

FHKI International Forum

“Trend and Opportunities of Big Data Analytics and AI in the Greater Bay Area”

New Driving Force from Big Data and A.I. @Government : Co-create with GBA

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Greeting

Good morning, Dr. YIP (Daniel YIP, FHKI Chairman), Ms. Annie CHOI (PS for I&T), distinguished guests, ladies and gentlemen. I am deeply honored to be invited to this international forum to share with you some of our views on the trends and opportunities of big data and artificial intelligence (A.I.) in Hong Kong, China and the Greater Bay Area.

Let me first congratulate the FHKI for your sixtieth anniversary. The economy of Hong Kong, China has flourished rapidly in different sectors over the past 60 years, and we must thank the FHKI for the great support that you provided to the local industrial and commercial sectors in the years, driving innovation and facilitating trade and business development.

A.I. in Everyday Life

Today’s theme is about AI and big data. Over the past few decades, A.I. has evolved from laboratory trials to mainstream commercial applications. Let me start with a real-life example of how AI impacts my everyday lives from morning till night.

In the morning after waking up, the first thing I’ll do is to turn on my smartphone with TouchID using A.I-enabled biometrics. After unlocking my phone, I check out my social media account to get updated on what is happening, where A.I. works behind the scene to personalize what I see based on my search history. On my way to work, intelligent transport systems such as the traffic control and surveillance system (TCSS) make use of real-time big data collected from traffic sensors and A.I. algorithms to continuously advise the least-congested route. During work, I compose, send and receive emails for communication with my working and trade partners with the assistance of speech-to-text Apps powered by AI natural language processing tools, while anti-virus software works

behind the scene to provide protection for my email account. Time for lunch, and I'll use the Google Search, again powered by AI, to provide recommendations of food that I like and use AI-enabled parking App to help me find an empty parking space during lunch. When I get back home, the smart Apps in my phone will connect to smart home IoT devices to adjust the lighting according to my personalized settings.

Global A.I. Market

From my experience above, whether you are conscious or not, A.I. plays an important role in our daily lives today, improving many day-to-day processes and allowing us to complete tasks easily and efficiently. A.I. is a massive market and the technology is ever improving. It is driven by favorable digital infrastructures with huge number of connected IoT sensors providing massive volume of data, and with ever-improving connectivity and computing power, and of course supported by open-source algorithm and API platforms. No doubt the global A.I. market has been growing dramatically, from around US\$600 million in 2012 to US\$ 5,000 million in 2016. It is expected to shoot to US\$ 16 trillion in 2030¹, more than 3000 times as compared to 2016.

The economy of The People's Republic of China has benefited significantly from the new A.I.-related products and services, with economic gains amounting to around 26% of GDP, compared to 14.5% in USA and 9.9% in Northern Europe. This is perhaps due to its huge population of commercial and domestic users. Within The People's Republic of China, the AI industry is particularly booming in the GBA, helped by the fact that many AI leaders such as Huawei and Tencent, as well as leading enterprises such as GSK and Zhuhai GREE, having their factories and even headquarters in the GBA. By 2020, the scale of the A.I and big data industry in GBA shall exceed RMB50 billion (equivalent to around US\$7 billion), representing a share of over 30% of the national scale².

Unique Edges of GBA and Hong Kong, China

As most of us are aware of, the Central Government has promulgated the strategy to transform GBA into an International Innovative & Technology (I&T) Hub. The role of GBA, as a whole, is to facilitate wider business to business engagement and collaboration with the global market for better integration of talent, capital and I&T innovation, and in

¹ Global Artificial Intelligence Study:
<https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html>

² 「粵港澳大灣區人工智能與機器人產業發展報告」：<http://gd.people.com.cn/BIG5/n2/2019/0828/c123932-33296026.html>

particular on A.I and big data development.

