



Newsletter

Operations Research Society of South Africa
Operasionele Navorsingsvereniging van Suid-Afrika





NATIONAL CONFERENCE OF THE OPERATIONS RESEARCH SOCIETY OF SOUTH AFRICA

University of Stellenbosch

20 – 23 September 2009

We are pleased to give notice of the 38th Annual Conference of the Operations Research Society of South Africa (ORSSA) to be held at the Stellenbosch Institute of Advanced Study on the main campus of Stellenbosch University. During this conference we shall celebrate the 40th anniversary of ORSSA. Full details of the meeting, including a preliminary programme and the registration fee structure are available on the conference website:

www.orssaconf.co.za

Keynote speakers: Professor John J. Bartholdi, III
Manhattan Associates Professor of Supply Chain Management
School of Industrial & Systems Engineering
Georgia Institute of Technology, Atlanta

Professor Extraordinary of Operations Research
Department of Logistics
Stellenbosch University, Stellenbosch (South Africa)

Online registration opened on Monday March 2nd 2009.

Please make a note of the following important dates:

Friday 31 July 2009:	Deadline for Abstract Submission
Tuesday 30 June 2009:	Deadline for Early-bird Registration
Tuesday 15 September 2009:	Last day of Registration
Sunday 20 September 2009:	Welcome Reception
Monday 21 September 2009:	Start of Conference

Registration and abstract submission may be done online on the conference website.

FROM THE EDITOR

Contactable at: zane@sun.ac.za



Zane Simpson

With the cold weather almost upon us, it's a great time to stay indoors and do some reading. I hope this newsletter can provide you with an interesting read.

We have my regular comic I have added, and Sarma Yadavalli gives his thoughts on the future of ORSSA.

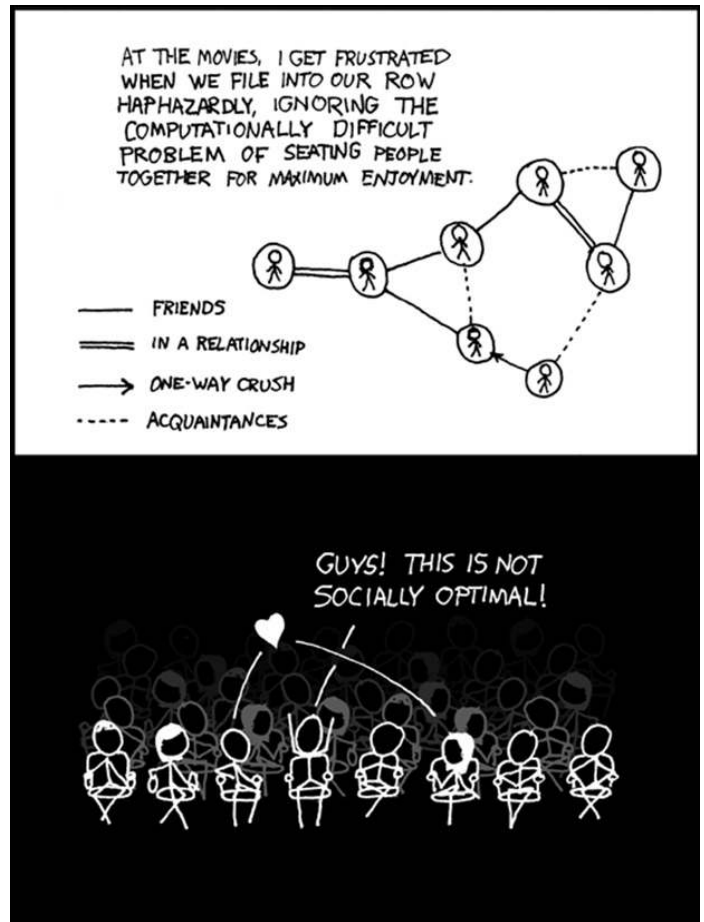
I was fortunate in obtaining two wonderful articles for this newsletter. The first is an article entitled *Solving Sudoku Problems with IP Software* by Theodor Stewart, and the second entitled *Election Night Forecasting 2009* by a team at the CSIR.

I wish to encourage more readers to submit contributions for the newsletter.

The member profile in this issue is long standing ORSSA member, Stephan Visagie, who is the business manager of ORiON.

I hope you enjoy this issue, as I have enjoyed putting it together for you all to read.

COMIC



Source: <http://www.xkcd.com>

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From the President's Desk

by Sarma Yadavalli (yadavalli@postino.up.ac.za)

ORSSA President



Warm greetings from all of the Executive members of ORSSA. I am honoured to have this opportunity to share my thoughts with you about the future of the ORSSA, and to thank you for making ORSSA what is today. China and India are advancing rapidly in the number of science and engineering patents granted, the number and quality of students graduated, and the levels of R & D funding committed and invested. In South Africa, it is time to reignite our commitment to science and technology – and ORSSA can lead the way. Everyone knows that the keys to success in this endeavour are education, collaboration, and innovation.

