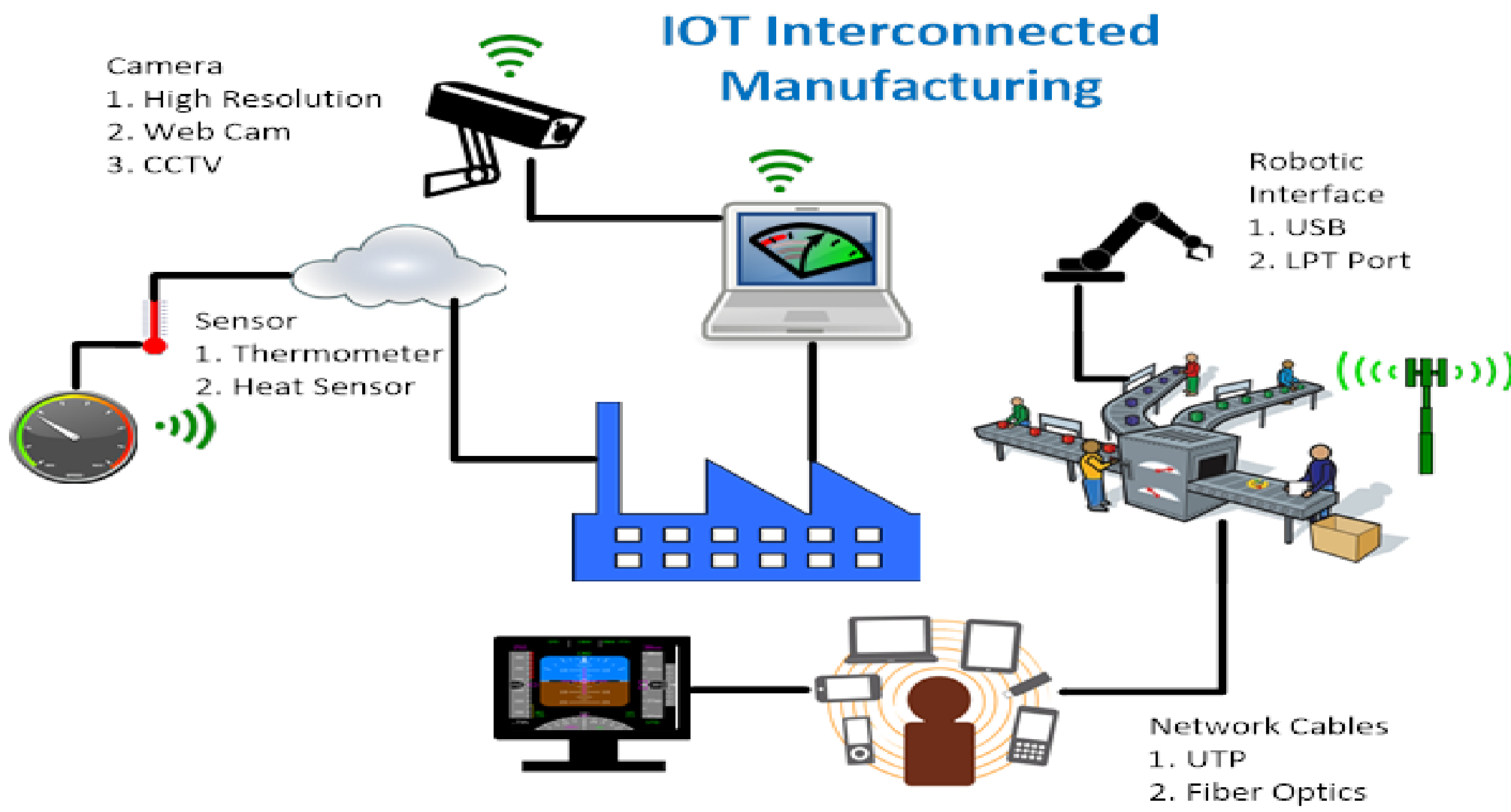




