The integration of AI into professional services

Simon Lee, Senior Director of FinTech, PropTech and Art-Tech, ASTRI - Hong Kong Applied Science and Technology Research Institute

Independent legal & accounting firms

ASTRI 25th

TECH FOR EVERYONE

INNOVATING FOR TOMORROW PUSHING THE FRONTIERS OF TECHNOLOGY

HONG KONG APPLIED SCIENCE AND TECHNOLOGY RESEARCH INSTITUTE

Mr. Simon Lee
Senior Director, FinTech, Prop-Tech & Art-Tech

v202501

25th
TECH
FOR
EVERYONE
ASTRI
Hong Kong Applied Science and
Technology Research Institute

The Largest Applied Research Institute in Hong Kong

24% PhDs 56% Master's for researchers

710+

staff members in Hong Kong and Mainland

Carried out

1,100+

research projects

Performed

1,500+

technology transfers

1,100+

patents granted

Figures as of 31 Dec 2024

中华人民共和国科学技术部
Ministry of Science and Technology of the People's Republic of China

ASTRI PROPRIETARY

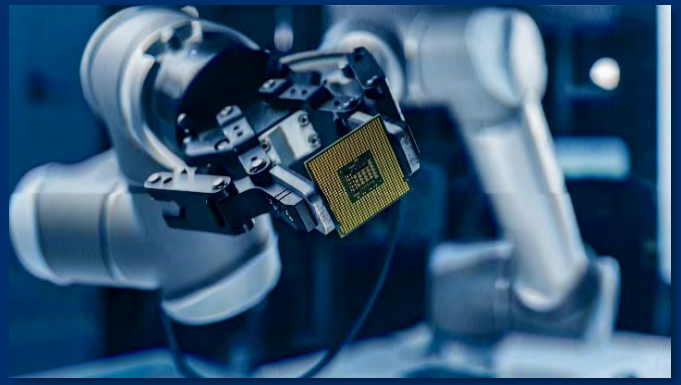
Leading Research Efforts in Six Core Application Areas

Smart City

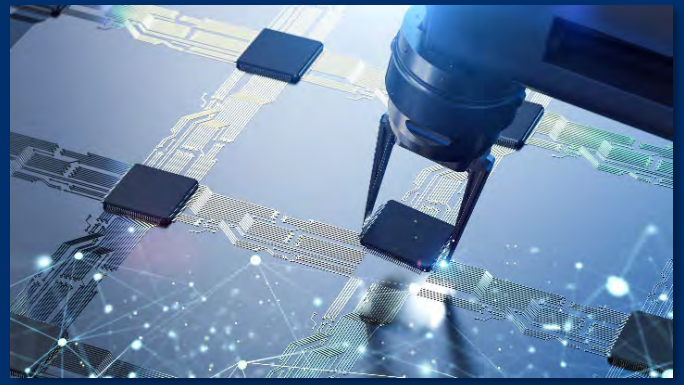
FinTech

Digital Health

New Industrialisation & Intelligent Manufacturing



Application Specific Integrated Circuits



Metaverse

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More Vibrant FinTech Ecosystem

Standard Chartered, PAOB, OpenRice, Lalamove

Federated Learning
Facilitating credit scoring for MSME financing

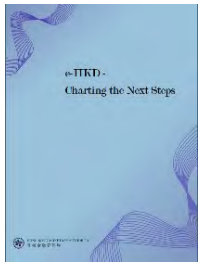
- *Artificial intelligence (AI) models*
- *Comprehensive credit analyses*
- *Privacy protection and data security enhancement*

Reference

Hong Kong Monetary Authority

Central Bank Digital Currency (CBDC)
e-HKD pilot programme launched

- *Implementing retail CBDC technology*
- *Exploring innovative use cases jointly with the industry*