In the GBA, Hong Kong, China could serve as the gateway for A.I. and big data development connecting mainland China and international companies eager to enter the GBA. The unique competitive edges of Hong Kong, China are our business-friendly environment, mature legislative and IP protection frameworks, experienced international workforce and strong compliance to internationally accepted data security principles. With GBA being transformed to an international I&T hub, it opens up significant opportunities for IT SMEs and professionals to leverage our own edges to materialize co-operations between enterprises from the mainland and the world for market entry, product localization and innovation on A.I.-related products and services.

The Challenges and Opportunities Ahead

Having just mentioned the significant I&T development potentials in GBA, next I would like to present how Hong Kong, China can make use our own advantages to support IT SMEs and professionals to tackle the challenges ahead, and seize the opportunities. I would also report what EMSD has done to co-operate with GBA cities, achieving synergy in I&T for the mutual benefit of both Hong Kong, China and GBA.

Talent Challenge. There are over 340,000 SMEs in Hong Kong, China, employing around 45% of total employment in the private sector as in December 2019³. SMEs are important drivers for the economy of Hong Kong, China. By virtue of their smaller entity, dynamic business models and flexible talents, they are easier to adapt to the changing business environment through rapid technological change. On the other hand, SMEs also face a key challenge of the shortage of high-calibre I&T talents^{4,5}. These I&T talents are essential to local SMEs when they develop their high-tier IT products and services. Over the years, our universities have achieved outstanding rankings, with five universities (HKU, HKUST, CUHK, CityU and PolyU) being ranked among the world's top 100, including three (i.e. HKU, HKUST and CUHK) in the top 50 in the latest 2020Quacquarelli Symonds (QS) university ranking⁶. Some of the local scholars are even recognized and included in A.I. 2000 Most Influential Scholar Annual List^{7,8}.

3 https://www.success.tid.gov.hk/english/aboutus/sme/service_detail_6863.html

4 <https://www.monster.com/career-advice/article/tech-talent-gap-survey-0816>

5 <https://www.foxbusiness.com/lifestyle/the-10-highest-paying-jobs-in-the-world>

6 <https://www.topuniversities.com/university-rankings/world-university-rankings/2020>

7 https://www.cpr.cuhk.edu.hk/en/press_detail.php?id=3236&t=cuhk-engineering-scholars-recognised-by-inclusion-in-ai-2000-most-influential-scholar-annual-list&s=

Despite recent world-wide economic downturn brought about by the COVID-19, the IT job sector is expected to continue to expand in tandem with the rapidly developing A.I industry, attracting data scientists and analysts with exceptional salary prospects. This has attracted top students to enter the IT industry and the trend will continue in the future. For imminent needs, SMEs can leverage the mature IT workforce in GBA to support the integration of their entrepreneurship in the GBA region.

Data Security and Intellectual Property. Technology innovation in A.I development requires lots of data and intellectual property protection. This is a big challenge for any collaboration between GBA and international companies on A.I and big data. Riding on the edge of Hong Kong, China as a major telecommunication hub, and with good privacy and IP protection provided by the regulatory framework of Hong Kong, China, the SMEs could play the important role in safeguarding data transfer in and out of the mainland China. This would enable Hong Kong, China to become the premier regional data hub for wider applications of big data analytics and A.I innovations on products and services.

Product Internationalization. Technology commercialization to marketed product is the desired final outcome for I&T development in Hong Kong, China. Rising trend of R&D commercialization by the start-ups in Hong Kong, China, technology companies and academia in recent years are indeed vital for the vibrant I&T ecosystem across the GBA. Taking advantage of Hong Kong, China as an international financial centre and business hub, as well as a central data hub between GBA and global markets, local IT SMEs and professionals are in an excellent position to design and apply smart city applications for commercialization and localization of A.I-related products and services. There are many bright SMEs in Hong Kong, China which make Hong Kong, China shine. For example, “SenseTime”, an artificial intelligence company, is one of the success stories of IT SMEs based in Hong Kong, China. It is one of the world’s first A.I unicorns, with business across The People’s Republic of China, Singapore, Japan and USA and is valued at over HK\$ 6.75 billion for developing A.I technologies in different commercial applications⁹.