Today's students are our future scientists, technologists, and decision makers. Now, more than ever, we need to engage the next generation in the exciting and challenging field of Science. My daughter always says, 'Dad, every problem in our life is an optimization problem, Is it not true?' I agree with her, and this is the reason why we need Operations Research. In today's world mathematics and science are no longer pursuits for the few. They are needed by everyone. We all know the advancement of Mathematical problems in Operations Research. The Department of Education in South Africa has been very vocal on this issue. In the current economic situation, one can think on whether ORSSA can do something extraordinary.

The way forward is fraught with economic difficulties both from an international and national perspective. However I am confident that should we unite in our purpose and goals, we can surmount such challenges and become an even more relevant society for all. With your support and participation we will take proactive actions, rally together and hone our collective skills as a professional body. I am very confident that we will emerge stronger and better as we move forward to serve our entire community.

I request all our members to take active steps to increase the membership at least two-fold as soon as possible. I welcome your views and suggestions to enhance the activities of our society and to endow it with dynamic participation in our field of endeavour.

**Senior Quantitative Analyst:
Market Risk Model Validation**

This is a vacancy that exists within the Risk Division of Nedbank Ltd.

Purpose of this role: To independently review and validate the following models:

- trading market risk
- investment risk
- counterparty credit risk
- operational risk,
- asset/Liability Management(ALM)

Outputs required:

- Design effective process and procedures for the validation of market risk, counterparty credit risk, operational risk and ALM models
- Give input to the development and improvement of the bank's model validation policy
- Ensure that an effective process is in place to validate derivative pricing models
- Validate market risk measurement models including the stress-testing of these models
- Validate counterparty credit risk models including the stress-testing of these models
- Validate ALM models
- Validate operational risk models
- Design models and benchmarks to enhance the model validation process
- Liaise with model developers from business cluster labs in order to ensure an effective model validation process
- Ensure that the market risk, counterparty credit risk, and operational risk models conform to regulatory (ie Basel 2) requirements

Formal qualifications:

M. Sc or PhD in Mathematics, Statistics, Financial Maths, Engineering or Operations Research

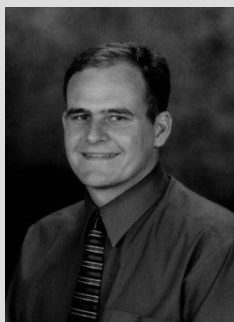
Additional comments:

- Minimum 5 years in a quantitative role
- Good understanding of optimisation , Monte-Carlo simulation and stochastic process, combined with the ability to apply these in the real world
- Ability to program in C++, Matlab, or Visual Basic
- Understanding of the financial markets and financial products such as derivatives

Contact details: Interested applicants can e-mail their cv's to vusid@nedbank.co.za and if they require more information they are welcome to contact Vusi Dladla at (011) 294-3853.

MEMBER INTERVIEW: STEPHAN VISAGIE

Contactable at: svisagie@sun.ac.za



Stephan Visagie

Stephan Visagie grew up on a farm near a small Karoo town, named Middelpoort. It is situated roughly halfway between Calvinia and Sutherland. After completion of his military service he obtained all his degrees at the University of Stellenbosch. He joined the Department of Logistics at the University of Stellenbosch in 1998 as a lecturer and is currently an associate professor of Operations Research at this department.

How did you get involved / hear about O.R. and what attracted you to it?

I started out studying physics and chemistry at the University of Stellenbosch. Along the way I took applied mathematics as an elective and enjoyed it a lot. So, I ended up with physics and applied mathematics as my major subjects. It was a very difficult decision as to which of these two subjects I should pursue on a postgraduate level. Applied Mathematics won by a slight margin. At the time, the Department of Applied Mathematics had a couple of OR modules in their postgraduate program which was my first introduction to OR. I enjoyed it from the start. I am very privileged and glad about the fact that I received all my formal OR education from two big names in OR in South Africa, namely Hennie de Kock and Gerhard Geldenhuys.

Which specific area of expertise are you the most interested in?

I cannot really say there is one single area that I am more interested in. In general, I am interested in a lot of diverse fields – the same applies to the different areas within OR. Most of my OR work fall under the broader field of Mathematical Programming. That is what I am more comfortable with. I am also interested in metaheuristics and combinatorial optimisation. However, what I am sure about is that in the broader sense I am more interested in the deterministic side of OR.

When did you get involved in ORSSA and what made you feel it was a worthwhile endeavour?

My first contact with ORSSA was when I attended the ORSSA conference in Mbabane, in Swaziland, back in 1996 as a post graduate student in Applied Mathematics. Two years later I was elected on the ORSSA executive committee and have stayed involved since then. My experience with ORSSA is that the members are friendly and that they form a close community in which they support each other – especially students that enter this community.

You are the business manager of ORiON. Does this take up a lot of your time, and why do you do it?

