

## **INNOVATION AND TECHNOLOGY FUND**

### **Post Project Evaluation Form for ITSP Projects Undertaken by Designated Local Public Research Institute**

#### **Notes for Completion**

This evaluation form comprises two parts which should be completed through ITCFAS in the following manner:

#### **Part A – Key Project Details**

This part will be completed automatically by ITCFAS 2 years after project completion.

#### **Part B –Report on Progress of Commercialisation/ Technology Transfer Activities**

The report on progress of commercialisation/technology transfer activities will be completed by the Project Coordinator (PC) / Technology Transfer Office (or by an authorised / designated person on behalf of the research institute) in 2 years and 5 years after project completion (or according to the timeframe adjusted by the subject officer of Technical Team of ITC as appropriate)

# Post Project Evaluation form for ITF project undertaken by Designated Local Public Research Institute

## Part A - Key Project Details

(to be completed automatically by ITCFAS 2 years after project completion)

1. Project Title : Machine Learning Algorithm for Cyber Security (Ref.: No.: ITS/001/13FP)

2. Designated Local Public Research Institute
- Local University (Hong Kong R&D University)
  - Hong Kong Productivity Council (HKPC)
  - Vocational Training Council (VTC)
  - Clothing Industry Training Authority (CITA)
  - Hong Kong Institute of Biotechnology (HKIB)

3. Industry Co-Applicant (if applicable) \_\_\_\_\_

4. Project Coordinator Prof CHAN Tai Man (Eng) 陳大文教授 (Chi)

5. Type of Project  Platform Project  Collaborative Project  Tier 3 Project

6. Total Project Cost (HK\$): 6,000,000

Amount of Industry Sponsorship (HK\$): 600,000

Amount of Other Sources of Financial Contribution (HK\$): 0

Amount of ITF Funding Sought (HK\$): 5,400,000

7. Project Schedule:

Original Commencement Date (dd/mm/yyyy): 01/04/2013

Revised Commencement Date (dd/mm/yyyy): \_\_\_\_\_

Original Completion Date (dd/mm/yyyy): 31/03/2015

Revised/Actual Completion Date (dd/mm/yyyy): 30/06/2015

Number of Months Delayed (if any): 3

## 8. Project Summary

*(A brief summary of the R&D technology achievement)*

Existing security products attempted to correlate files and traffics to pre-defined patterns and data structures. However, if there is no information of the patterns or data structures, these products would not be able to identify security risks within a short timeframe. Since machine learning uses an iterative and automated approach, a prevention system can monitor thousands of discrete events in real time and can reprocess data until a robust pattern is found. This allows the system to go beyond looking for known patterns.

Therefore this project has investigated and developed advanced machine learning models and algorithms that can look for unusual processes running or anomalous behaviors for incident response in the cyber security perspective. With the help of these advanced machine learning techniques, an organization can automatically identify unusual traffic on the network, and can even identify new samples of malware before they can steal or destroy sensitive information.

## 9. Project Deliverables

*(A brief summary of the project deliverables developed)*

1. A machine learning engine for unusual traffic and malware detection
2. An automatic training system that can conduct training over unusual traffic and malware
3. A prototype system to evaluate the effectiveness of the machine learning engine

## 10. Impact to the Community [e.g. Item 4, Part V of application form]

*(A brief summary on how the project can bring social benefit)*

In recent years, there is an increasing trend in the varieties and occurrence of information security threats and cyber attacks. At the same time, the cyber threats continue to grow in scale and sophistication. The conventional techniques in cyber threat detection have been complicated by the various emerging cyber threats and they would not be enough for businesses and individuals to only protect their own information systems. This project can provide the advanced machine learning models and algorithms to defend against cyber attacks and malicious activities over the Internet and can benefit the society as a whole.

11. Marks obtained in Original Assessment

Components (weightings for Platform & Collaborative Projects/Seed Projects)	Markings
(a) Innovation and Technology Components (20%/36%)	14
(b) Technical Capability (20%/32%)	12
(c) Financial Considerations (16%/8%)	8
(d) Holistic Plan to Realisation/Commercialisation (16%/4%)	8
(e) Relevance with Government Policies or in Overall Interest of the Community (12%/8%)	8
(f) IP Rights and Benefit Sharing (8%/4%)	4
(g) Management Capability (8%/8%)	4
Total (100%):	58

12. Project Status:  Completed  Terminated on (dd/mm/yyyy):

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*Completion of Part B is NOT required if the project is terminated.*

## Part B1 - Report on Progress of Commercialisation/Technology Transfer Activities

*(to be completed by the subject officer of Technical Team of ITC in 2 years after project completion based on the progress of commercialisation/technology transfer activities reported below)*

1. Summary of the commercialisation/technology transfer activities in 2 years after project completion:

1. The University has granted a non-exclusive and non-transferrable source-code license of the technology to ITC Co. Ltd at a fee of HK\$500,000.
2. Consultancy services have been provided to XYZ R&D centers on advanced machine learning algorithms at a fee of HK\$100,000.

