Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM)

Programming is fun?

by
Tan Choo Jun
School of Science and Technology
Wawasan Open University (WOU)

12 May 2016
Biography

Had more than 10-year experience in software design and development industry.

Doing Research and Development (R&D) in computational intelligence, specifically for multi-objective based optimisation and classification problems.

Working in School of Science and Technology at Wawasan Open University (WOU).

Handling mixture courses of undergraduate and master programme: software engineering, information system, advanced manufacturing.
Do you think so?
These are the answers from people:

1. Finding fulfilment and happiness in your career/study.
2. It requires thought, intention, action, and a willingness to change course when you’ve made mistakes.
3. Lays out a strategy for planning in software development.
4. Cultivating the desire to live a remarkable life.
5. Leading a remarkable life is something you have to discover as even being a reasonable goal.
Programming is fun?

Question: What can the programming do (during your study)?
Cmizer: An intelligent Circuit optimizer

Objective: to provide decision support for electronic engineers to design circuits with a faster and easier manner, hence contributing towards the productivity of the electronic industries

Award: bronze medal for CIGIF 2012 - The 3rd Cyber International Genius Inventor Fair 2012 in South Korea

Cmizer’s team
Sharing on Research Project 1
Cimizer in Windows

Preliminaries
Research Project 1
Research Project 2
Research Project 3
Research Publication 1
Research Publication 2
Research Publication 3
Research Publication 4
Research Publication 5

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<table>
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<th>Research Project 1</th>
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</thead>
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<tr>
<td>Cimizer: in Ubuntu (Linux)</td>
<td>Programming is fun? Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM) 12 May 2016</td>
</tr>
</tbody>
</table>

- **Sharing on Research Project 1**
  - Cimizer: in Ubuntu (Linux)

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Sharing on Research Project 1
Cimizer: in Ubuntu (Linux)
1 **USM Extract**: A suite of soft computing and other data-based learning algorithms for Extracting information/knowledge from complex databases

2 **Objective**: to contribute towards the use of OSS-based intelligent systems in the Knowledge Discovery in Databases domain

3 **Award**: silver prize of the 5th Open Source Software (OSS) World Challenge, 2011 in South Korea
Sharing on Research Project 2
USM Extract identifying flower for farmer
Sharing on Research Project 2
USM Extract identifying flower for farmer

Intelligent Data Analysis and Decision Support

Classification Network Prediction in Solo Action

Instructions:
- Choose your data mart. Make sure that the targeted data set has gone through the training process at least once.
- Click on a particular feature record and enter the value for prediction. Click the Keep Changes button to save the entered value. Repeat the same step for other feature records.
- Click on the network name button to perform prediction.

Proceed to Main Menu

Data Mart: IRIS

Data mark features availability

Target Class: 0.5
Target Class Description: Iris-Versicolor
Confidence Level: 0.7646667
Sharing on Research Project 2
USM Extract diagnosing diabetes for medical doctor

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- Click on the network name button to perform prediction.

Data Mart: PID

Data mart features availability

<table>
<thead>
<tr>
<th>Id</th>
<th>Code</th>
<th>Description</th>
<th>Feature Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dmvc663</td>
<td>AGE</td>
<td>AGE</td>
<td></td>
</tr>
<tr>
<td>dmvc664</td>
<td>PREGNANT_TIME</td>
<td>PREGNANT_TIME</td>
<td></td>
</tr>
<tr>
<td>dmvc665</td>
<td>PLASMA_GLUCOSE</td>
<td>PLASMA_GLUCOSE</td>
<td></td>
</tr>
<tr>
<td>dmvc666</td>
<td>DIASTOLIC_BP</td>
<td>DIASTOLIC_BP</td>
<td>12</td>
</tr>
<tr>
<td>dmvc667</td>
<td>TRICEPS_THICKNESS</td>
<td>TRICEPS_THICKNESS</td>
<td>12</td>
</tr>
<tr>
<td>dmvc668</td>
<td>SERUM_INSULIN</td>
<td>SERUM_INSULIN</td>
<td></td>
</tr>
<tr>
<td>dmvc669</td>
<td>BODY_MASS_INDEX</td>
<td>BODY_MASS_INDEX</td>
<td></td>
</tr>
<tr>
<td>dmvc670</td>
<td>DIABETES_PEDIGREE</td>
<td>DIABETES_PEDIGREE</td>
<td>Diabetes +ve</td>
</tr>
</tbody>
</table>

