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

URL: http://weko.wou.edu.my/?action=repository_uri&item_id=537

Creative Commons: • © - "ñ‰c—˜ - Œp³
http://creativecommons.org/licenses/by-nc-sa/3.0/deed.ja
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.
Programming is fun?

Do you think so?
Programming is fun?

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)?
Sharing on Research Project 1
Cmizer

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

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

Programmimg 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
Intelligent Data Analysis and Decision Support Systems

USM Extract
Classification Network
Prediction with
Solo Action
Batch Action

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

Data Mart: PID

Data Mart features availability

Id | Code | Description | Feature Value
--- | --- | --- | ---
dmvcopikt10 | AGE | AGE | 1
dmvcopikt3 | PREGNANT_TIME | PREGNANT_TIME | 1
dmvcopikt4 | PLASMA_GLUCOSE | PLASMA_GLUCOSE | 1
dmvcopikt5 | DIASTOLIC_BP | DIASTOLIC_BP | 1
dmvcopikt6 | TRICEPS_THICKNESS | TRICEPS_THICKNESS | 12
dmvcopikt7 | SERUM_INSULIN | SERUM_INSULIN | 1
dmvcopikt8 | BODY_MASS_INDEX | BODY_MASS_INDEX | 1
dmvcopikt9 | DIABETES_PEDIGREE | DIABETES_PEDIGREE | 1

Target Class: 1.0
Target Class Description: Tested positive for diabetes
Confidence Level: 0.668753

Diabetes +ve
Sharing on Research Project 2
USM Extract examining quality of wine for trader

Intelligent Data Analysis and Decision Support

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: WINE91

Data mark features availability

<table>
<thead>
<tr>
<th>Id</th>
<th>Code</th>
<th>Description</th>
<th>Feature Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dmrcolwine110</td>
<td>NON_FLAVANOIDS PHENOLS</td>
<td>NON_FLAVANOIDS PHENOLS</td>
<td></td>
</tr>
<tr>
<td>dmrcolwine111</td>
<td>PROANTHOCYANINS</td>
<td>PROANTHOCYANINS</td>
<td></td>
</tr>
<tr>
<td>dmrcolwine112</td>
<td>COLOR_INTENSITY</td>
<td>COLOR_INTENSITY</td>
<td>12</td>
</tr>
<tr>
<td>dmrcolwine113</td>
<td>HUE</td>
<td>HUE</td>
<td></td>
</tr>
<tr>
<td>dmrcolwine114</td>
<td>DILUTED WINES</td>
<td>DILUTED WINES</td>
<td></td>
</tr>
<tr>
<td>dmrcolwine115</td>
<td>PROLINE</td>
<td>PROLINE</td>
<td></td>
</tr>
<tr>
<td>dmrcolwine116</td>
<td>ALCOHOL</td>
<td>ALCOHOL</td>
<td>58</td>
</tr>
<tr>
<td>dmrcolwine117</td>
<td>MALIC ACID</td>
<td>MALIC ACID</td>
<td>0.78</td>
</tr>
<tr>
<td>dmrcolwine118</td>
<td>ASH</td>
<td>ASH</td>
<td></td>
</tr>
<tr>
<td>dmrcolwine119</td>
<td>ALCALINITY</td>
<td>ALCALINITY</td>
<td></td>
</tr>
<tr>
<td>dmrcolwine121</td>
<td>MAGNESIUM</td>
<td>MAGNESIUM</td>
<td></td>
</tr>
<tr>
<td>dmrcolwine122</td>
<td>TOTAL PHENOLS</td>
<td>TOTAL PHENOLS</td>
<td></td>
</tr>
</tbody>
</table>

Target Class: 1.0
Target Class Description: Class1
Confidence Level: 1.0

Class 3
Sharing on Research Project 2

USM Extract: Award ceremony in South Korea

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
Sharing on Research Project 2
USM Extract: Award ceremony in South Korea
Sharing on Research Project 2
USM Extract: Selected winners in the award ceremony
Sharing on Research Project 3
MDG (Mobile Desktop Grid)

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

Analysis & Development
Artistic content & Development

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
Sharing on Research Project 3
MDG matching DNA structure and previewing in 3D format

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 Bukit Jalil, Kuala Lumpur
Sharing on Research Project 3
MDG: demonstration booth in SunTech City, Singapore
Sharing on Research Project 3
MDG: demonstration booth in SunTech City, Singapore
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)

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.\(^1\)

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>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>$\Psi$ (dollars)</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 (ma)</td>
<td>&gt; 1000</td>
<td>2.8</td>
</tr>
<tr>
<td>6 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollars)</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>15.06</td>
</tr>
<tr>
<td>Time (ma)</td>
<td>&gt; 1000</td>
<td>16.37</td>
</tr>
<tr>
<td>7 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollars)</td>
<td>13.68 to 14.49</td>
<td>13.95</td>
</tr>
<tr>
<td>$\Gamma$ (day)</td>
<td>30.0 to 17.0</td>
<td>23.67</td>
</tr>
<tr>
<td>Time (ma)</td>
<td>&gt; 1000</td>
<td>4.23</td>
</tr>
<tr>
<td>8 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollars)</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 (ma)</td>
<td>&gt; 1000</td>
<td>4.87</td>
</tr>
<tr>
<td>9 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollars)</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 (ma)</td>
<td>&gt; 1000</td>
<td>6.00</td>
</tr>
<tr>
<td>10 Jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Psi$ (dollars)</td>
<td>14.06 to 17.98</td>
<td>14.47</td>
</tr>
<tr>
<td>$\Gamma$ (day)</td>
<td>50.0 to 45.0</td>
<td>52.32</td>
</tr>
<tr>
<td>Time (ma)</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.

---

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.

**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.  

<table>
<thead>
<tr>
<th>Accuracy Rate</th>
<th>Standard Classifiers</th>
<th>MmGA Ensemble Coupled</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9452</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.9666</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.9643</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.9494</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.9424</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.


A comparison of In-domain and cross-domain results between the SVM classifier and the MmGA Ensemble ⁵


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

Visit us at www.wou.edu.my