The Role of EMSD

Innovation in EMSD

The EMSD has all along been promoting the application of new technology in a

⁸ <https://www.cse.ust.hk/News/ai2000/>

⁹ <https://en.wikipedia.org/wiki/SenseTime>

wide range of Government services. For example, we introduced oil-free chillers for improving the energy efficiency of air-conditioning systems. The EMSD also provides tailored technical support to Government departments to adopt new technology in various projects, and many of which involve AI and big data, including the award winning “Central Command System of Marine Police” in 2011, the “Smart Fever Screening System at border control points for the Department of Health” and the “Smart Prison” in 2019.

InnoPortal

In support of the 2017 Policy Address on development of I&T, the EMSD launched an online platform in 2018, known as the E&M InnoPortal, for matching government’s I&T wishes with solutions from the I&T sector. The platform lists the electrical and mechanical (E&M) service wishes of various government departments and public organisations. Through an automatic notification function, the platform informs interested parties such as universities and start-ups of the potential engagement or procurement opportunities of such service wishes, so that they can then propose relevant I&T solutions for matching.

For successfully matched I&T wishes and solutions under the platform, the EMSD will carry out field trials to assess whether the solutions can indeed address the intended needs of the government departments and public organisations. The trials, in the form of prototype testing or pilot projects, will take place in the EMSD Headquarters or other suitable government premises. Upon completion of the tests, the EMSD will upload validated performance reports onto the E&M InnoPortal for reference by the public.

The E&M InnoPortal helps government departments and public organisations identify opportunities and solutions to enhance their services with new technologies, while the universities, I&T start-ups and SMEs, leveraging government facilities as a testing ground, can gain experience and reference from the live trial of their products, and refine and prove their solutions. Upon completion of the trials, the universities, I&T start-ups or SMEs will receive objective and impartial performance reports, and other stakeholders may also refer to the reports in trying or adopting these solutions, thereby helping the further promotion of the solutions for wider applications.

Innovation Facilitator

In April 2019, the Government promulgated the pro-innovation procurement policy, aiming to encourage government bureaux and departments (B/Ds) to adopt I&T solutions to meet their needs. Under the policy, the EMSD and the Office of the Government Chief Information Officer (“OGCIO”) have been appointed respectively as the Innovation Facilitators to help with the adoption of innovative E&M solutions and IT solutions in the Government.

As one of the Innovation Facilitators, EMSD supports government bureau and departments (B/Ds) in identifying, co-creating and integrating innovative E&M solutions for enhancing public service delivery, providing tailor-made assistance to B/Ds from incubation of innovative ideas to large-scale deployment. The EMSD will also assist B/Ds in building collaborative partnerships with the I&T sector including start-ups, universities and the trades.

I&T Strategic Partnerships

In order that I&T wishes are effectively met with potential I&T solutions, the EMSD is actively exploring opportunities to establish strategic partnerships with major I&T solution providers in Hong Kong, China and the GBA through Memoranda of Co-operation (“MoC”). The EMSD signed twelve MoCs with five local universities and seven research institutions in June 2019 to establish strategic partnerships to leverage the E&M InnoPortal and support the application of I&T in the Government. These twelve strategic partners, being an ensemble of a significant share of local start-ups and top-notch solution experts from the research and academic institutions, represent a solid support to the EMSD on our future work on I&T.

To further extend the strategic partnership towards the GBA, the EMSD signed 3 more MoCs with institutions from the Guangdong province in August 2019. The collaboration with GBA not only allows the EMSD to promote the E&M InnoPortal to GBA so as to tap the greater I&T resources and hence broaden our I&T solutions source, but also fosters knowledge and experience exchange with GBA, and help promulgate local I&T solutions to the GBA.

