

**Dr. B. Kanagasabapathi, M.E., Ph.D.,**  
*Research Scientist,*  
Center for Knowledge Driven Information Systems, Infosys Labs,  
**Infosys Limited,**  
Infy City, Hosur Road, Bangalore - 560 100. INDIA.  
Email: saba8879@gmail.com; sabapathi@india.com.  
Mobile No.: +91-72590-33257  
Homepage: <http://sites.google.com/site/saba8879>



## Summary

- ❖ Skilled at learning new concepts quickly and communicating ideas clearly and effectively.
- ❖ Strong in business acumen, customer orientation, change management, analytical skills, communication skills, team development and mentoring.
- ❖ Has strong inclination towards continuous learning and research.
- ❖ Highly adaptive & quick acceptance to changes.

## Career Objective

To become a dynamic researcher to provide real time solutions to the practical issues of industries by embedding theoretical knowledge into practical by continual learning and implementation.

## Career Interest

1. Optimization
  - Resource Optimization
  - Combinatorial Optimization
2. Forecasting & Applied Statistical Modeling
  - Developing forecasting models
  - Developing statistical models for business needs
3. Project Management
  - Multi-project Scheduling
  - Generating Resource-constrained project schedules
  - Project Monitoring and Cost Control
  - 4D Visualization & its Applications
  - Developing Transportation/Logistic Models

## Research Skill Sets

- Developing algorithms for complex deterministic and stochastic optimization problems using Heuristic Techniques.
- Developing linear programming models.
- Critical analyses of data sets for effective project management.
- Developing 3D CAD building/product models.

**Work Experience**

Organisation/ Institution	Designation	Experience	
		From	To
Infosys Limited	Research Scientist	October, 2011	Till date
Infosys Technologies Limited	Senior Research Associate	April, 2010	September, 2011
Infosys Technologies Limited	Research Associate	October, 2009	April, 2010
Infosys Technologies Limited	Junior Research Associate	August, 2007	September, 2009
Indian Institute of Technology Madras	Teaching and Research Assistant	July, 2002	July, 2007

**Educational Qualifications**

Degree & Branch	Institute / University	Year	% of Marks with Class	Remarks
Ph.D. (Project Management & Operations Management)	Indian Institute of Technology Madras, Chennai.	2008	9.15 (CGPA) First Class with Distinction	NA
M.E. (Construction Engineering & Management)	College of Engineering, Guindy, Chennai. Anna University.	2002	8.73 (CGPA) First Class with Distinction	Class Second

**Software Orientation**

Operating Systems : MS-DOS, Windows.

Languages : Turbo C, Exposure to C++, Exposure to Visual Basic 6.0.

Packages : MS Office, AutoCAD 2000, Primavera Project Planner (P3), MS Project 2003, QSB, LINDO, MATLAB 7, Extend 5, SPSS, Exposure to SAS.

**Project Involvement**

Infosys Labs, Infosys Limited (*formerly* SETLabs, Infosys Technologies Limited)

Title : iARM: Infosys Association Rule Mining

Description : Association rule mining (ARM) is a data mining technique that extracts rules based on the hidden relationship between entities present in a large database. ARM assists in understanding what products or services are likely to be purchased or subscribed together by a consumer. Knowing and analyzing what products customers' purchase as a group can be very helpful for retailers' and manufacturers' in the Consumer Packaged Goods (CPG) industry. Though ARM is applied to carryout market basket analysis (MBA) in the retail industry, the application is not limited only to retail industry alone. ARM finds its application in other industries such as telecommunication, banking, insurance, bioinformatics, and so on. We have developed an in-house fully automated and highly sophisticated rule mining tool which generates rules with greater accuracy in a short span of time by a single click of a button.