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Reference

Hong Kong FinTech Ecosystem

Alternative Credit Scoring
Smart credit access for SMEs

- *Credit scoring by alternative data*
- *Secured data and insight sharing*

Reference

Generative AI for FinTech & ESG Initiatives

Private ChatGPT
Generative answers with traceable links and high accuracy

- *Domain specific and vector databases*
- *Ensuring data confidentiality as a secure in-house tool*

Reference

ICBC Asia, Chow Tai Fook, China Mobile HK

AI Chatbot & OCR
Enhancing experience & efficiency

- *Domain-specific HK Cantonese*
- *Sentiment analysis*
- *Handwritten Chinese OCR*

Reference

GBA Carbon Neutrality Association

AI ESG Report Analytical Engine
Automatic extraction from massive data

- *"Top 100 Carbon Neutrality HK Listed Co"*
- *Deep natural language processing engine*
- *Reducing checking and compliance costs*

Reference

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Award-winning Innovations

Inventions Geneva

Special Award for Innovation
1 Award

Gold with Congratulations of the Jury
10 Awards

Gold
36 Awards

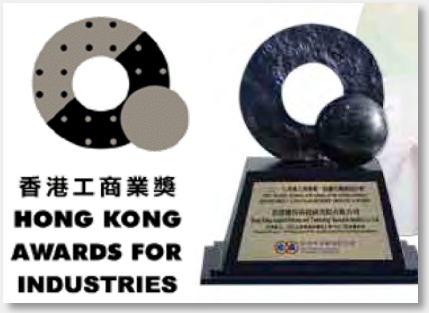
Sliver
59 Awards

Copper
21 Awards

Garnered more than **120** awards from 2018 - 2024

2020 STATE SCIENTIFIC AND TECHNOLOGICAL PROGRESS AWARD

First Class Award



HONG KONG AWARDS FOR INDUSTRIES

- **Equipment and Machinery Design Category Award (2024)**
- **Equipment and Machinery Design Certificate of Merit (2024)**

HONG KONG ICT AWARDS

- **Smart Living (2018 – 2021, 2024)**
- **Smart People (2021)**
- **Smart Mobility (2020, 2024)**
- **Smart Business (2018, 2022, 2023)**
- **FinTech (2024)**

ASIA FINTECH AWARDS IN SINGAPORE

- **Banking Tech of the Year (2024)**
- **Data Initiative of the Year (2023)**

ICT CHINA AWARD 2022

Innovative Application Category – First Class Award (2022)

4th ASIA EXHIBITION OF INNOVATIONS & INVENTIONS HONG KONG (AEII)

4 awards received

- **1 Gold Medal with Congratulations of Jury**
- **2 Gold and 1 Bronze Medal**

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Orchestrating the I&T Ecosystems

- To support Hong Kong in developing into an international I&T hub
- To facilitate a closer connection between **upstream and midstream research** to the **downstream market** as well as push for more **Industry-Academia-Research collaboration**

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Bridging Upstream Research with Industry Needs

- **Identify collaboration opportunities** between ASTRI and University professors
- **Bridge industry requirements** with joint ASTRI-University research capabilities
- **Facilitate project-specific research agreement and IP agreements** among ASTRI, University and professor(s)
- **Oversee commercialisation** of research deliverables through ecosystem partners

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FinTech & ESG Alliance
金融科技與永續發展聯盟

In line with the HKSAR Government's initiatives to develop Hong Kong into a green FinTech hub, ASTRI set up its third ecosystem, FTEA, on 22 February 2024

FTEA aims to engage with all stakeholders to foster a holistic ecosystem that paves the way for an innovative era of financial services and sustainability

FTEA Member: 140+
Supporting Organisations: 30+

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Expanding the I&T Footprint in the GBA

To leverage the advantages of the Greater Bay Area, including its rich resources and huge market for technology applications