Use of I&T for public innovation

I would like to show you some of the A.I.-related projects that we co-created with our local and GBA strategic I&T partners for enhancing public service

Firstly, on energy efficiency and conservation, we integrate machine learning algorithm with Building Information Modelling (BIM) and Computerized Fluid Dynamics (CFD) modelling to regulate air distribution patterns within building for better energy utilization. In addition, rule-based data mining technique has been adopted to diagnose sensor data from central air conditioning plant for symptom visualization, failure identification and recommendation of energy saving opportunities. Secondly, to enhance work productivity, we use image processing technique with convolution neural network algorithm (CNN) to plan for continuous automatic drone-enabled surveillance in prison boundary area, thereby saving lots of manpower for repeatedly daily inspection works. Thirdly, on safety enhancement, we integrate machine-vision techniques in robotics and drones to carry out automatic mosquito oil fogging, reducing the risk of front-line workers in handling chemicals. A.I.-based signaling analysis is also deployed in detecting pre-mature failure of safety critical components of lifts, safeguarding the users and enhancing lift reliability. In the last example on service enhancement, along with our vision to contribute to the peaceful after-death journey of the deceased, we are attempting the introduction of CNN algorithm in cremation system. Let's see the following video on how it works (Slide 18.video show).

To support our digitalization and I&T application initiatives, we are tapping the best I&T resources, big data applications and A.I. models from the best of the eastern and western worlds. For example, we make use of both Huawei Cloud and Amazon Web Services (AWS) in some applications. We enjoy the geographical advantages of Hong Kong, China in the GBA to connect with mainland A.I. specialists through VPN network of the Huawei Cloud. This enables the A.I. models and associated data exchange from the Mainland be easily deployed through that platform to support our I&T needs, such as consulting A.I specialists and using their natural-language-processing model to customize our Cantonese-based Chatbot system. On big data applications for our asset management, AWS provides a structured unified platform as central data lake for our IoT sensors, as well as big data analytics and visualization for buildings. All these are vivid illustrations of our edge and positioning in supporting Hong Kong, China as an international I&T hub.

The outbreak of COVID-19 has brought about unprecedented challenges to Hong Kong, China. To help combat the outbreak of COVID-19, the EMSD launched a thematic page in the E&M Inno-Portal in February 2020 for seven anti-epidemic I&T application wishes, including mobile fever screening robots, robots for indoor disinfection, robots for minimizing close person-to-person contact, self-disinfecting substances/coatings, anti-viral air filters etc.

Four of these I&T wishes are heavily related to A.I. enabled robotic solutions. Within two weeks, we received an overwhelming response of over 200 I&T solutions from local and GBA I&T strategic partners within 2 weeks. These include, among others, over 40 solutions each for different types of AI-based robotic solutions, many of which have been deployed in the mainland to perform high risk tasks that reduce human contacts during the outbreak.

The Future (Closing Remarks)

In closing, following recent years of rapid development, GBA has become an important technological base in The People's Republic of China and even in Asia, and more advanced technology enterprises are setting up offices or even their headquarters here, with high value-added business on A.I., big data analytics and related applications. With mature A.I. workforce available in GBA, local IT SMEs and professionals can act as the gateway agent for mutual co-operations between enterprises from mainland and those from overseas markets, making use of the edges of Hong Kong, China as the premier regional data hub for wider product internationalization of big data analytics and A.I. innovations.

I would like to thank FHKI for your years of contribution in supporting and facilitating local SMEs to make the best use of the unique edges of Hong Kong, China in tapping the rich resources and opportunities in GBA. For EMSD, we will join hands with FHKI to continue the building up of a network of I&T professionals and solution providers to support wider adoption of A.I. and big data technologies in public services delivery, helping Hong Kong, China develop into a smart city and the GBA into an International I&T hub.

- Thank you -