It does take up an enormous (I may say disproportionate) amount of my time, but on the other hand it is very rewarding as well. Since her appointment as my typesetting assistant, Lieschen Venter has helped me a lot and carried a big share of the workload. She is doing an excellent job.

I am involved and stay involved with ORiON, because I am very proud of the product WE put forward. In this "WE" the name of Jan van Vuuren should be mentioned – he also invests a huge amount of his time in ORiON and is central to ORiON's success. I believe that ORiON is constantly increasing in quality and stature and I am proud to be involved in it.

Have you been involved in any interesting OR projects or research, and what were they about?

To me, all the projects that I am involved in are interesting – that is exactly why I am involved. It would be unfair to highlight only some of them. From an interesting perspective I could mention that I am co-supervisor to a Master's student in Physics who is applying metaheuristics to optimise quantum computing algorithms. I am excited about this project because it combines OR and Physics – the two subjects that I enjoy dearly.

What has been the highlight of your OR career to date?

The highlight in my opinion would be the day when we got permission from the University of Stellenbosch to start a program in Operations Research in the Department of Logistics. It took hard work from Wessel Pienaar and (to a lesser extent) me to achieve that. I have to lift my hat to Wessel for his role in achieving this. After the program was approved, Hennie de Kock was appointed at the department. The two of us had a very heavy lecturing load in the beginning, because we were responsible for all the OR modules in the program. We had an excellent relationship and academically complemented each other very well. We started out with five students and this number constantly increased to about fifty students. I am very grateful that my road crossed with excellent students in this time – many have remained friends until today. The majority of OR skills at the University of Stellenbosch are now hosted in the Department of Logistics. I am glad and proud to be part of this OR group and to have been involved in it from the start.

How do you feel about young OR students?

I feel passionate about young OR students, because they are the future of the subject. I put in a lot of effort to convince young students to enroll for and get involved in OR.

ADVERTISEMENT VACANCY

A vacancy for a full A4 advertisement in this publication has become available. This will be full colour, for the inside front cover. If you are interested in advertising within this publication, please contact our newsletter business editor:

Mr Francois Bester

Email: fbester@oprecon.com

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For more information about advertising in this ORSSA publication or online, please visit our online advertising space at:

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and click on Advertise on the navigation menu.



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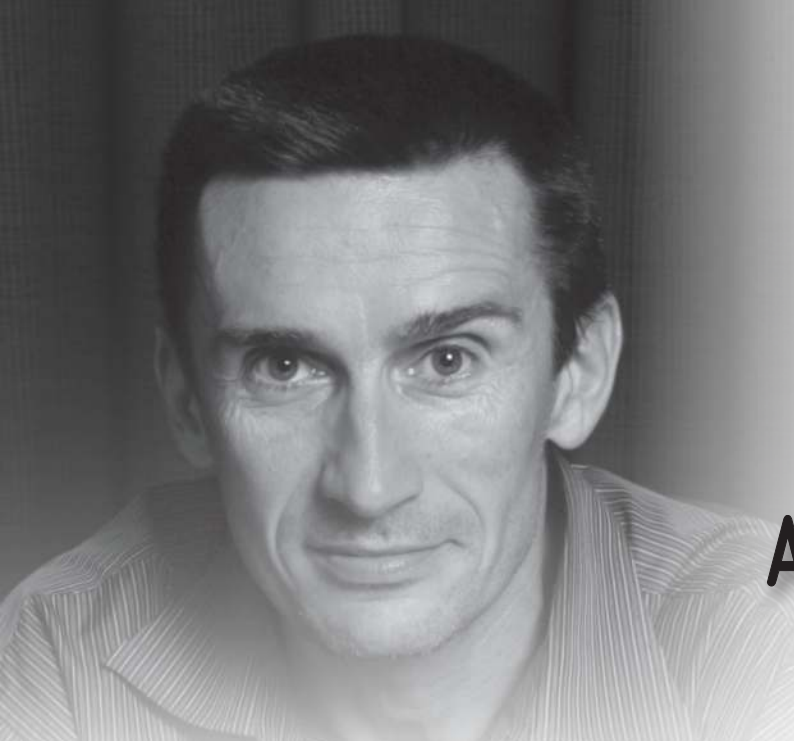
QUERIES AND CONTRIBUTIONS

Any queries and contributions to the newsletter are most welcome, especially article submissions. For any queries and contributions, please contact the newsletter editor:

Zane Simpson

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AN INFORMATION REVOLUTION LIVES IN YOUR ENTERPRISE ARCHITECTURE

**By Goran Dragosavac, at SAS Institute
South Africa**

As the need for corporate governance has grown, so has the need for data governance. But data governance itself cannot be achieved unless a strong methodology around your enterprise architecture, business processes and ultimately your information architecture have been formulated.

When looking to define what an enterprise architecture is, one can say that it is in theory the “organising logic” used by business processes in a technology framework. From this we can deduct that an information architecture is then the logic and processes surrounding the management of an organisation’s information.