- **Relocated ASTRI's subsidiary in Shenzhen to Futian,** Shenzhen branch of Hong Kong Science Park in Jan 2024, and held a grand opening ceremony in Oct 2024
- Applied for **Futian Government's One to One Matching Fund**
- **Actively seek cooperation with universities in the GBA**
- **Develop R&D projects** with ecosystem partners in the GBA

In line with National 14th Five-Year Plan
Propel Hong Kong into an international I&T hub

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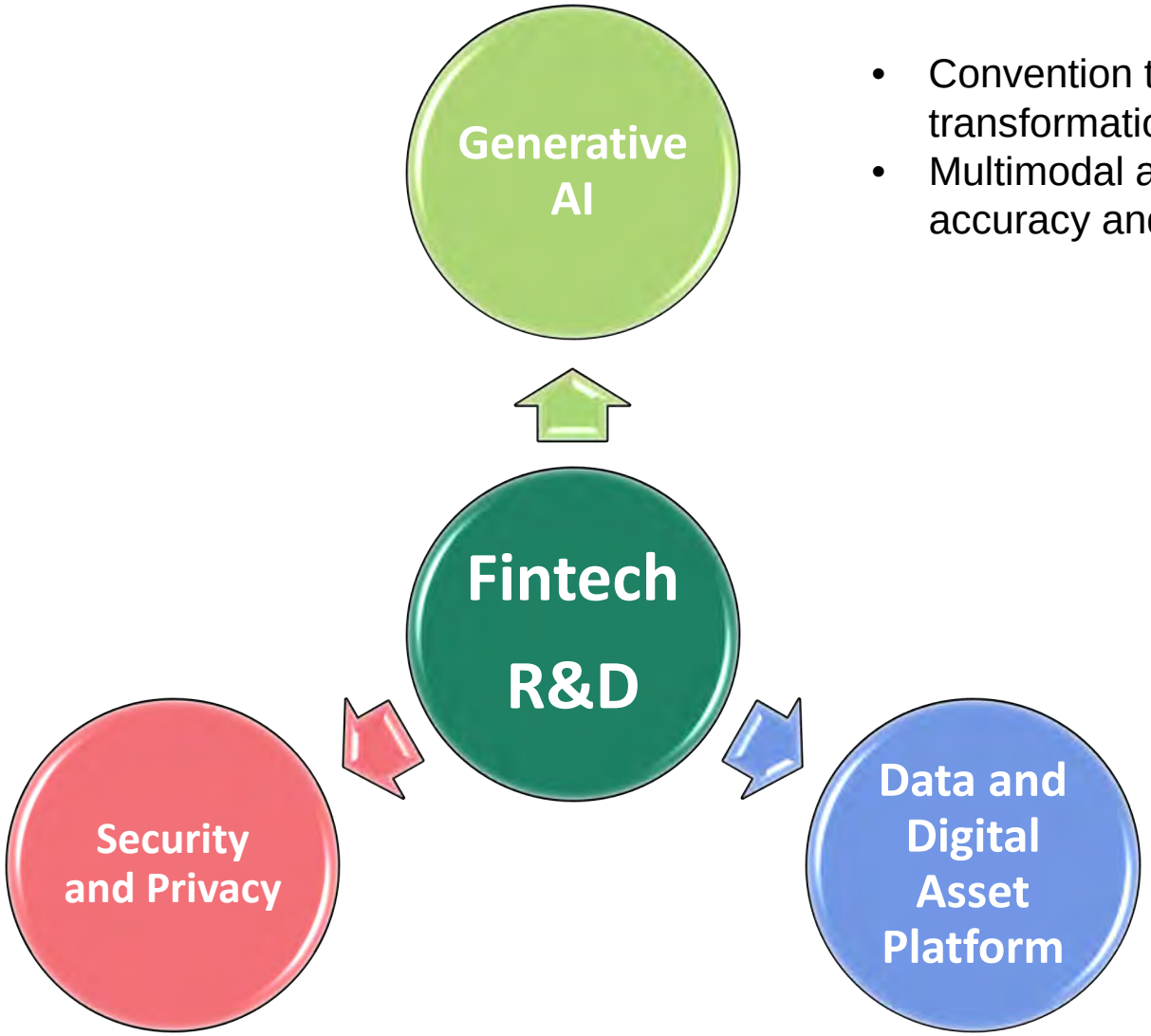
FinTech Innovation in ASTRI

