Sc courses [CMI and IIT-Chennai] and self-study (2008-2010):

Haskell, Operating systems, Distributed systems, Theory of computation, Databases, Logic-1, Complexity-1, Principles of Programming Languages (Java and lambda calculus), Algorithms, Graph theory, Cryptography, Data Mining-1, Information Retrieval, Automata, Concurrency, Timed Systems

#### Ph.D courses [CMI and IMSc] and self study (August 2010 - October 2011):

Complexity-2, Topics in data mining (Recommender Systems, Streaming Algorithms), Randomized algorithms (including PTAS), Logspace computation, Program Verification, Program Analysis, Program Slicing, Computational number theory and algebra, Computational geometry, Expander graphs, Combinatorics (Generating functions),

Probabilistic method, Communications Complexity, Linear Programming And Combinatorial Optimization and Computational Biology (Bioinformatics) algorithms for sequence alignment.

## **PUBLICATIONS and PUBLICATION DRAFTS**

**(Google Scholar URL - <http://scholar.google.co.in/citations?user=eLZY7CIAAAAJ&hl=en>)**

1.(During PhD) Decidability of Existence and Construction of a Complement of a function with Prof.Meena Mahajan, IMSc, 2011

(<http://arxiv.org/abs/1106.4102>)

2.(Master's Thesis) Few Algorithms for Ascertaining Merit of a document (Citation graph Maxflow, Recursive Gloss Overlap Algorithm and Interview algorithm applying either of the previous two with applications of them) with Profs. Ravindran(IIT Chennai) and Madhavan Mukund (CMI) in 2009-2010 – <http://arxiv.org/abs/1006.4458>.

3. (During PhD) Evaluated NIST TAC 2010 dataset (Summarization track) for Update Summarization by applying Interview Algorithm – appeared in proceedings of TAC 2010 at:

[http://www.nist.gov/tac/publications/2010/participant.papers/CMI\\_IIT.proceedings.pdf](http://www.nist.gov/tac/publications/2010/participant.papers/CMI_IIT.proceedings.pdf)

4.(Old draft) IntegerPartitions and Hash Functions (insufficiently reviewed)

(<https://sites.google.com/site/kuja27/IntegerPartitionAndHashFunctions.pdf?attredirects=0>)

5.(Updated draft) IntegerPartitions and Hash Functions

([https://sites.google.com/site/kuja27/IntegerPartitionAndHashFunctions\\_2014.pdf?attredirects=0&d=1](https://sites.google.com/site/kuja27/IntegerPartitionAndHashFunctions_2014.pdf?attredirects=0&d=1))

6. Interview Algorithm is in  $IP=PSPACE$  (insufficiently reviewed)

(<https://sites.google.com/site/kuja27/InterviewAlgorithmInPSPACE.pdf?attredirects=0>)

7. Few Non-trivial questions and Shell Turing Machines (insufficiently reviewed)

(<https://sites.google.com/site/kuja27/UndecidabilityOfFewNonTrivialQuestions.pdf?attredirects=0>)

8. Research Statement - <https://sites.google.com/site/kuja27/ResearchStatement2.pdf?attredirects=0>

9. Research Proposal with some proof sketches (includes a new timeout manager algorithm implemented in Global Analytics Decision Platform 3.0) -

<https://sites.google.com/site/kuja27/PhDThesisProposal.pdf?attredirects=0>

Following are publication drafts (not final versions) - in progress:

10. (Draft) Lower Bounds for Majority Voting and Pseudorandom choice -

<https://sites.google.com/site/kuja27/LowerBoundsForMajorityVotingPseudorandomChoice.pdf>

11. (Old Draft) Circuits for computation of error probability in majority voting -

<https://sites.google.com/site/kuja27/CircuitForComputingErrorProbabilityOfMajorityVoting.pdf>

12. (Updated Draft) Circuits for computation of error probability in majority voting -

[https://sites.google.com/site/kuja27/CircuitForComputingErrorProbabilityOfMajorityVoting\\_2014.pdf](https://sites.google.com/site/kuja27/CircuitForComputingErrorProbabilityOfMajorityVoting_2014.pdf)

13. (Old Draft) Indepth analysis of a variant of Majority Voting with relation to ZFC -

<https://sites.google.com/site/kuja27/IndepthAnalysisOfVariantOfMajorityVotingwithZFAOC.pdf?attredirects=0>

14. (Updated Draft) Indepth analysis of a variant of Majority Voting with relation to ZFC -

[https://sites.google.com/site/kuja27/IndepthAnalysisOfVariantOfMajorityVotingwithZFAOC\\_2014.pdf?attredirects=0](https://sites.google.com/site/kuja27/IndepthAnalysisOfVariantOfMajorityVotingwithZFAOC_2014.pdf?attredirects=0)