But a true information architecture is built on a solid enterprise architecture, and is more than just the data and the software that manages it. It is a set of principles, disciplines, and process that a company adheres to, and is influenced by factors such as data storage, retrieval and analysis within the enterprise architecture.

A rather general explanation of information architecture involves designs of processes including methods of organising, labelling and accessing information. When referring to information and not data, an information architecture strategy simply needs to provide easy access, storage and retrieval of data and then the tools to turn this data into useful information.

An Information Strategy

An enterprise architecture could be a series of enterprise software systems cobbled together to provide an organisation with the means to provide operational efficiencies and complete operational tasks. A true enterprise architecture is one where these very systems

seamlessly integrate with each other for cross-functionality and/or feed into a centralised data store. It is developed in a layered approach and takes the business, user and organisational needs into consideration and meets each of these.

On the flipside the information architecture then draws from this centralised set of processes or the data layer beneath these, and sets about improving efficiency and effectiveness of the business itself because the structure of information is documented, understood and accessible.

An information strategy consists of a technology infrastructure and an organisational infrastructure. The organisational infrastructure is made up of leaders who supply the strategy, stewards who maintain information accuracy and operation experts who know the systems requirements and needs. The technology infrastructure is made up of three main components, namely; processes that support the business processes, information services which are specifically designed business specific processes and data storage services that are part of the larger enterprise architecture picture.

The Enterprise Information Goldmine

With an effective enterprise architecture in place, that allows cohesion between business processes and data, one can start extracting real value from the information at hand.

By using analytics and data analysis tools as a pervasive mechanism within your enterprise architecture, organisations are able to turn otherwise menial data into information. They can then start predicting patterns in an organisation, perform cluster analysis, monitor operational efficiencies, map trends and then start making quantifiable assumptions of the future of the business based on this data.

By adding an analytics layer, that is modelled to your specific business needs, to your enterprise architecture you can be assured of being able to tap into this data with ease. This layer should always be open systems based, and be able to integrate with a myriad of applications – a proprietary system will leave you back where you started – with silo’s of information and no accurate view of your business.

Conclusion

So while an enterprise architecture is an essential tool for organisations today, as it streamlines processes, creates efficiencies, stops wastage and curbs duplication, the true value of adopting it lies in what you do with the information it can yield.

When looking towards taking the leap to an enterprise architecture paradise, be sure you don’t overlook building an information strategy. To create a solid information architecture strategy, it needs to be understood that information architecture is more just data in a database. It needs to be seen as a hierarchy of products and services arranged to ensure the accurate and fast delivery and storage of data and all information across the enterprise.

To learn more about how to meet the requirements for real-time decision making, contact SAS on +27 11 713 3400 (Johannesburg and Pretoria) or +27 21 912 2420 (Cape Town) or visit our website, www.sas.com/sa.



THE POWER TO KNOW.

Solving Sudoku Problems with Standard IP Software

by Theodor J Stewart (Theodor.Stewart@email.uct.ac.za)

Department Department of Statistical Sciences, University of Cape Town and
Manchester Business School, University of Manchester

This article lays no claim to being a research paper, and certainly no form of survey of algorithms is intended. Our primary aim is to demonstrate that sudoku problems (of any level of difficulty) can easily and quickly be solved using no more than standard integer programming software.

I would have thought that formulation of the sudoku problem as a standard IP structure would be a pretty obvious approach for any one in OR, and I implemented the approach purely for my own entertainment. (My wife thinks I'm crazy and miss the point of puzzles!) But I have not seen reference to the approach, and thought members of ORSSA might be interested.

In fact, a brief Google Scholar search on sudoku algorithms generates a large number of hits, with references to erudite research papers discussing (*inter alia*): heuristics and metaheuristics, artificial intelligence, evolutionary algorithms, particle swarm optimization, constraint programming. Now, I do not for one moment dispute that the sudoku problem might be a useful test bed for testing and comparing different algorithms, but as we shall see, such research has nothing to do with solving sudoku puzzles.

I am assuming that every reader is familiar sudoku. As a start towards an IP formulation, let us define the binary variables x_{ijk} ($(i = 1, \dots, 9; j = 1, \dots, 9; k = 1, \dots, 9)$) such that $x_{ijk} = 1$ if integer $k = 1, \dots, 9$ if integer k appears in row i , column j of the tableau. At this stage, there are of course 729 variables, but many of these automatically fall away before we move to solution to the LP. The contents of a number of cells are given; suppose that the content of cell r, c is specified as the integer n , which fixes $x_{rcn} = 1$. But it is not only this variable which is fixed, as we must also have $x_{rck} = 0$ for all $k \neq n, x_{icn} = 0$ for all $i \neq r$ and $x_{rjn} = 0$ for all $j \neq c$. In other words, for each cell for which the entry is specified, the values of 25 of the x_{ijk} variables are fixed. Of course, there may be some duplication of

information, but nevertheless our experience is that the number of free variables is typically reduced to about 200 or less in this way.