TECH FOR EVERYONE

Overview



- Convention to Generative AI transformation
- Multimodal and AI agent to improve accuracy and operation efficiency

- AI enabled designs
- Enhance data protection for AI applications

- Follow latest trends of ESG, CBDC, Tokenized Assets
- Facilitate secure data sharing and pricing valuation

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AI in Law & Accounting

Benefits & Directions of adoption:

Efficiency

- Handle Repetitive Tasks
- Document Processing
- Data Analytics

Client Experience

- Faster Responses and improved engagement in routine inquiries

Scalability

- 1 Chatbot, Limitless Clients
- Liberating professionals' time for more complex and important tasks

Accuracy

- Minimize errors in document processing & research, e.g. Contract comparison, pulling information from past legal cases

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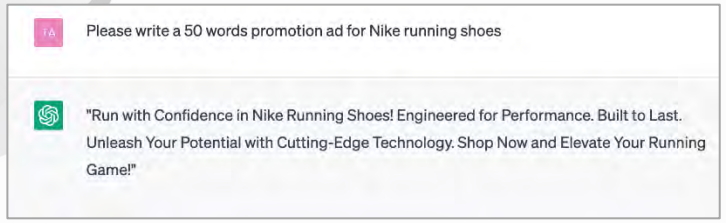
Generative AI

AIGC Era:
Everything can be Generated by AI



Text Generation and QA

ChatGPT (OpenAI)
Gemini (Google)
文心一言 (Baidu)
通义千问 Tongyi Qianwen (Alibaba)

Image Generation

MidJourney
DALL-E2 (OpenAI)
Stable Diffusion

AIGC

Video Generation

Gen-1/Gen-2 (Runway research)
Google Imagen Video (Phenaki)
Meta AI (Make a video)

Code Generation

Audio Generation

Voicebox (Meta)
Bark (Suno)

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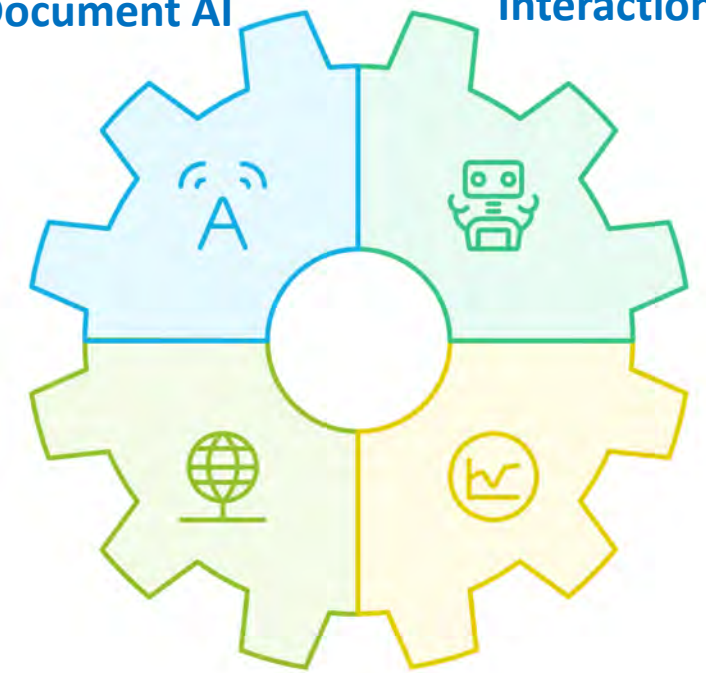
From Conventional AI to Gen AI