Title : MEDCaPS: Model and Event Driven Capacity Prediction System for healthcare industry

Description : The management of resources is one of the key challenges faced by the healthcare industry. When hospitals do not successfully manage capacity assets, they suffer by way of revenue loss, operational inefficiency, delays and patient dissatisfaction. Efficient capacity management can only be built upon a foundation of accurate forecasting and timely scheduling. The resource requirements, that is, the resources to be consumed by a patient, depend on the clinical pathway taken by the patient during his/her hospital stay. The main

challenge in predicting resource requirements in the healthcare context lies in forecasting a patient's clinical pathway, since the pathway has to be forecast well before many of the relevant diagnostic and clinical findings become available. In this project, a model and event driven capacity prediction system (MEDCaPS) is developed to (i) forecast patients' clinical pathways based on historical data, demographic variables, and currently available diagnostic and clinical findings about the patient and (ii) estimate the resource capacity requirements for the patient based on the predicted patient pathway. The MEDCaPS system continually updates its forecasts based on newly available clinical and diagnostic data, as soon as such data becomes available.

**Title** : Development of a statistical modeling framework for iCATalytics

**Description** : Statistical modeling framework is an integral part of the iCATalytics product offering. The statistical modeling capability is being presented to the market as a distinct differentiator and a great value add. Our team initiated the statistical modeling framework development for iCATalytics, which has a long term roadmap of developing a library of models for the retail industry.

**Title** : Development of an algorithm for pattern extraction in a multi-sensor monitoring system

**Description** : For a large manufacturing client in Japan, we have developed an algorithm to identify the abnormal pattern in the system. Three problem instances were provided to analyze the performance of the proposed algorithm. The pattern extraction algorithm is a multi-phase algorithm. In the first stage the region of interest is identified using  $T^2$  statistic. In the second stage the actual sensor readings are mapped to sensor states. The normal data set is used to compute the mean and standard deviation for each sensor. The mean and standard deviation is used to estimate the control limits (e.g., three levels of sigma, namely,  $1\sigma$ ,  $2\sigma$ , and  $3\sigma$ ). These control limits are used to map the sensor readings to sensor states for both normal and abnormal data sets. In the third stage, candidate patterns are identified. A heuristic is applied on the sensor states of the abnormal data set to scan for patterns representing an abnormal event. Such patterns form the set of candidate patterns. In the fourth stage, the best solution is identified from the candidate patterns.

#### Doctoral Thesis

**Title** : Development and analysis of scheduling rules for resource-constrained multiple projects

**Description** : Since the late 1950's, Critical Path Method (CPM) and Programme Evaluation and Review Technique (PERT) have been widely used for planning and scheduling projects. Both the techniques have gained wide acceptance, but their assumption of unlimited resources availability was not valid in many real life situations. Moreover these tools do not offer any help in deciding which activity will have the priority in a resource-constrained scheduling environment. Sequencing rules (also called priority rules, activity urgency factors, scheduling rules or scheduling heuristics) are used to determine which one of the competing activities will have priority for resource allocation. A resource-constrained multi-project scheduling (RCMPS) problem is defined as scheduling two or more projects simultaneously with resource constraints with one given objective. This research work deals with an exhaustive development of scheduling rules by considering project due-dates, operation/activity duration times, operation/ activity due-dates, project slack and activity slack.

#### Publications

Books : 1  
 Patents / Trade Secret : 8  
 Refereed Journals : 9  
 Refereed International Conferences : 11  
 National Conference & other publications : 2  
 (Please Refer Annexure - 1 for complete details)

**Professional Recognition**

- Recipient of Boeing Pride Award 2011.
- Chief Technical Advisory Board, *International Journal of Soft Computing and Engineering (IJSCE)*.
- Chief Technical Advisory Board, *International Journal of Recent Technology and Engineering (IJRTE)*.
- Editorial Advisory Board, *Asian Journal of Computer Science and Technology (AJCST)* and *Asian Journal of Engineering and Applied Technology (AJEAT)*.
- Scientific Committee and Editorial Review Board on Engineering and Physical Sciences, World Academy of Science, Engineering and Technology (WASET)
- Reviewer Board, *International Journal of Data Engineering (IJDE)*
- Reviewer Board, *Scientific Journals International*
- Referee, *Construction Management and Economics*
- Technical Committee, 2012 International Conference on Power and Energy Engineering (ICPEE 2012), 2012 International Conference on Wireless Networks (ICWN 2012) and 2012 International Conference on Electronics Engineering and Informatics (ICEEI 2012)
- Reviewer Committee, 3<sup>rd</sup> International Conference on Mechanical and Electrical Technology (ICMET 2011) Dalian, China.
- Chief Guest, ENFOQUE 2009 - A National Level Technical Symposium held at Kongu Engineering College, Perundurai.
- Senior Member, International Association of Computer Science and Information Technology (IACSIT).