15.(Draft) [A Chaos theoretic Parallel Pseudorandom generator in RNC For Majority Voting and Pseudorandom Choice](https://sites.google.com/site/kuja27/ChaoticPRG.pdf?attredirects=0) (<https://sites.google.com/site/kuja27/ChaoticPRG.pdf?attredirects=0>)

16. (Draft) [Analysis of a Randomized Space Filling Algorithm and its Linear Program Formulation](https://sites.google.com/site/kuja27/Analysis%20of%20a%20Randomized%20Space%20Filling%20Algorithm%20and%20its%20Linear%20Program%20Formulation.pdf?attredirects=0) (<https://sites.google.com/site/kuja27/Analysis%20of%20a%20Randomized%20Space%20Filling%20Algorithm%20and%20its%20Linear%20Program%20Formulation.pdf?attredirects=0>)

17. (Old Draft) Discrete Hyperbolic Polylogarithmic Sieve For Integer Factorization (version 1) -

<https://sites.google.com/site/kuja27/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization.pdf?attredirects=0&d=1>

18. (Old Draft) Discrete Hyperbolic Polylogarithmic Sieve For Integer Factorization – with Interpolation Search (version 2) -

[https://sites.google.com/site/kuja27/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization\\_updated\\_interpolation\\_search.pdf?attredirects=0&d=1](https://sites.google.com/site/kuja27/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization_updated_interpolation_search.pdf?attredirects=0&d=1)

19. (Old Draft) Discrete Hyperbolic Polylogarithmic Sieve For Integer Factorization – with

Interpolation Search (version 3) -

[https://sites.google.com/site/kuja27/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization\\_updated\\_interpolation\\_search\\_30June2013.pdf?attredirects=0&d=1](https://sites.google.com/site/kuja27/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization_updated_interpolation_search_30June2013.pdf?attredirects=0&d=1)

20. (Old Draft) Discrete Hyperbolic Polylogarithmic Sieve For Integer Factorization – with Interpolation Search (version 4 and version 5 with handwritten illustrations and calculations) -

[http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization\\_updated\\_interpolation\\_search.pdf/download](http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization_updated_interpolation_search.pdf/download)

21. (Draft) Informal notes – 1 : on Implication Graphs, Error probability of Majority Voting and P Versus NP Question

[http://sourceforge.net/projects/acadpdrafts/files/ImplicationGraphsPGoodEquationAndPNotEqualToNPQuestion\\_excerpts.pdf/download](http://sourceforge.net/projects/acadpdrafts/files/ImplicationGraphsPGoodEquationAndPNotEqualToNPQuestion_excerpts.pdf/download)

22. (Old Draft) Discrete Hyperbolic Polylogarithmic Sieve For Integer Factorization - using Rectangular Binary (or) Interpolation Search

[http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization\\_updated\\_rectangular\\_interpolation\\_search.pdf/download](http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization_updated_rectangular_interpolation_search.pdf/download)

23. (Draft) Informal Notes on Derivation of Upperbound for Discrete Hyperbolic Factorization with Stirling Formula - using Rectangular Binary or Interpolation Search (

[http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicFactorization\\_UpperboundDerivedWithStirlingFormula\\_2013-09-10.pdf/download](http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicFactorization_UpperboundDerivedWithStirlingFormula_2013-09-10.pdf/download))

24. (Old Draft) Discrete Hyperbolic Polylogarithmic Sieve For Integer Factorization – using Rectangular Binary (or) Interpolation Search and Upperbound derived with Stirling Formula  
[http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization\\_updated\\_rectangular\\_interpolation\\_search\\_and\\_StirlingFormula\\_Upperbound.pdf/download](http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization_updated_rectangular_interpolation_search_and_StirlingFormula_Upperbound.pdf/download)

(a C++ implementation of this algorithm is at:

<http://sourceforge.net/p/asfer/code/HEAD/tree/cpp-src/miscellaneous/DiscreteHyperbolicFactorizationUpperbound.cpp> and factorization result logs at: <http://sourceforge.net/p/asfer/code/HEAD/tree/cpp-src/miscellaneous/>)

25. Individual Invention Disclosure for Survival Index Based Transaction Timeout Manager (Sun Microsystems) - 2002-2003

<https://sites.google.com/site/kuja27/SurvivalIndexBasedTxnTimeoutManager.pdf?attredirects=0>

26. AstroInfer (AsFer) Open Source Product Design that includes an experimental non-statistical inference model -

<http://sourceforge.net/p/asfer/code/HEAD/tree/AstroInferDesign.txt>

27. VIRGO Open Source Product Design that includes an experimental Pseudorandom Number Generator based Loadbalancer - <http://sourceforge.net/p/virgo-linux/code-0/HEAD/tree/trunk/virgo-docs/VirgoDesign.txt>