NLP and Document AI

Avatar and Interaction



Computer vision

Big data and analytics

Domain Specific LLM

RAG and AI Agent
- Generative information query
- AI Agent for business intelligence

Business Intelligence
- Data Analytics using Natural Language
- Text-to-SQL/Cypher

Multimodal
- Video driven RPA
- XR and 3D modelings
- Medical image analytics
- Chart/Diagram understanding

Realistic Avatar
- Live broadcasting
- Movement and Interaction

Ethical AI
- Fraud detection
- AI governance

Gen AI Roadmap

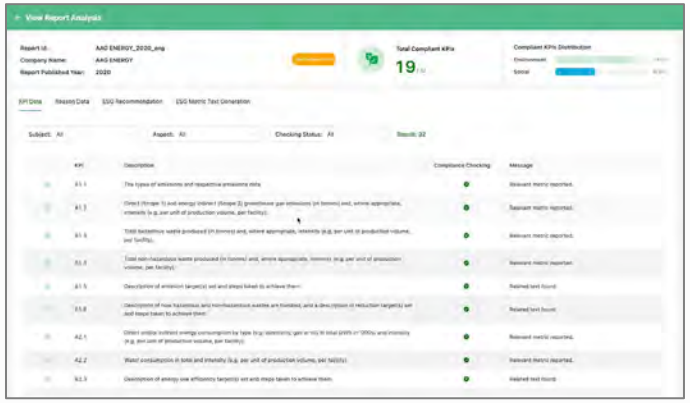
ASTRI

NLP & Document AI - General Unstructured Data Analysis Solution

Semantic Understanding → **Summary / Review / Checking** → **Writing and Generation**

Industry Benchmark

Company Profile and compliance checking



- ✓ **ESG Report Analysis**
- ✓ News Analysis
- ✓ Annual Report Analysis
- ✓ Legal/Loan Document Review
- ✓ Compliancy Checking
- ✓ Cross Document Semantic Comparison

Strategy Analysis & Improvement Suggestion

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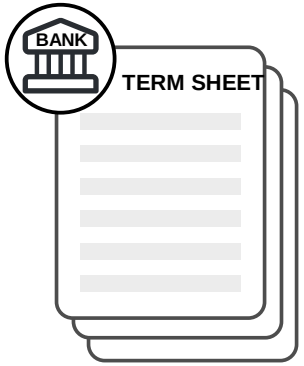
Semantic Matching for Loan Document Review

Automatically identify the corresponding sections in agreement, for each item defined in the term sheet.



Loan Term Sheet (20-30 pages)

Legal Agreement (>100 pages)

Purpose	:	To finance the general working capital of the Borrower and its Subsidiaries, including financing the repayment by the Borrower of amounts owing under the USD 500 million syndicated facility made available to the Borrower under the USD 500 million syndicated facility agreement dated 9 August 2018.

Top 3 Accuracy > 90%

83%	3.1 **Purpose** The Borrower shall apply all amounts borrowed by it under the Facilities towards financing the general working capital of the Borrower and its Subsidiaries, including but not limited to repayment of the Existing Financial Indebtedness under the Existing Facility Agreement.
72%	**"Existing Facility Agreement"** means the US$500,000,000 syndicated facility agreement dated 9 August 2018 between, among others, [redacted] Limited as agent and the Borrower as borrower (as amended, supplemented and restated from time to time);
69%	**"Existing Financial Indebtedness"** means the existing financial indebtedness incurred by the Borrower under the Existing Facility Agreement;