In order to capitalize on this reduction, there needs to be some form of preprocessing as follows:

- Create a marker for each (i, j, k) , say m_{ijk} , initialized to (say) -1 ;
- For each cell (r, c) for which the content is specified as n , set $m_{rcn} = 1, m_{rck} = 0$ for all $k \neq n, m_{icn} = 0$ for all $i \neq r$ and $m_{rjn} = 0$ for all $j \neq c$;
- Create a list of variables for the LP solver which includes only those x_{ijk} for which $m_{ijk} < 0$.

We shall express the constraints as functions of all x_{ijk} , but we note that many of these are constants which should be moved to the "right-hand side" of the constraints. In principle, four sets of constraints are needed, viz.:

$$\sum_{k=1}^9 x_{ijk} = 1 \quad \text{for all } i, j \quad (\text{One entry per cell})$$

$$\sum_{i=1}^9 x_{ijk} = 1 \quad \text{for all } j, k \quad (\text{Digit } k \text{ once in column } j)$$

$$\sum_{j=1}^9 x_{ijk} = 1 \quad \text{for all } i, k \quad (\text{Digit } k \text{ once in row } i)$$

$$\sum_{(i,j) \in \text{square } s} x_{ijk} = 1 \quad \text{for all } k, s \quad (\text{Digit } k \text{ once in square } s)$$

In principle the above define 324 constraints, but once again many will be redundant. For each cell for which the content is specified, 4 of the constraints are automatically satisfied (given the associated fixing of other variables as described above), and may be deleted from the LP formulation. In practice we find

that little more than 200 constraints need thus to be retained in the LP structure.

The emerging LP formulation of the sudoku problem thus typically contains around 200 variables and a little over 200 constraints. Even though all variables are binary, this is clearly not a large LP.

Our only concern is to find a feasible solution, which is usually (but not always!) unique. Any arbitrary objective function can be specified. For no particularly good reason, in the implementations discussed below I "minimized" the sum of variables included.

I have implemented the above formulation in two ways:

- In Microsoft Excel, writing the preprocessor in VBA, and using the *What'sBest* solver from the LINDO corporation (which did require a commercial version of *What'sBest*, as the problem exceeded the maximum number of binary variables for the free demo version);
- As a Delphi program calling the open source LPSOLVE package (available from the lp_solve group on Yahoo Groups, coordinated by Peter Notebaert)

The writing of the code was quite straightforward and not particularly demanding. The user interface with the spreadsheet version (for entry of the puzzle) is more convenient (probably because my programming skills for windows interfaces are a bit underdeveloped), but the Excel overheads give a much longer solution time of around 20 seconds per puzzle. The Delphi/LPSOLVE implementation achieves a solution in less than 0.2 seconds (i.e. with no detectable delay after clicking the solve button).

These times are essentially unaffected by the classification of the puzzle from easy to diabolical. It is evident that the classification of difficulty is based on how many unresolved loops need to be kept active by a human solver. This issue is largely irrelevant to the IP solution. There may be a tendency for the harder problems to result in slightly more variables, but the effect on computational time is barely detectable.

I am happy to supply copies of the code (without guarantees) to anyone who may be interested.

1					7		9	
	3			2				8
		9	6			5		
		5	3			9		
	1			8				2
6					4			
3							1	
	4							7
		7				3		

Finnish doctor of mathematics, Arto Inkala, developed what he hoped is the worlds hardest sudoku. The name of the sudoku puzzle is AI Escargot (as seen on the left). "AI" comes from his name initials. "Escargot" ("Snail") comes from the look of the Sudoku puzzle, being that it looks like snail. Solving the problem is also slow, like a snail 😊

The AI Escargot sudoku puzzle became world famous as being the most difficult sudoku puzzle known in 2006.

If you have not already tried the puzzle, why not test your skills and see if you can solve it, or how long it takes you.

Election Night Forecasting 2009

by Jenny Holloway, Jan Greben and Hans Ittmann

CSIR Built Environment

1. INTRODUCTION

A telephone call from Izak Minnaar, Head of Radio Research of the SABC, in October 2008 started the process. They were gearing up for the coming general elections and wanted to involve the CSIR forecasting team again during the 2009 elections. Although the CSIR team got involved with the first democratic elections in 1994, the SABC has contracted the team since 1999 for election night prediction of national and municipal elections. Since then, the CSIR forecasting model has been used to forecast the final results of the election using the results as these are being declared. A number of meetings were held with the SABC after October 2008 and, closer to the election date, the CSIR team ensured that all its systems, models and programmes were working. Results from the IEC are fed to the SABC and the CSIR obtain its data from the SABC. After standing in long queues on election day and after the polling stations closed, some of the CSIR members made their way to the IEC election headquarters at the Pretoria Show Grounds for what would be a long, exciting night and next day or two!