28. King Cobra - Byzantine distributed request servicing software design with queues and arbiters - <https://sourceforge.net/p/kcobra/code-svn/KingCobraDesignNotes.txt>

29. (Updated Draft) An NC algorithm and some Sequential Search Algorithms for Discrete Hyperbolic Polylogarithmic Sieve For Factorization using Binary or Interpolation Search with Stirling Formula and Logarithmic Sorted Tile Merge in PRAM model -

[http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization\\_PRAM\\_TileMergeAndSearch\\_And\\_Stirling\\_Upperbound.pdf/download](http://sourceforge.net/projects/acadpdrafts/files/DiscreteHyperbolicPolylogarithmicSieveForIntegerFactorization_PRAM_TileMergeAndSearch_And_Stirling_Upperbound.pdf/download)

and [AsFer PRAM implementation design notes with tile id\(s\)](#)

(<http://sourceforge.net/p/asfer/code/HEAD/tree/ImplementationDesignNotesForDiscreteHyperbolicFactorizationInPRAM.jpg>)

(Most recent of all the previous drafts on Discrete Hyperbolic Factorization)

30. (Draft) [Informal notes - 2 : on Minimum Convex Hulls of Implication Graphs and Hidden Markov Model on class nodes of Concept Hypergraph](#)

31. (Draft) [Informal notes - 3 : on Minimum Convex Hulls of Implication Random Growth Networks and Perfect Voter Decidability](#)

32. (Draft) [Informal handwritten notes on Philosophical Analysis of Democracy Circuit and Pseudorandom Choice -](#)

[https://sites.google.com/site/kuja27/PhilosophicalAnalysisOfDemocracyCircuitAndPRGChoice\\_2014-03-26.pdf](https://sites.google.com/site/kuja27/PhilosophicalAnalysisOfDemocracyCircuitAndPRGChoice_2014-03-26.pdf)

33. (Draft) Informal Handwritten Notes - Distinct Partitions, Hash collision chains and Schur Theorem -

[https://sites.google.com/site/kuja27/SchurTheoremMCPAndDistinctPartitions\\_2014-04-17.pdf](https://sites.google.com/site/kuja27/SchurTheoremMCPAndDistinctPartitions_2014-04-17.pdf)



34. [Krishna iResearch Open Source Products \(AsFer, USBmd, VIRGO, KingCobra, Acadpdrafts\) - High Level Handdrawn Architecture Diagram -](http://sourceforge.net/p/acadpdrafts/code/ci/master/tree/Krishna_iResearch_opensourceproducts_archdiagram.pdf)  
[http://sourceforge.net/p/acadpdrafts/code/ci/master/tree/Krishna\\_iResearch\\_opensourceproducts\\_archdiagram.pdf](http://sourceforge.net/p/acadpdrafts/code/ci/master/tree/Krishna_iResearch_opensourceproducts_archdiagram.pdf)

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## TEAM PATENTS

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1. Simultaneous global transaction and local transaction management ...  
US Pat. 7610305 - Filed 24 Apr 2003 - Issued 27 Oct 2009 - Sun Microsystems, Inc.
  2. Read/write lock transaction manager freezing  
US Pat. 7739252 - Filed 14 Jul 2003 - Issued 15 Jun 2010 - Oracle America, Inc.
  3. Utility for configuring and verifying data sources  
US Pat. 7134008 - Filed 4 Sep 2003 - Issued 7 Nov 2006 - Sun Microsystems, Inc.
  4. Transaction optimization of read-only data sources  
US Pat. 7165061 - Filed 31 Jan 2003 - Issued 16 Jan 2007 - Sun Microsystems, Inc.
  5. Common transaction manager interface for local and global transactions  
US Pat. 7743083 - Filed 24 Apr 2003 - Issued 22 Jun 2010 - Oracle America, Inc.
  6. Specifying transaction manager type at various application levels  
US Pat. 7082432 - Filed 24 Apr 2003 - Issued 25 Jul 2006 - Sun Microsystems, Inc.
  7. Transaction manager freezing  
US Pat. 7640545 - Filed 14 Jul 2003 - Issued 29 Dec 2009 - Sun Microsystems, Inc.
  8. Identity for data sources  
US Pat. App 10655346 - Filed 4 Sep 2003 - Sun Microsystems, Inc.
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## 9.Common transaction manager interface

US Pat. App 10422453 - Filed 24 Apr 2003 – Sun Microsystems, Inc.