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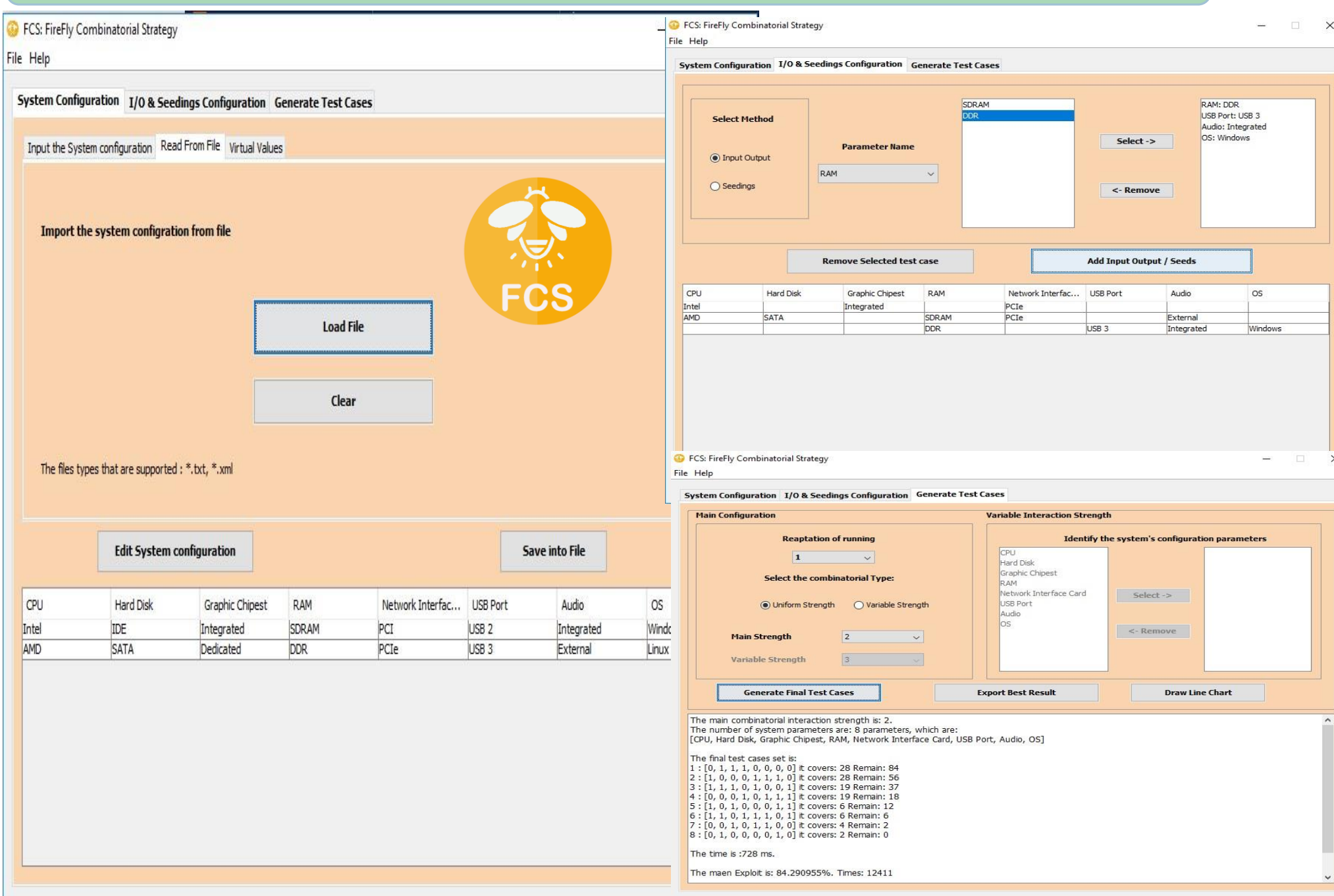