2. APPROACH

In South Africa, an electoral system of proportional representation is followed. In this system every vote is tallied and seats in the National Parliament are allocated on a proportional basis. Provincial Legislatures follow the same electoral system for voters registered within their boundaries. The system is therefore different to that used in a lot of other countries in that there is no allocation of constituency seats. There are also a large number of parties contesting the elections with the national elections of 2009 consisting of 26 parties.

The technique used to forecast the elections involves clustering all voting districts on prior knowledge. The method used in 1999 was to cluster the voting districts according to the demographic profile of their population, with the assumption that people of similar race, education, income, language and age would vote in similar ways. This was done using census data recorded in 1996. Subsequent to this, all applications of the election forecasting methodology have involved the



Figure 1: The CSIR team from left to right: Zaid Kimmie, Rosalie de Villiers, Jan Greben (project leader), Chris Elphinstone, Peter Schmitz, Hans Ittmann and Jenny Holloway.

same clustering technique but have been based on previous voting patterns, rather than on demographics. The reasoning behind this choice centered around the fact that the previous election results were more recent than the available census data and they also did not rely on the subjective assumptions about the importance of certain census parameters for voting behaviour. In the 2004 elections the clusters were based on the 1999 national election results and in 2009 the clusters were derived from the 2004 national election results. Various analyses were done on previous elections to determine the best number of clusters to use to obtain sufficient accuracy at an early enough point during the count and the final number selected was 20 clusters. The model used a fuzzy clustering technique, so that each voting district has some membership in each cluster, but may have a stronger membership in one cluster than in others. The Euclidean distance was used as the measure of distance and in 2009, 19726 voting districts were clustered.

On the election night and during the following days, until the final count is known, the available results that have been counted are used to determine a prediction for each cluster based on the known results of voting districts belonging to each cluster. The predictions of each cluster are then in turn used to provide a prediction for the uncounted voting districts aligned to that cluster. All results are weighted by the registered

voters in each voting district and the expected turnout, calculated again on a cluster by cluster basis. In this way, a prediction for the final percentage results expected for each party can be calculated.

The simplest forecast would be to merely take the available results at any time and extrapolate these to the final result. However, this is only acceptable if the voting districts counted at any one time is a random sample of all voting districts. This has proved not to be the case in previous elections and therefore the success of our model is based on countering the bias in the order of the incoming results.

3. RESULTS – 2004

In 2004 the model performed well for the parties which obtained a large percentage of votes, namely the ANC, DA and IFP as well as for the NNP, ID and ACDP which each got between 1% and 2% of the vote. The first forecast was released, at 01h20 on the morning after the elections, after 2% of the votes had come in, stating that the ANC would get 69% while the actuals at the time were 60% for the ANC. The predictions for the ANC remained fairly stable throughout the count, never moving outside of the 69% to 70% band and finally converged with the final results at the end of the count at 69.7%. The predictions for the DA were initially over