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### DETAILS OF WORK (1999 – Present)

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C/C++/Java/Python on Windows and various Unix flavours

#### PRODUCTS

Netscape Application Server 4.0, iPlanet/SunONE Application Server 6.x, SunONE Web/Proxy Server 3.6/4.0, Apache web server 1.4.x/2.0.x, webMethods Broker Messaging Server 5.x/6.x/7.x, ASFER Classification and Inference Software for Large Data Sets (10.0,12.0+), USBmd (1.0,3.0+), VIRGO Linux Kernel Extensions for Cloud (5.0,6.0,7.0,8.0,10.0,12.0+), Global Decision Platform(GDP) 2.3.0/ 2.3.1/ 2.5.0/ 2.5.1/ 2.7 / 2.7.1/3.0, KingCobra 1.0+, Automated Modelling Platform(AMP), Python 2.4.3 and 2.7 source code, Linux kernel [3.2.0, 3.7.8, 3.9.x], Maitreya's Dreams 7.0.3, STL, BOOST, wxWidgets library, Swiss Ephemeris API (based on NASA JPL DE406 Ephemeris).

#### LANGUAGES/PLATFORMS/TOOLS

C/C++, Java 1.5-1.7, J2EE, Python, R and rpy2, Haskell, Solaris 6-10, Windows 2000, HP-UX 11.23 (PA-RISC and IA64),AIX, Linux, Sun Studio, CORBA (Visibroker), VAX FORTRAN, VAX VMS, GNU collection, MS Visual Studio .NET C++, WinDbg, DDD, Visual Basic and ASP, OptimizIt, Eclipse, EclipseCDT, Code::Blocks, ActiveState Python, IDLE, Haskell FP, Insight, GreatCircle, Valgrind, Callgrind, Cloud Computing Mapreduce Tools (Dumbo Mapper-reducer on Hadoop), Python NLTK, Hadoop, PiCloud, ActiveMQ, RabbitMQ, Pyutilib workflow, PyF workflow, Linux kernel – [3.2.0, 3.7.8, 3.9.x], Maitreya's Dreams 7.0.3, wxWidgets library, Swiss Ephemeris API (based on NASA JPL DE406 Ephemeris), BioInformatics Sequence Alignment Tools (BioPython, ClustalOmega),

ROOT(CERN), Geolocation Python API, Beautiful Soup, CRF tools, GATE, SentiWordNet, Stanford CoreNLP, ENT, MongoDB, WEKA

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January 2013 – present – Krishna iResearch (self-started, not-for-profit, open-source research initiative started in 2003) ([https://sourceforge.net/users/ka\\_shrinivaasan](https://sourceforge.net/users/ka_shrinivaasan))

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Working on Research, Design and Development of open source projects started by self licensed under GPL v3:

1. acadpdrafts - All publications and drafts (along with important documents and Photo ID proofs) are uploaded at <http://sourceforge.net/projects/acadpdrafts/>

2. (Experimental) Krishna iResearch intelligent Cloud Platform - Linux kernel USB device driver module for debugging USB issues possibly using machine learning algorithms for fault detection (USBmd) USBmd – (Latest Code at sourceforge repository: <https://sourceforge.net/p/usb-md/> and periodically updated Design Details at: [http://sourceforge.net/p/usb-md/code-0/HEAD/tree/USBmd\\_notes.txt](http://sourceforge.net/p/usb-md/code-0/HEAD/tree/USBmd_notes.txt)). ( Last released tag: USBmd 3.0 )

3. Krishna iResearch intelligent Cloud Platform - Asfer - AstroInfer astronomy and astrology machine learning inference open source software which uses algorithms viz.,

- 2.1 Bayesian Classifier,
- 2.2 Support Vector Machines,
- 2.3 Decision Tree Classifier,

- 2.4 String mining - Pairwise String Sequence Alignment (Needleman-Wunsch) ,
- 2.5 String mining - Multiple String Sequence Alignment(BioPython,ClustalOmega),
- 2.6 String mining - Powerset construction (C++) and String matching implementation in python(Jellyfish distance measures like Jaro-winkler, Edit-distance, Phonetic Matching rate etc.,) and
- 2.7 Parsers and Encoding features for USGS and NOAA HURDAT2 data
- 2.8 Automated Generation of Training and Test set for Classifiers that segregate the datasets into Event Classes and Automated generation of encoded astronomical object files specific to each Event Class.
- 2.9 Sequential implementation of Discrete Hyperbolic Factorization and PRAM design for publication drafts in <https://sites.google.com/site/kuja27/>
- 2.10 A Concept Hypergraph and HMM(Hidden Markov Model) based Experimental Inference Model Design inspired by Cognitive Psychology
- 2.11 Design for extracting patterns from numerical data
- 2.12 A Chaos Attractor implementation that generates a sequence of numbers using logistic equation and uses Python and R to compute a correlation coefficient between a non-Chaotic and Chaotic sequence of numbers.
- 2.13 Discrete Fourier Transform computation for a parsed numerical input sequence using Python and R
- 2.14 Spline interpolation and graph plot for a parsed numerical input sequence using Python and R