## PRODUCT BACKGROUND

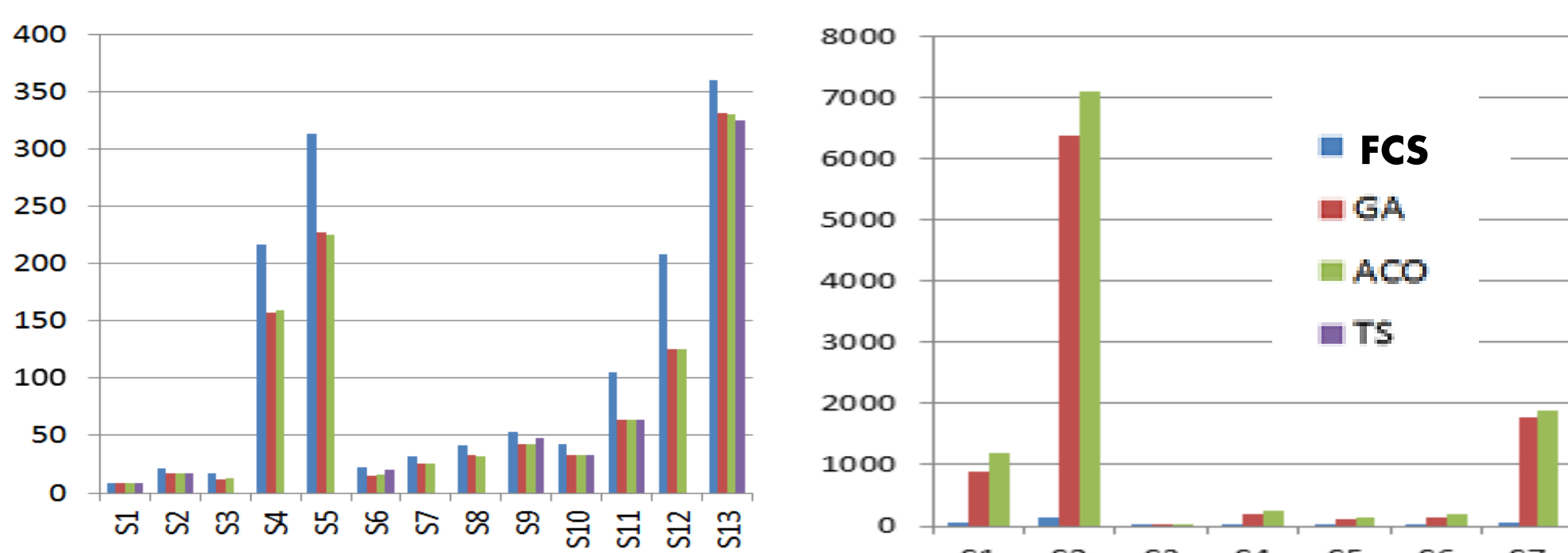


- A common **problem** in **IoT systems** is the large number of the combinations of hardware, operational, and software configurations that required to be **tested** to **ensure** the IoT systems are **free of bugs**.
- Due to the **limitations** of time and cost, there is a need for **testing efforts 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.

## PRODUCT OVERVIEW



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.



## 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**

## NOVELTY & INVENTIVENESS

- The **first IoT 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.

## BENEFITS



## MARKETABILITY

- **Software prototype** for Testing & Maintenance
- Teaching & Learning **tutorial tool** in Software Testing & Maintenance, and Software Quality Assurance.

## COLLABORATORS



## ACHIEVEMENTS

- Firefly Combinatorial Testing Strategy, **Computing Conference 2018**, London, 9-12 July 2018
- 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**
- **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	1. <b>RM500/License</b> a Year 2. <b>RM50/day</b> as service	<b>RM8970/License</b> a Year 500 users	<b>RM450/License</b> per Month	<b>RM1600/License</b> a Year ONE user
Features	<ul style="list-style-type: none"> <li>• Uniform interaction +Variable interaction +Input-Output+ Seeding</li> <li>• Portable for Windows, Mac OS, and Linux.</li> </ul>	<ul style="list-style-type: none"> <li>• Uniform interaction + Seeding</li> <li>• Required internet connection.</li> </ul>	<ul style="list-style-type: none"> <li>• Uniform interaction + Seeding</li> <li>• Portable for Windows, Mac OS, and Linux.</li> </ul>	<ul style="list-style-type: none"> <li>• Uniform interaction + Seeding</li> <li>• Windows only</li> </ul>