**Academic and Co-curricular Activities**

- Active participation in the organisation of the CIB w92 International Symposium on Project Procurement for Infrastructure Construction held at IIT Madras, Chennai.
- Participated and Organised several short-term courses and conferences conducted at IIT Madras and Anna University.
- Active NSS member and took part in AIDS Awareness Camp, held at Madurantakam.
- Participated and Won Prizes in many Sports Events during School and College Days.
  - Runners up, Sobha Cup 2011, Inter Corporate Cricket Tournament, Bangalore Sports Club, KSCA.
  - Runners up, ICICI Cup 2009, Inter Corporate Cricket Tournament, Bangalore Sports Club, KSCA.
  - Won Silver Medal in IITM Inter Hostel Cricket Competition for the sports year 2005-06.
  - Won Gold Medal in IITM Inter Hostel Ball Badminton Competition for the sports year 2005-06 & 2006-07.

**Scholarships and Grants**

- ❖ Awarded the Tamilnadu Educational Trust Scholarship for pursuing Post-graduate studies in Engineering.
- ❖ Awarded the MHRD scholarship for pursuing doctoral research studies at IIT Madras.
- ❖ Awarded the IITM Foreign Travel grant for participating and presenting a research paper in the 21<sup>st</sup> Annual Conference of the Association of Researchers in Construction Management (ARCOM 2005) held during September 5 - 7, 2005 at SOAS, London, UK.

**Personal Details**

Father's Name : Sri. S. Balasubramanian

Date of Birth : 05/05/1979

Sex : Male

Marital Status : Married

Nationality : Indian

Languages Known : Tamil (native), English (excellent spoken and written), Telugu (speak),  
Malayalam (speak)

Present Address : T-10, Paramount Raghavendra Akash Apartments, 33/2, Konappana Agrahara  
Opp. Infosys Gate 5, Hosur Road, Electronic City, Bangalore-560100.

E - Mail : saba8879@gmail.com  
saba8879@yahoo.com

**Declaration**

I hereby declare that all the information furnished above is true to the best of my knowledge.

Place : Bangalore

Date :

Signature

**References**

Prof. C. Rajendran  
Professor  
Department of Management Studies  
Indian Institute of Technology Madras  
Chennai - 600 036.  
Email: craj@iitm.ac.in  
Phone: +91-44-22574559

Prof. L.S. Ganesh  
Professor  
Department of Management Studies  
Indian Institute of Technology Madras  
Chennai - 600 036.  
Email: lsg@iitm.ac.in  
Phone: +91-44-22574554

## Annexure - 1

### List of Publications

**Books/Book Chapters**

1. Kanagasabapathi, B. "*Multi-project Scheduling: Development and analysis of scheduling rules for resource-constrained multiple projects*" LAP Lambert Academic Publishing, New York, 2011. (ISBN 978-3-8473-0050-2)