Target Class: 1.0
Target Class Description: Tested positive for diabetes
Confidence Level: 0.6687053
Sharing on Research Project 2
USM Extract examining quality of wine for trader
Sharing on Research Project 2
USM Extract: Award ceremony in South Korea
Sharing on Research Project 2
USM Extract: Award ceremony in South Korea

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Sharing on Research Project 2
USM Extract: Selected winners in the award ceremony
1 **MDG**: An one-stop solution to obtain worldwide cluster resource for computational use

2 **Objective**: to resolve the problem of insufficient computational resources in addressing global issues

3 **Awards**: Malaysia Champion, Parasoft’s Code Quality Challenge Award, and Sun MicroSystems Technology Award in the Open Jive Regional Challenge at Malaysia

4 **Award**: Sun MicroSystems Technology Award in the Open Jive Grand Finals Challenge
Sharing on Research Project 3
MDG (Mobile Desktop Grid)

Domain Expert & Mentor & Design
Research Content & Design & Analysis & Hardware-Network Setup

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Sharing on Research Project 3
MDG client interface in a handtop
Sharing on Research Project 3
MDG matching DNA structure and previewing in 3D format
Sharing on Research Project 3
MDG: award ceremony in Bukit Jalil, Kuala Lumpur

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Sharing on Research Project 3
MDG: demonstration booth in SunTech City, Singapore
Sharing on Research Project 3
MDG: demonstration booth in SunTech City, Singapore

Programming is fun? Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM) 12 May 2016
Sharing on Research Project 3
MDG: demonstration in SunTech Conventional Centre, Singapore
Sharing on Research Project 3
MDG: award ceremony in SunTech City, Singapore
Sharing on Research Project 3
MDG: selected winners in the award ceremony
Question: What can the programming do (for further your study)?
**Key result:** It achieved fast convergence with statistically better performance (at the 95% confidence level)

![Graph showing comparison between mGA and MmGA](image)

A comparison between $l_{gd}$ of mGA (i.e. dotted lines) and bootstrapped $l_{gd}$ of MmGA. The error bars indicate the 95% confidence intervals of the mean $l_{gd}$ results of MmGA.

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**Sharing on Research Publication 2**