Goal of AstroInfer is to develop an inference system for Big Data, especially, massive encoded string and numeric datasets and to mine patterns in them. Presently implemented for mining patterns in astronomical datasets(degrees of astronomical objects viz planets, constellations etc.,) and prediction based on rules and execution of those rules, but works

for any dataset. Design started in May 2003. (Last released tag: ASFER 12.0)

(Latest Code at sourceforge repository: Asfer - <http://asfer.sourceforge.net> and periodically updated Design Details at:

<http://sourceforge.net/p/asfer/code/HEAD/tree/AstroInferDesign.txt>)

4. Krishna iResearch intelligent Cloud Platform - VIRGO – VIRtual Generic Os – Cloud Platform – Linux Kernel Extensions for cloud – kernel modules, system calls for cloud rather than at application level high up the stack with :

3.1 Config file support

3.2 Psuedorandom Generator Based Loadbalancer

3.3 Kernel space remote execution

3.4 User space remote execution with kernel upcall and pthread creation of userspace library function or executable

3.5 Example unit test cases

3.6 Usermode output redirected logging feature for Kernel upcall to Userspace

3.7 Intermodule Function Invocation in Kernel Space – through which any machine on cloud can be completely remote-controlled deep upto board and hardware cards through function names or commands sent through virgo\_clone() calls.

3.8 CPU Pooling Driver – Multi-kernel-threaded VIRGO clouexec Kernel Driver Module for unrestricted service of virgo\_clone or other client requests.

3.9 Memory Pooling Driver (and a key-value store) and system calls and userspace clients for it on Cloud nodes – virgo\_malloc, virgo\_get, virgo\_set, virgo\_free

3.10 Queueing Driver that implements a wrapper over linux workqueue and also a native local queue – used for KingCobra requests queueing with handler invocation

- 3.11 VIRGO Cloud File Systems Driver that implements distributed cloud file system calls and telnet userspace clients for – virgo\_open, virgo\_close, virgo\_read and virgo\_write of a file on remote cloud node
- 3.12 All the drivers above for CPU, Memory and File System on cloud have 3 paths each for telnet connection to remote driver kernel server socket and system call connection to remote driver kernel server socket – 1) parameter is executable in userspace 2) parameter is a function name which uses a kernel upcall plugin to execute in userspace 3) parameter is a function name executable in kernel space – configured by a boolean flag with in the driver binaries. Based on this flag either kernel upcall to userspace or kernel intermodule invocation is done.

Goal of VIRGO is thus to enable viewing entire cloud as a single “logical machine” upto hardware level and this differentiates from other cloud libraries which are in userspace mostly. Unification and Integration of AstroInfer and USBmd into VIRGO to make it a Cloud Platform with Machine Learning abilities, Integration of mobile operating systems in cloud are, among other things, long term goals for VIRGO.

(Latest Code at sourceforge repository: VIRGO - <https://sourceforge.net/projects/virgo-linux/> and periodically updated Design details at: <http://sourceforge.net/p/virgo-linux/code-0/HEAD/tree/trunk/virgo-docs/VirgoDesign.txt>)

Design started in 2008. (Last released tag: VIRGO 12.0)

5. Krishna iResearch intelligent Cloud Platform – King Cobra – Byzantine Distributed Request Servicing Software with Queueing and Arbiters (that includes a new experimental Electronic Money Protocol – MAC (MessageAsCurrency) Design) on either Krishna iResearch intelligent Cloud platform or Hadoop Cluster – (Repository - <https://sourceforge.net/p/kcobra/> and periodically updated design notes at <https://sourceforge.net/p/kcobra/code-svn/KingCobraDesignNotes.txt>)

Implements a minimal kernelspace and userspace messaging framework using VIRGO cpupooling (virgo\_clone) and memory pooling drivers that in turn queues the requests into a kernel workqueue. The VIRGO workqueue handler pops the request from workqueue and invokes KingCobra driver's servicerequest exported function and replies to the publisher and optionally disk persists the incoming requests to filesystem through VFS. Differentiator is KingCobra implements a cloud messaging with a decentralized queue with disk persistence and workflow in kernel level so that hardware is easily integrated into cloud. (Last released tag: KingCobra 1.0)