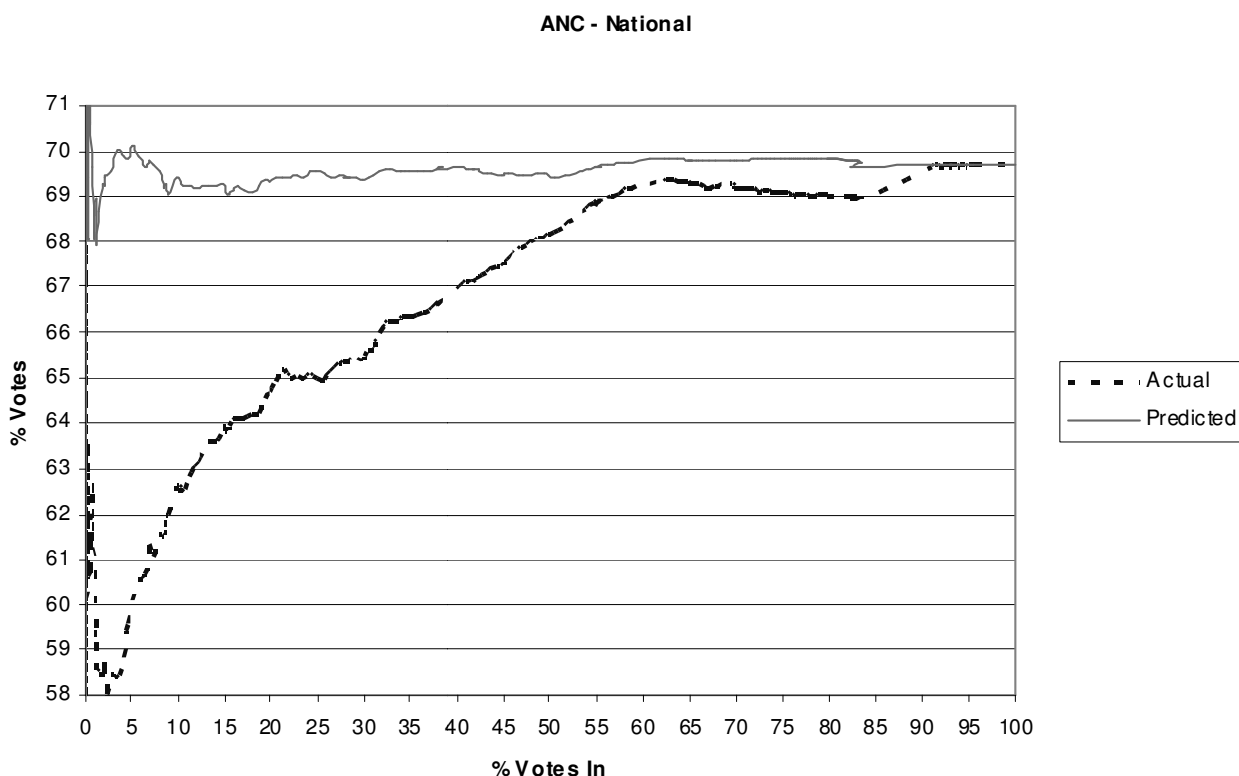


Figure 2: ANC Actual results versus Predicted results – 2004.

estimated, gradually dropping from a prediction of 14% after 5% of votes were counted (when actuals for the DA showed 22%) until it converged at a final result of 12.4%. The early predictions therefore performed much better than an extrapolation of the actuals at that time, even though the model could not remove all the bias resulting from the order in which the voting districts came in. The graph in Figure 2 shows the predictions for the ANC in 2004 against actual results.

4. RESULTS – 2009

Typically the results start coming in after an hour or so after the polling station have closed. This time round things went a bit slower and declaring of results by the IEC was about one and a half hours behind what it was in 2004. With the SABC the CSIR team decided that we would not make any forecasts before 05h00 the Thursday morning. There were also data problems and even a break in the communications with the IEC early that Thursday morning. The CSIR nevertheless had forecasts by 06h00 that morning. The data problems impacted on our ability to forecast voter turnout. For the rest the model was fairly robust in handling the data problems.

Leading up to the 2009 elections, our team, had some concern as to how well the clustering of 2004 voting patterns would behave in the 2009 elections due to the emergence of COPE. Pre-election market surveys indicated COPE would get around 15% of the votes. The issue was whether this support would behave in a manner consistent with the clustering of voting districts. In the end, both the actuals and forecasts for COPE remained reasonably stable throughout the counting process with their final tally coming in at 7.4%. Overall, however, the performance of the model in the 2009 elections did not fair quite as well as in previous elections with regard to the stability of the ANC and DA percentage votes over time. Where in 2004 the prediction stabilised early on and remained fairly constant after about 40% of the votes were declared, in 2009 the predictions for both these parties fluctuated right until the end.

Various reasons for this instability of predictions have been identified and they mainly centre around the following two key assumptions that are inherent either in the model itself or in the software containing the model:

1. The forecasting software assumed that national and provincial results were released at the same time but in the 2009 election, the IEC

frequently released provincial votes for a voting district while the national votes were held back. The software did not check for this and therefore assumed that for all voting districts that had released results, there must be a national result. Consequently, the model used zero counts where national results were absent.

2. In order for the model to work it makes the assumption that people vote in the same voting stations as where they are registered. Although one has previously been able to vote outside of one’s voting district, there was greater publicity and awareness around this option in 2009 resulting in many people voting elsewhere. This had several knock-on effects which impacted the model.

Nevertheless, the CSIR predictions with 15% of the votes out (at 06h45 on Thursday 23 April 2009), at national level, for the main parties against the final results were the following:

Table 1: *Predicted versus final results at national level*

	Forecast	Final Results
ANC	65.6	65.9
DA	17.3	16.7
COPE	7.0	7.4
IFP	4.1	4.6
ID	1.5	0.9
VF plus	1.2	0.8

Given the data problems these turned out to be fairly good! There were also predictions at provincial level for all the nine provinces and these too were fairly accurate although the forecasted percentage predictions for smaller parties were always going to be difficult because of the relative little support.

5. MEDIA INTERACTION

Working with the SABC meant a lot of media exposure for the CSIR predictions both on radio through news bulletins, radio interviews and via TV through the two spokes persons namely Zaid Kimmie and Hans Ittmann, as well as in the printed media. As the predictions are computed the CSIR team feeds the SABC research team with news items which are placed on the SABC intraweb where all the different radio and TV stations can access these for use in the different news bulletins. Any interesting news story that can be picked up from the results, predictions and the analysis thereof is

formulated as news items with the SABC journalists. This brings a whole new exposure and experience to members of the CSIR team. Everything happens on the run and immediately, one cannot dwell on things. The first predictions are always very exciting since these will be used by all the media and obviously the team want to make sure these are "good predictions". The question is always how long we wait before releasing these first predictions!