**Patents**

1. Shastri, L., Zoubin, G., Miguel, L., Kanagasabapathi, B., and Raj, K.A.A.D. (2012) Method and System for mining frequent items and infrequent items in a large transaction database. (Filed with IP Cell, Infosys Ltd)
2. Raj, K.A.A.D. and Kanagasabapathi, B. (2012) Method and system to efficiently manage freight transportation in a multi-mode distribution system. (Filed with IP Cell, Infosys Ltd)
3. Shastri, L., Raj, K.A.A.D., and Kanagasabapathi, B. (2011) "Method and system for detecting anomalies in a multi-sensor monitoring system." (Filed with IP Cell, Infosys Ltd)
4. Kanagasabapathi, B. and Raj, K.A.A.D. (2011) "Method and system for association rule mining." (*Filed with IPTO and USPTO app. no. 13/111,178*)
5. Shastri, L., Gopichand, A., Kanagasabapathi, B. and Raj, K.A.A.D. (2011) "Method and system for forecasting clinical pathways and resource requirements." US 2012/0150498.
6. Raj, K.A.A.D. and Kanagasabapathi, B. (2010). "Method and system for logical data masking." US 2011/0270837 A1.
7. Raj, K.A.A.D. and Kanagasabapathi, B. (2010). "Method and system for estimating base sales volume of a product." US 2011/0313813 A1.

**Trade Secret**

1. Raj, K.A.A.D., Kanagasabapathi, B., Babu, S.B. and Shah, M. (2009). "*Statistical framework for forecasting sales volumes considering the effect of promotions and pricing in the CPG Industry.*" Infosys Limited, Bangalore.

**Refereed Journals**

1. Kanagasabapathi, B. and Raj, K.A.A.D. (2012). Performance evaluation of sampling methods for mining association rules from large datasets.
2. Raj, K.A.A.D., Kanagasabapathi, B., Shrivastava, S. and Krishnan, K. (2010). "Performance evaluation of Adstock models using market drivers in the Consumer Packaged Goods (CPG) Industry." *International Journal of Electronic Marketing and Retailing* (Accepted for Publication). (ISSN: 1741-1025)

3. Durai Raj, K.A.A., Kanagasabapathi, B. and Agnihothram, G. (2011) "Meta-heuristic to estimate parameters in Non-Linear Regression Models." *International Journal of Mathematics in Operational Research*, Vol. 3, No. 5, pp.473-489. (ISSN: 1757-5850)
4. Kanagasabapathi, B., Rajendran, C. and Ananthanarayanan, K. (2010). "Scheduling in resource-constrained multiple projects to minimize the weighted tardiness and weighted earliness of projects." *International Journal of Operational Research*, Vol. 7, No. 3, pp.334 - 386. (ISSN: 1745-7645)
5. Kanagasabapathi, B., Antony Arokia Durai Raj, K., Shoban Babu, B. and Shah, M. (2009). "Forecasting volumes for Trade Promotions in Consumer Packaged Goods (CPG) Industry using market drivers." *International Journal of Business Forecasting and Marketing Intelligence*, Vol. 1, No. 2, pp.139 - 152. (ISSN: 1744-6635)
6. Kanagasabapathi, B., Rajendran, C. and Ananthanarayanan, K. (2009). "Performance analysis of scheduling rules in resource-constrained multiple projects." *International Journal of Industrial and Systems Engineering*, Vol. 4, No. 5, pp.502 - 535. (ISSN: 1748-5037)
7. Kanagasabapathi, B. and Ananthanarayanan, K. (2005). "4D Visualization as a planning tool in a resource-constrained multi-project scheduling environment." *Special Edition of VIRTUAL Journal* (<http://virtual.inesc.pt/convr2005>). (ISSN: 0873-1837)
8. Kanagasabapathi, B. and Ananthanarayanan, K. (2004). "Implementation of 4D Visualization as a planning tool in the Indian AEC Industry." *Journal of Institution of Engineers (India), Architectural Engineering Division*, Vol. 85, No. 2, October, pp.35 - 40. (ISSN: 0257-344X)
9. Kanagasabapathi, B. and Ananthanarayanan, K. (2004). "4D CAD: A powerful tool for visualizing the construction projects - a Review." *NICMAR Journal of Construction Management*, Vol. XIX, No. II, pp.47 - 54. (ISSN: 0970-3675)

