

# Firefly Combinatorial Test List Generator for IoT Systems



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#### **PRODUCT BACKGROUND**



A common problem in IoT systems is the large number of the combinations of hardware, operational, and software configurations that required to be

#### **NOVELTY & INVENTIVENESS**

- The first loT combinatorial testing Strategy Based On Modified Greedy Algorithm.
- Sustainability practices & contributions
- Improves software testing practices with lesser test size, hence reduce testing costs
- More effective at finding software faults.
- **Result of Comparing with Existing Strategies**
- It can be run in any platform environment such as OS, Linux, Window.



- tested to ensure the IoT systems are free of bugs.
- Due to the limitations of time and cost, there is a need for testing efforts minimization but with sufficient testing efforts.
- **Generate a test list is NP-hard problem.**
- > The Firefly algorithm is used to minimize the test cases list.

				PI	ROD	UCT O	VE	RV	IEW								
FCS: FireFly Co	mbinatorial Strategy					M. 18	_ 0	FCS: FireFly	y Combinatorial Stra	ategy							>
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The result of FCS is compared with Genetic Algorithm (GA), Ant Colony Optimization Algorithm (ACO) and Tabu Search (TS). It shows that FCS generates a nearly optimum result with an extremely short time.





- Pairwise Test Data Generation Based On Flower Pollination Algorithm, Malaysian Journal of Computer Science, WebofScience, JCR, Q4.
- An experimental study of hyper-heuristic selection and acceptance mechanism for combinatorial t-way test suite generation, Information Sciences, WebofScience, JCR, Q1
- Hybrid Flower Pollination Algorithm Strategies For T-Way Test Suite Generation" PlosOne, 2018. in press. WebofScience, JCR Q1
- An Elitist-Flower Pollination based Strategy for Constructing Sequence and Sequence-less T-way Test Suite Generation. International Journal of Bio-Inspired Computing, 2018. in press. WebofScience, JCR Q2

# **FUNDS**

- FRGS "Input-Output Relations Harmony Search T-way Testing Strategy" RM90K
- FRGS "A Reinforcement Learning Sine Cosine based Strategy for Combinatorial Test Suite Generation" RM60K
- International Research Fund RM200K King Khalid University
- University Malaysia Pahang Research Funds RM80K
- Received RM90K from King Khalid University for

### **PATENT/COPYRIGHT**

#### > Applied for the Patent

# Gold Medal at CITREX2018

**Glod** Medal at BIS2017

#### COMMERCIALIZATION

Affordable price (RM500/license/Year), while HEXAWISE tool cost is \$1,995=RM8970/license, and Pro-Test \$399=RM1600/license/Year

Strategy	FCS	HEXAWISE	TestCover	Pro-Test
Price	<ol> <li>1. RM500/License a Year</li> <li>2. RM50/day as service</li> </ol>	RM8970/License a Year 500 users	RM450/License per Month	RM1600/Licen se a Year ONE user
Features	<ul> <li>Uniform interaction         <ul> <li>+Variable interaction</li> <li>+Input-Output+</li> <li>Seeding</li> </ul> </li> </ul>	<ul> <li>Uniform interaction + Seeding</li> </ul>	<ul> <li>Uniform interaction + Seeding</li> </ul>	<ul> <li>Uniform interaction + Seeding</li> </ul>
	<ul> <li>Portable for Windows, Mac OS, and Linux.</li> </ul>	<ul> <li>Required internet connection.</li> </ul>	<ul> <li>Portable for Windows, Mac OS, and Linux.</li> </ul>	<ul> <li>Windows only</li> </ul>