**[In addition to the above, IT and other academic training for students and freshers is also done in freetime. ]**

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June 2014 – July 2014 – PiQube, Chennai – Consultancy on Design and a Java based minimal Implementation for computing the various statistical measures from a job experience sequence: 1) Stability or predictability of job experience sequence using Shannon Entropy and Inversion number, 2) Estimating various types of average experience metrics, 3) Mobility scoring, 4) Initial work on Skills based clustering of linkedin profiles using String similarity and 5) Initial Hidden Markov Model design for job change motivation inference

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February 2014 – PiQube, Chennai – In-office non-profit Consultancy to PiQube for initial design of a Multivariate Linear Regression model for Stability and Gap scoring in Resume that includes entropy independent variables using ENT sequence disorder measure, study of various tools (including Stanford CoreNLP - Classifiers and Recursive Tensor Neural Network Sentiment Analysis Tools) for Sentiment Analysis of a Resume and Holistic Resume scoring model using social network analysis from multiple datasources

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October 2013 – January 2014 – continued work on my opensource products (Krishna iResearch - [https://sourceforge.net/users/ka\\_shrinivaasan](https://sourceforge.net/users/ka_shrinivaasan)) and non-profit machine learning remote consultancy to PiQube, Chennai (<http://piqube.com>) for initial design of a Resume scoring, Named Entity Recognition in Resume using GATE, CRF++, IIT-Bombay CRF, study of Social Network Analysis Tools (SocVnet,SNAP etc.,) and informal mail interactions on my open source products among other things

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September 2012 - February 2013 – Parttime Consultancy for Global Analytics(Chennai) and Work on my opensource products (Krishna iResearch)

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1. Did the Python AMP workflow implementation as per the workflow specification for AMP using PyUtilib, RabbitMQ and Config files support.
2. Wrote AMP workflow-over-cloud specification in addition to AMP workflow spec.
3. Guided on GDP bug fixes and issues

Apart from the above worked on design and development of my nonprofit open source products- [https://sourceforge.net/users/ka\\_shrinivaasan](https://sourceforge.net/users/ka_shrinivaasan)

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January 2011 – March 2011 and July 2011 – August 2012 – Global Analytics(Chennai)

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## – Senior Lead Software Architect (C/C++/Python)

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1. Mentored and Managed a team of 3 people .
2. Released version 2.3.1 of Global Decision Platform(GDP) with fixes for crashes in production environment.
3. Did refactoring, many bug fixes and enhancements to Global Decision Platform(GDP) version 2.5.0 for master demo lead passthroughs to work.
4. Implemented acceptor-worker thread model request handling in GDP 2.5.0 with single acceptor thread and configurable number of worker threads for Service Execution Manager(SEM) and Service components of GDP. This resulted in significant improvement in response time.
5. Designed and implemented session based request-response in GDP 2.5.0
6. Implemented modified timeout error logging with placeholders for errorcodes and request id and did fixes for frequent crashes in production environment for GDP 2.5.0.
7. Released GDP version 2.5.1 for which 2 minor binaries were developed to clear the queue and test the creation of queues (for System V message queues)
8. Released GDP version 2.7 which has important bug fixes for crashes in python container(needed for AMP runtime described later), few features for graceful shutdown of the SEM, option to reconnect to MySQL during exception in Python container etc.,
9. Redesigned GDP 2.5.0 SEM loadbalancer for GDP 3.0 to route requests to service

processes by periodically monitoring the service process load and removing a bottleneck due to wait/notify code. This resulted in 10x speed up of the request-response throughput time.

10. For GDP version 3.0, designed and Implemented a new **Session Timeout Manager** algorithm to timeout the request session based on user configured timeout value(simplified version of Survival Index Based Transaction Timeout Manager mentioned later).

11. For GDP version 3.0, worked on embedding multiple python interpreters in Service process with Python C API replacing boost::python calls. This involves facility to have a global dictionary across multiple interpreters (or) local dictionary per request (or) per-thread dictionary for each service worker thread (using thread local storage) and also creation of pool of interpreters from which interpreters are allocated per request and returned to the pool after the request is serviced. This obviated the need for boost::python since boost did not support multiple interpreters with multithreading and interpreter pooling. This involved fixing one of the most time consuming bug related to restricted mode python in 2.4.3. Since it was deprecated in python 2.7, fixed Python 2.4.3 source to circumvent restricted mode and also did another fix for the same problem with PyImport\_ImportModuleEx()

12. Mentored the team to work on Dynamic Risk Tables (DRT) library of GDP to extend the database compatibility to MySQL and Oracle