#### Refereed International Conference Publications

1. Raj, K.A.A.D., Lee, F.H. and Kanagasabapathi, B. (2012) Heuristic algorithm for solving capacitated vehicle routing problem.
2. Kanagasabapathi, B., Girotra, N. and Raj, K.A.A.D. (2012). A comparative study of association rule mining algorithm.
3. Kanagasabapathi, B. and Ananthanarayanan, K. "Studies on the performance analysis of scheduling rules in a resource constrained multi-project scheduling environment." Proceedings of the *World IT Conference for Design and Construction (INCITE/ITCSED 2006) Vol - II, Swarup, P.R., and B. Kumar (Eds.)* New Delhi, India, 15 - 17 November 2006, pp.125-139.
4. Kanagasabapathi, B. and Ananthanarayanan, K. "Towards a framework for implementing scheduling rules in Multi-project resource scheduling." Proceedings of the *World IT Conference for Design and Construction (INCITE/ITCSED 2006) Vol - I, Swarup, P.R., and B. Kumar (Eds.)* New Delhi, India, 15 - 17 November 2006, pp.311-322.
5. Kanagasabapathi, B. and Ananthanarayanan, K. "A proactive approach for resource-constrained scheduling of multiple projects." Proceedings of the *1<sup>st</sup> International Conference on Construction Engineering and Management (ICCEM 2005)*, Seoul, Korea, 16 - 19 October 2005, CD-Rom, pp.744-747.
6. Kanagasabapathi, B. and Ananthanarayanan, K. "An organisational delegation model for improving the process of managing multiple construction projects." Proceedings of the *3<sup>rd</sup> Post-graduate Conference on Construction Industry Development*, Johannesburg, South Africa, 9 - 10 October 2005, CD-Rom, pp.30-35.
7. Kanagasabapathi, B. and Ananthanarayanan, K. "A simulation approach for the resource-constrained multi-project scheduling environment." Proceedings of the *5<sup>th</sup> Consortium of Students in Management Research International Conference, COSMAR 2005*, Indian Institute of Science, Bangalore, India, 22 - 24 September 2005, CD-Rom.
8. Kanagasabapathi, B. and Ananthanarayanan, K. "A simulation model for resource-constrained scheduling of multiple projects." *Association of Researchers in Construction Management 21<sup>st</sup> Annual Conference, Khosrowshahi, F (Ed.)*, London, UK, 7 - 9 September 2005, pp.823 - 831.
9. Kanagasabapathi, B. and Ananthanarayanan, K. "Scheduling and visualizing multiple resource-constrained projects." Proceedings of the *4<sup>th</sup> Management In Construction Researchers Association (MICRA) Conference*, Daud, N., Y. Ahmad, F.A.M. Rahim and R. Sulaiman (Eds.), Kuala Lumpur, Malaysia, 4 - 5 May 2005, pp.01-98 - 01-108.
10. Kanagasabapathi, B. and Bh. Nagabhushana Rao. "Simulation studies to improve site level planning of construction activities." *9<sup>th</sup> Online World Conference on Soft Computing in Industrial Applications*, September 20 - October 8, 2004.
11. Kanagasabapathi, B. Ananthanarayanan, K., and Lakshminarayanan, R. "Procurement Management Information System for Indian Construction Organisations operating in Multiple Projects." Proceedings of the *CIB W92 International Symposium on Project Procurement for Infrastructure Construction*, Kalidindi, S.N. and K. Varghese (Eds.), Chennai, 7 - 10 January 2004, pp.162 - 169.

1. Kanagasabapathi, B. and Ananthanarayanan, K. "4D CAD: An efficient tool for planning and scheduling construction projects." Proceedings of the *First National Conference on Emerging Trends in Engineering, Technology and Management, Indian Society for Technical Education (ISTE Chapter)*, Hosur, 8 - 9 September 2003, CD Rom.
2. Kanagasabapathi, B. and Ananthanarayanan, K. (2004). "4D CAD: An efficient tool for planning and scheduling construction projects." *Engineering Today*, Vol. VI, No. 8, pp.2 - 5.