MmGA model: a Case Study of Multi-objective Job-Shop Scheduling at Australia

**Key result:** The requirements are satisfied within a fraction of the time with statistical significance results.

<table>
<thead>
<tr>
<th>Jobs</th>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ψ</strong> (dollar)</td>
<td>Enumeration Method (worst to best)</td>
<td>Bootstrapped results of MmGA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Γ</strong> (day)</td>
<td></td>
<td>Lower Bound</td>
<td>Mean</td>
<td>Upper Bound</td>
</tr>
<tr>
<td>5 Jobs</td>
<td></td>
<td>4.97 to 5.16</td>
<td>5.03</td>
<td>5.08</td>
</tr>
<tr>
<td></td>
<td>5.0 to 6.0</td>
<td>0.87</td>
<td>0.88</td>
<td>0.83</td>
</tr>
<tr>
<td></td>
<td>&gt; 1000</td>
<td>2.8</td>
<td>3.23</td>
<td>4.23</td>
</tr>
<tr>
<td>6 Jobs</td>
<td></td>
<td>11.09 to 14.87</td>
<td>12.26</td>
<td>12.67</td>
</tr>
<tr>
<td></td>
<td>21.0 to 12.0</td>
<td>15.06</td>
<td>14.30</td>
<td>13.77</td>
</tr>
<tr>
<td></td>
<td>&gt; 1000</td>
<td>16.37</td>
<td>12.93</td>
<td>17.37</td>
</tr>
<tr>
<td>7 Jobs</td>
<td></td>
<td>13.68 to 14.49</td>
<td>14.00</td>
<td>14.08</td>
</tr>
<tr>
<td></td>
<td>30.0 to 17.0</td>
<td>23.67</td>
<td>22.49</td>
<td>21.46</td>
</tr>
<tr>
<td></td>
<td>&gt; 1000</td>
<td>4.23</td>
<td>4.83</td>
<td>5.17</td>
</tr>
<tr>
<td>8 Jobs</td>
<td></td>
<td>17.5 to 19.06</td>
<td>17.86</td>
<td>18.01</td>
</tr>
<tr>
<td></td>
<td>31.0 to 26.0</td>
<td>26.62</td>
<td>25.90</td>
<td>25.26</td>
</tr>
<tr>
<td></td>
<td>&gt; 1000</td>
<td>4.87</td>
<td>5.17</td>
<td>5.43</td>
</tr>
<tr>
<td>9 Jobs</td>
<td></td>
<td>13.4 to 16.77</td>
<td>13.79</td>
<td>13.92</td>
</tr>
<tr>
<td></td>
<td>13.0 to 0.0</td>
<td>4.57</td>
<td>4.00</td>
<td>3.40</td>
</tr>
<tr>
<td></td>
<td>&gt; 1000</td>
<td>6.00</td>
<td>6.23</td>
<td>6.43</td>
</tr>
<tr>
<td>10 Jobs</td>
<td></td>
<td>14.06 to 17.98</td>
<td>14.60</td>
<td>14.79</td>
</tr>
<tr>
<td></td>
<td>59.0 to 45.0</td>
<td>52.32</td>
<td>51.50</td>
<td>50.85</td>
</tr>
<tr>
<td></td>
<td>&gt; 1000</td>
<td>7.87</td>
<td>8.10</td>
<td>8.67</td>
</tr>
</tbody>
</table>

A comparison of Cost-Saving (ψ) and Tardiness (Γ) with the enumeration method.

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**Key result**: The stability of the average results is ascertained by the estimated 95% confidence intervals, which meet the requirements of the electronic engineer.

A comparison of voltage gain, cutoff frequency and passband ripple results between the MmGA model and the baseline requirement.

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**Key result:** It produced statistically better accuracy rates with fewer number of features (at the 95% confidence level).

A comparison of the Accuracy rate between the standard classifiers and the MmGA Ensemble coupled with the similar set of classifiers.

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Sharing on Research Publication 4
MmGA ensemble model: an Android-based application for data collection
Key result: It produced 50% reduction in the number of features (i.e., 1560 from 3114) with 3% reduction in accuracy.

<table>
<thead>
<tr>
<th></th>
<th>Accuracy (%)</th>
<th>No. of features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronics to Electronics</td>
<td>85.9%</td>
<td>1560</td>
</tr>
<tr>
<td>Kitchen Appliances to Kitchen Appliances</td>
<td>88.0%</td>
<td>1559</td>
</tr>
<tr>
<td>Electronics to Kitchen Appliances</td>
<td>82.3%</td>
<td>1560</td>
</tr>
<tr>
<td>Kitchen appliances to Electronics</td>
<td>83.0%</td>
<td>1560</td>
</tr>
</tbody>
</table>

A comparison of In-domain and cross-domain results between the SVM classifier and the MmGA Ensemble.

Programming is fun?

**Question**: Does it work for you?
Programming is fun?

**Answer:** We have more options and ideas from Mr. Muhamad Rashidi A. Rahman if they do not work for you.

Let’s ’Teh tarik’ together!
Thank You

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