13. Was involved in the Automated Modelling Platform(AMP) development to automate the predictive modelling from the production data. Fixed many crashes in python runtime during testing of AMP prototype realtime design. Suggested an alternative design for AMP realtime based on external user address-space message queue, which populates the in-memory queue from on-disk request log, periodically replenishes it from disk, reads requests from message queue and posts them in parallel to Realtime-subset and Realtime-superset

python services, and gives a virtual view of the single physical queue to each queue client(queue clients are located in SEM) – meant to replace an existing queueing module with msgsnd/msgrcv which involves user and kernel address-space copying to remedy huge queue backlog seen in AMP realtime prototype. This tightly couples GDP Python runtime with the AMP runtime

14. For GDP 3.0, implemented a GDP pluggable queue named **GDAMPQ** designed for AMP above – Global Decisioning and Automated Modeling Platform Queue which is a simple in-memory queue with optional disk persistence to replace an existing queueing module with msgsnd/msgrcv which involves user and kernel address-space copying. This in-memory queue in best testing circumstances is 30% better than the System V unix message queues.

15. Worked on Python 2.4.3 source code to analyze crashes in PyMalloc. Modified Python 2.4.3 source to add a flag **DISABLEPYMALLOC** to disable calls to PyMalloc and re-route them to unix malloc/free systemcalls. Also analyzed Python 2.4.3 source code for restricted mode related errors while designing multi-interpreters for GDP 3.0 and fixed them.

16. Worked on writing python configuration scripts for automating the build configuration and installation of GDP components like SEM, Service and Master .

17. Implemented a minor **encrypt** utility for master component of the GDP

18. Wrote Functional specification for **GDP 3.0 Automated Installer** design

19. Wrote Functional specification for **AMP Workflow**

20. Wrote Functional specification for **AMP Cloud deployment**

21. Studied python workflow packages for AMP workflow viz., Pyutilib.workflow, PyF and implemented a workflow prototype for AMP workflow in Pyutilib.workflow.

22. Implemented a small prototype stub using Dumbo Mapper-reducer for Cloud Deployment of AMP

23. Did 2 one-week training sessions for GDP versions

24. Did one-week training session for Python.

25. Implemented a mini-GDP client and server for debugging socket related errors in production.

26. Developed a documentation knowledgebase intranet website for GDP documentation, design documents, installation troubleshooting documents and debugging documents.

27. Implemented a Build Version feature for GDP 2.7.1 and GDP 3.0 which dynamically generates a buildversion.h headerfile which contains #defines for build machine and architecture information,SVN source tree version information for the build and is built at runtime by SEM, Service and Master binaries which include this buildversion.h header file  
(In August 2012 resigned for personal reasons.)

## **opensource products (Krishna iResearch) – (C++/Python)**

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Worked on my Open Source Products Design & Development (Krishna iResearch) and Did consulting and development for Global Analytics, Chennai (optimization, a smart-pointer reference-counted memory manager backed-up by an Object Pool, and refactoring) in Global Decision Platform (GDP) 2.3 for GPD 2.3.1 and 2.5 which is written in C++ with boost::python embedding.

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## **August 2008 – June 2011 – Work on my opensource products (Krishna iResearch)**

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Started working on open source project ASFER (<http://asfer.sourceforge.net>) as part of my non-profit open source initiative Krishna iResearch – ASFER is a rule miner and executer- presently uses Vector space retrieval and Support Vector Machines with added Support for Naive Bayesian Multinomial Classifier and Decision Tree Classifier

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## **March 2006 – July 2008 - webMethods (now Software AG) (Bangalore) (C/C++/Java)**

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Worked on WebMethods Broker Server 5.x/6.x/7.x– a heavily multithreaded messaging product written in C/C++/Java based on publisher/subscriber model – Clients can publish and/or subscribe to certain predefined types of messages called “Events”. My responsibilities included development of new functionalities and fixing customer escalation issues in core areas of Broker (Connection Layer, Territories/Gateways, Broker Admin Tool etc.,) and writing knowledgebase documents.

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November 2005 – February 2006 – Krishna iResearch (self-started, not-for-profit, open-source research initiative)

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Initial design work for Krishna iResearch open source products focussing on algorithms for web and BigData

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August 2005 – November 2005 – Verizon Data Services India, Chennai

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In Verizon India for brief period and then self-study in Mathematics and Computer Science.

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May 2003 – Krishna iResearch (self-started, not-for-profit, open-source research initiative)

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Registered on SourceForge.net and Initial design work started for open source products focussing on algorithms for web and BigData

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February 2000 – July 2005 - Sun Microsystems (now Oracle) (Bangalore)

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Ported SunONE Application Server to Red Hat Enterprise Linux  
Advanced Server 2.1 (2005)

Certified JWS DP 1.3 webservices pack on Sun One Application  
Server 7.1 (2005)

Studied feasibility of supporting SunOne Web/Proxy Server on Solaris 10 zones (2005)

On Academic Sabbatical for 3 months (February 2005-May 2005)

**Implementation of a threaded ICP server and porting SOCKS server for Sun Java system web proxy server 4.0 (C/C++/Solaris/Windows/RHELinux) (2004-2005):**

Implemented a threaded ICP(Internet Cache protocol) server functionality using NSPR threads.