2. Do you think that an additional report should be submitted again for further assessment\*?

- Yes (to be assessed again in [ \_\_\_\_ ] (normally 5 years after project completion))
- No (no further assessment is required)

\* *Based on the progress of commercialisation/technology transfer activities reported by the Project Coordinator below, subject officer of technical team of ITC may adjust the timeframe and decide whether additional report is required.*

(To be filled by the Project Coordinator (PC)\* / Organisation Manager / Technology Transfer Office (through Organisation Manager of the research institute) in 2 years after project completion)

Q1. How much income has been received during the project period and after the project completion through the commercialisation of the project results (where applicable)?

	<i>During the project period</i>	<i>After project ends</i>
	<i>HK\$*</i>	<i>HK\$</i>
<i>Licensing/sale of technology</i>		500,000
<i>Royalty</i>		
<i>Sales of sample/prototype</i>		
<i>Proceed from customization/consultancy services</i>		100,000
<i>Proceed from contract research/further development of project results</i>		
<i>Use of technology in production of goods for sales/provision of services</i>		
<i>Intellectual Property Rights (IPRs) (e.g. trade mark, copyright, know-how, etc.)</i>		
<i>Other technology transfer activities (Please specify: _____ )</i>		
<b>Total:</b>		600,000

\* As recorded in the final report of the project in question.

Q2. Is there any spin-off company established to commercialise the project results?

Yes  No

*If yes, please provide details:*

Q3. Is there any joint venture or start-ups (e.g. company set up by research staff) established to commercialise the project results?

Yes  No

*If yes, please provide details:*

Q4. How many MOU/LOIs have been signed?

0

Q5. Are there any products/software/services developed from the project results which have been rolled out in the market?

Yes  No

If yes, please provide details:

The Internet Security Software Suite from ITC Co. Ltd has incorporated the advanced machine learning engine developed from this project.

Q6. How many IPRs have been generated from the project results?

	<i>Number</i>
<i>Patents filed</i>	<u>2</u>
<i>Patents granted</i>	<u>                    </u>
<i>Copyrights (no matter registered or not)</i>	<u>                    </u>
<i>Trademarks/designs registered</i>	<u>                    </u>
<i>Others (please specify: _____ )</i>	<u>                    </u>

Please provide a brief description of the IPRs generated from the project results (where applicable):

1. "Machine learning engine using ABC technique", Chan Tai Man, 2014, Application No. PCT/XX2015/XXXXXX
2. "Automatic training system using DEF technique", Chan Tai Man, 2014, Application No. PCT/YY2015/YYYYYY

Q7. How many technology transfer activities have been conducted?

	<i>Number</i>
<i>Academic/professional publications issued</i>	<u>2</u>
<i>Media interviews/press conferences conducted</i>	<u>                    </u>
<i>Workshops/seminars organized</i>	<u>1</u>
<i>Free-of-charge consultancy services provided to the industry</i>	<u>                    </u>
<i>Others (please specify: _____ )</i>	<u>                    </u>

Please provide a brief description of the technology transfer activities conducted (where applicable):

**Publications:**

1. CHAN Tai Man, A novel machine learning engine using ABC technique, ABC Journal on Cyber Security, pp. 1111-1113, 2015
2. CHAN Tai Man, A novel automatic training system using DEF technique, DEF Journal on Cyber Security, pp. 2222-2224, 2015

**Seminar:**

1. "Why cyber security is important: Cyber threat detection using machine learning", Computer Science Dept., Hong Kong R&D University, 1 November 2015

Q8. How many training opportunities/jobs have been created in relation to commercialisation of project results? If so, please provide details.

2 jobs were created at ITC Co. Ltd for the further development of the advanced machine learning engine

Q9. Is there any science and technology/industry award granted for the results of the project?

Yes  No

*If yes, please provide details:*

Q10. Apart from serving the industry, have the project results dovetailed Government policies or brought benefit to the community at large?

Yes  No

*If yes, please provide information on the contribution to the overall interest of the community (e.g. related Government initiatives, public sector trial/adoption, etc.)*

The project has an impact towards cyber security by providing advanced machine learning models and algorithms to defend against cyber attacks and malicious activities. The proposal is also in line with the Hong Kong Government's Digital 21 Strategy, particularly on cloud security and data privacy.

Q11. Please provide details/experience of successful commercialisation/realisation of project results (e.g. how did the project results bring benefits to the company/organisation after adoption the technologies developed from the project).

The commercialization of the project results has enabled the licensing company to further its technical capability on cyber security by strengthening its cyber threat detection technologies.

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*Completed by the Project*

*Coordinator\*:*

*Name:*

Prof CHAN Tai Man

*Signed:*

*Date:*

01 June 2016

*\*This form may be completed by an authorized/designated person on behalf of the research institute if the Project Coordinator has left the organisation.*