Interacting with the media on radio and TV is also very exciting and different, not something modellers or statisticians do very often. This time round the CSIR possibly got more exposure than ever. What typically happens is that the predictions are "hot news" during the morning after the elections and everyone wants to interact, talk to the CSIR and hear our views. When it becomes clear what the actual final results will be the predictions is no longer "hot news" and then media ignores us, our predictions are of no interest any longer! This time round it was very different because of the question whether the ANC will get a two thirds majority or not. By the Friday it was still not clear whether the ANC will achieve this although the ANC had at some stage more than 67% of the votes declared. The CSIR model consistently predicted that the ANC will not achieve two thirds! We stuck to our model predictions. In the end it turned out that these were correct!

With an election there are also many political analysts used by the media and they are also at the election headquarters. A number of them have been involved in the past and they got to know the CSIR team members. They regular interacted with the CSIR team to get the latest updates on our predictions.

The media exposure was on various radio stations, on SABC2 and SABC3 as well as a short interview with BBC international. This started on the Tuesday night before

the election and the final news item involving the CSIR was on Friday night on SABC3 during the seven o'clock news bulletin. There were many newspaper reports quoting the predictions from the CSIR as well and quoting our spokes persons.

6. CONCLUSIONS

For all the CSIR team members this is possibly one of the most interesting projects they have been involved in and at the same time possibly the most exciting. There is an incredible vibe at the election centre, lots of media activity while at the same time we as modellers rub shoulders with politicians from all political parties, political analysts and media personalities. It happens every few years and is an intense few days. Given all the problems the team had this time round we are still happy that our predictions were fairly close to what the final results were. We look forward to the next elections which will be the municipal elections in 2011.

7. REFERENCES

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UPCOMING CONFERENCES

IFORS 2011

Conference for the  International Federation of Operational Research Societies

The 19th Triennial Conference of the International Federation of Operational Research Societies (IFORS) will be held at the new Melbourne Convention Centre in the centre of the city of Melbourne, Australia from the 10th to the 15th July 2011 and will bring operational researchers from around the globe together.

<http://www.ifors2011.org>



CORS-INFORMS International Meeting

Toronto, Canada, June 14-17, 2009

<http://meetings.informs.org/Toronto09/index.html>



EURO Conference 2009 in Bonn OR Creating Competitive Advantage

23rd European Conference on Operational Research

Bonn, July 5 - 8, 2009

<http://www.euro-2009.de/>

EURO Summer Institute 2009

"OR in Agriculture and Forest Management"

Aim of this EURO Summer Institute is to bring together young scientists with academic experts on OR methods besides the development of applications for Agriculture, Forestry and related industries of the primary sector.

Lleida, Spain, July 25th-August 8th

<http://www.esi2009.udl.cat/>



Logistics Management 2009

HAMBURG, 2.-4. SEPTEMBER 2009

The Logistics Management 2009 is an international conference addressing research experts and practitioners interested in logistics management and related fields. The interdisciplinary exchange and the discussion of current trends, strategies and research outcomes are fundamental components of this conference.

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http://www.smartframe.de/lm09/lm09_en_home.html



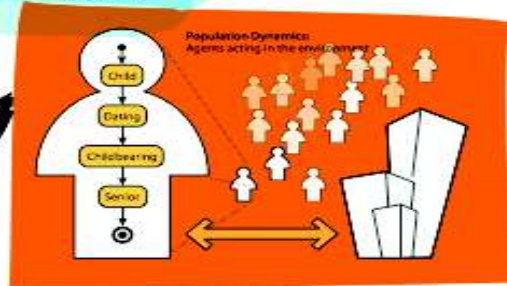
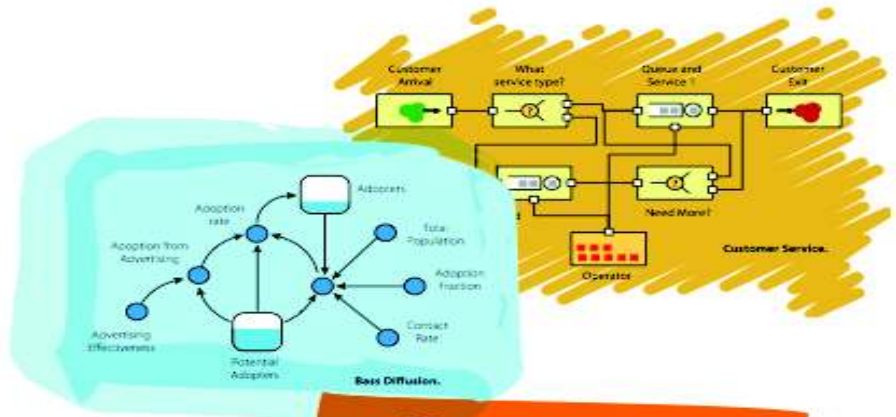
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