Also ported a legacy SOCKS server to proxy server 4.0.

**Load Balancer Module for Apache Web Server 1.3.27 / 2.0.47**

**(C/C++) (2003-2004) :**

Designed and implemented a Load balancer module for Apache 1.3.27 which will route the HTTP/HTTPS requests onto SunONE Application Server instances by Round Robin Algorithm.

This module is part of Sun ONE Application Server 7, Enterprise Edition. Also ported the module to Apache 2.0.47.

**Optimizations and Features for iPlanet/Sun ONE Application**

**Server 6.x (Java) (open sourced at <http://glassfish.java.net>) (2002) :**

a) Fixed bugs related to performance, admin-tool and security in iPlanet Application Server 6.x. Also fixed few CTS bugs in SunONE Application Server 7 Standard Edition.

b) Involved in optimization of SUN J2EE Reference Implementation (RI) to make the JTS transaction manager enterprise-class. This included introducing a new Component Level Transaction Attribute setting feature in iPlanet Application Server 6.5. With this, user can set the type of transaction (XA or Local) at J2EE application component level. [Patents granted – details in the end]

c) Added a Trace functionality for the JTS transaction manager in SunONE Appserver 7.0 Enterprise Edition (<http://glassfish.sourceforge.com/documentation/1:2ur2-b04->

1/dir\_512e7fccb5ab465c594742cd72317a0e.html).

**Debugging and Monitoring framework (MagicDraw) (2002) :**

Designed a Debugging and Monitoring framework for Sun ONE Application Server 7.0 Enterprise Edition.

**Store Adapter prototype for High Availability(Java) (2002) :**

Implemented a store adapter prototype for Clustra High Availability Database. This was to test the feasibility of using Clustra HADB as backend store for session data in SunONE Application Server 7.0 Enterprise Edition.

**Minor Feature Addition to SunOne Application Server 6.5 SP1 (2002)**

Added support for enabling/disabling TCP\_NODELAY in SunOne Application Server 6.5 SP1

**Survival Index based Transaction Timeout Manager for iPlanet Application Server (Java) (2002):**

Designed and implemented a new Transaction Timeout Manager for iPlanet Application Server. This resulted in an overall speed-up of 10% for the application server. (Invention Disclosure done in 2002-2003)

**Miscellaneous Bugfixes for customer escalations in the BillerXpert product which was dependent on iPlanet Application Server. This was one of the most involved bugfixes that required many days of debugging with JVM Profiling tools. (2001)**

**An automated Test suite for nightly build setup of iPlanet Application Server 6.0 (2001):**



Designed and implemented a test suite which ran a set of regression tests on nightly builds of iPlanet Application Server - written on Korn shell.

JVM related bugfix for IBM's Java Virtual Machine team related to native thread and green thread implementations of JVM (2000)

Created a Resume Querying System using JDBC with Oracle Backend for Sun Microsystems Human Resources Department to track candidate profiles – named ResumeXpert (2000)

#### Official Training Courses (SunU)

1. Solaris internals
2. Multithreaded Application development in Solaris
3. SOLARIS DEVICE DRIVER INTERNALS

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July 1999 - January 2000 - BaaN Infosystems (now SSA Global) (Hyderabad)

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Developed a storefront for an e-commerce application called E-Enterprise using Microsoft Internet Information Server/Site Server, Visual Basic, Active Server Pages and Visual Interdev

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January 1999 – May 1999 – BE Thesis and Project(team) – COBRA –  
Distributed Computing Framework based on CORBA(Visibroker) and JAVA.

April 1998 – June 1998 – BE Internship at Steel Authority of India Limited  
(Raurkela and Durgapur Steel Plants) – Enhancements to Automated Furnace  
Data Acquisition software through a GUI developed on VAX Fortran over VAX  
VMS

#### MISCELLANEOUS

1. Gold medal for proficiency from PSG Tech for ranking first in B.E.(CSE) – Received in February 2000
2. Praveen Uttarardh (Hindi) - 1988 - 92
3. Joint Entrance Screening Test(JEST) 2006 in Theoretical Computer Science - Rank 21.
4. Interests include solving puzzles, writing, reading non-fiction mostly on science, mathematics, religion and philosophy.
5. Participated in Winter School 2010 on Machine Learning and Computer Vision, Microsoft Research & CIFAR, IISc