Sustainable student workshop year 1 at Universiti Sains Malaysia (USM): programming is fun?

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

Programming is fun?

by
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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
Programming is fun?

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)?
1. **Cmizer**: An intelligent Circuit optimizer

2. **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

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

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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

Programming is fun? Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM) 12 May 2016
Sharing on Research Project 1
Cimizer: in Ubuntu (Linux)
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

Intelligent Data Analysis and Decision Support Systems
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: I.5
Target Class Description: Iris-Versicolor
Confidence Level: 0.7646667

Sample data:
- Id: dmwcol13, Code: SEPAL_LE, Description: SEPAL_LE, Feature Value: 3
- Id: dmwcol14, Code: SEPAL_WD, Description: SEPAL_WD, Feature Value: 3
- Id: dmwcol15, Code: PETAL_LE, Description: PETAL_LE, Feature Value: 4
- Id: dmwcol16, Code: PETAL_WD, Description: PETAL_WD, Feature Value: 1
Sharing on Research Project 2
USM Extract diagnosing diabetes for medical doctor

Intelligent Data Analysis and Decision Support

<table>
<thead>
<tr>
<th>Id</th>
<th>Code</th>
<th>Description</th>
<th>Feature Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dmvc0pl10</td>
<td>AGE</td>
<td>AGE</td>
<td></td>
</tr>
<tr>
<td>dmvc0pl3</td>
<td>PREGNANT_TIME</td>
<td>PREGNANT_TIME</td>
<td></td>
</tr>
<tr>
<td>dmvc0pl4</td>
<td>PLASMA_GLUCOSE</td>
<td>PLASMA_GLUCOSE</td>
<td></td>
</tr>
<tr>
<td>dmvc0pl5</td>
<td>DIASTOLIC_BP</td>
<td>DIASTOLIC_BP</td>
<td>12</td>
</tr>
<tr>
<td>dmvc0pl6</td>
<td>TRICEPS_THICKNESS</td>
<td>TRICEPS_THICKNESS</td>
<td>12</td>
</tr>
<tr>
<td>dmvc0pl7</td>
<td>SERUM_INSULIN</td>
<td>SERUM_INSULIN</td>
<td></td>
</tr>
<tr>
<td>dmvc0pl8</td>
<td>BODY_MASS_INDEX</td>
<td>BODY_MASS_INDEX</td>
<td></td>
</tr>
<tr>
<td>dmvc0pl9</td>
<td>DIABETES_PEDIGREE</td>
<td>DIABETES_PEDIGREE</td>
<td></td>
</tr>
</tbody>
</table>

Target Class: 1.0
Target Class Description: Tested positive for diabetes
Confidence Level: 0.6687053

Diabetes +ve

Programming is fun? Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM) 12 May 2016
Sharing on Research Project 2
USM Extract examining quality of wine for trader

Intelligent Data Analysis and Decision Support

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Programming is fun? Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM) 12 May 2016
Sharing on Research Project 2
USM Extract: Award ceremony in South Korea
Sharing on Research Project 2
USM Extract: Award ceremony in South Korea

Programming is fun? Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM) 12 May 2016
Sharing on Research Project 2
USM Extract: Selected winners in the award ceremony
MDG: An one-stop solution to obtain worldwide cluster resource for computational use

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

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

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

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

Domain Expert
& Mentor & Design

Analysis
& Development

Artistic content
& Development

Research Content
& Design & Analysis
& Hardware-Network Setup

MDG Team
Change Tomorrow

Programming is fun?Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM) 12 May 2016
Sharing on Research Project 3
MDG client interface in a handtop
Preliminaries
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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
Sharing on Research Project 3
MDG: demonstration booth in SunTech City, Singapore

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

Preliminaries
Research Project 1
Research Project 2
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Research Publication 5
Sharing on Research Project 3
MDG: demonstration booth in SunTech City, Singapore
Sharing on Research Project 3
MDG: demonstration in SunTech Conventional Centre, Singapore

Programming is fun? Sustainable Student Workshop Year 1 at Universiti Sains Malaysia (USM) 12 May 2016
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).

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

<table>
<thead>
<tr>
<th>Jobs</th>
<th>Enumeration Method (worst to best)</th>
<th>Bootstrapped results of MmGA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower Bound</td>
<td>Mean</td>
</tr>
<tr>
<td>5 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollar)</td>
<td>4.5 to 5.16</td>
<td>4.97</td>
</tr>
<tr>
<td>$\Gamma$ (day)</td>
<td>5.0 to 6.0</td>
<td>0.87</td>
</tr>
<tr>
<td>Time (ms)</td>
<td>&gt; 1000</td>
<td>2.8</td>
</tr>
<tr>
<td>6 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollar)</td>
<td>11.09 to 14.87</td>
<td>11.92</td>
</tr>
<tr>
<td>$\Gamma$ (day)</td>
<td>21.0 to 12.0</td>
<td>15.08</td>
</tr>
<tr>
<td>Time (ms)</td>
<td>&gt; 1000</td>
<td>16.37</td>
</tr>
<tr>
<td>7 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollar)</td>
<td>13.68 to 14.49</td>
<td>13.93</td>
</tr>
<tr>
<td>$\Gamma$ (day)</td>
<td>30.0 to 17.0</td>
<td>23.67</td>
</tr>
<tr>
<td>Time (ms)</td>
<td>&gt; 1000</td>
<td>4.23</td>
</tr>
<tr>
<td>8 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollar)</td>
<td>17.5 to 19.06</td>
<td>17.74</td>
</tr>
<tr>
<td>$\Gamma$ (day)</td>
<td>31.0 to 26.0</td>
<td>26.62</td>
</tr>
<tr>
<td>Time (ms)</td>
<td>&gt; 1000</td>
<td>4.87</td>
</tr>
<tr>
<td>9 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollar)</td>
<td>13.4 to 16.77</td>
<td>13.70</td>
</tr>
<tr>
<td>$\Gamma$ (day)</td>
<td>13.0 to 0.0</td>
<td>4.57</td>
</tr>
<tr>
<td>Time (ms)</td>
<td>&gt; 1000</td>
<td>6.00</td>
</tr>
<tr>
<td>10 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollar)</td>
<td>14.06 to 17.98</td>
<td>14.47</td>
</tr>
<tr>
<td>$\Gamma$ (day)</td>
<td>59.0 to 45.0</td>
<td>52.32</td>
</tr>
<tr>
<td>Time (ms)</td>
<td>&gt; 1000</td>
<td>7.87</td>
</tr>
</tbody>
</table>

A comparison of Cost-Saving ($\Psi$) and Tardiness ($\Gamma$) 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

Preliminaries
Research Project 1
Research Project 2
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Research Publication 1
Research Publication 2
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Research Publication 5
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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