Top Relevant List Ranking

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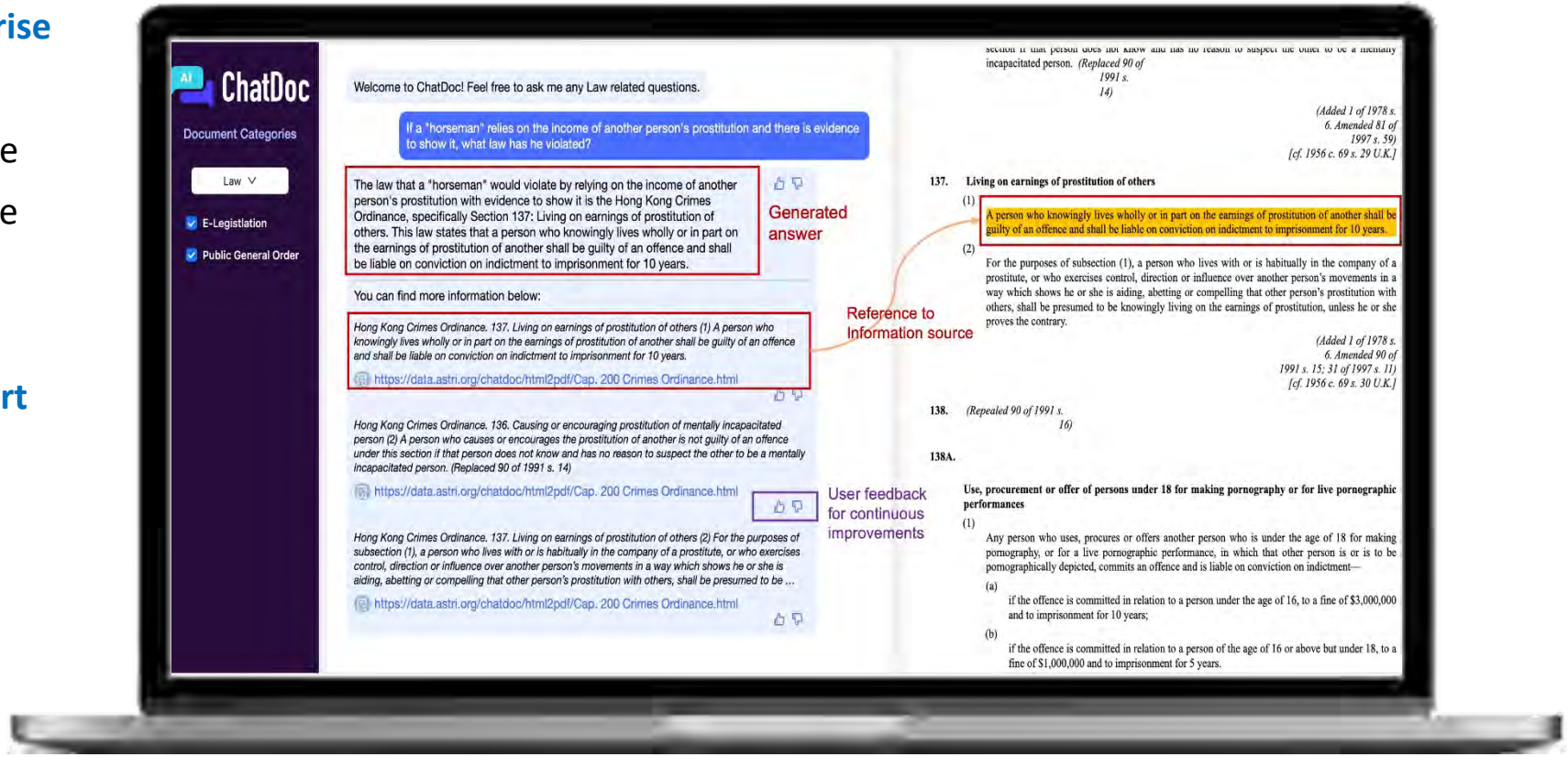
Generative Information Query for Business Intelligence

Generative information query for Enterprise

- On-premise private “ChatGPT”
- Domain Specific LLM & knowledge base
- Verifiable answer, accurate and reliable
- Reduce hallucination

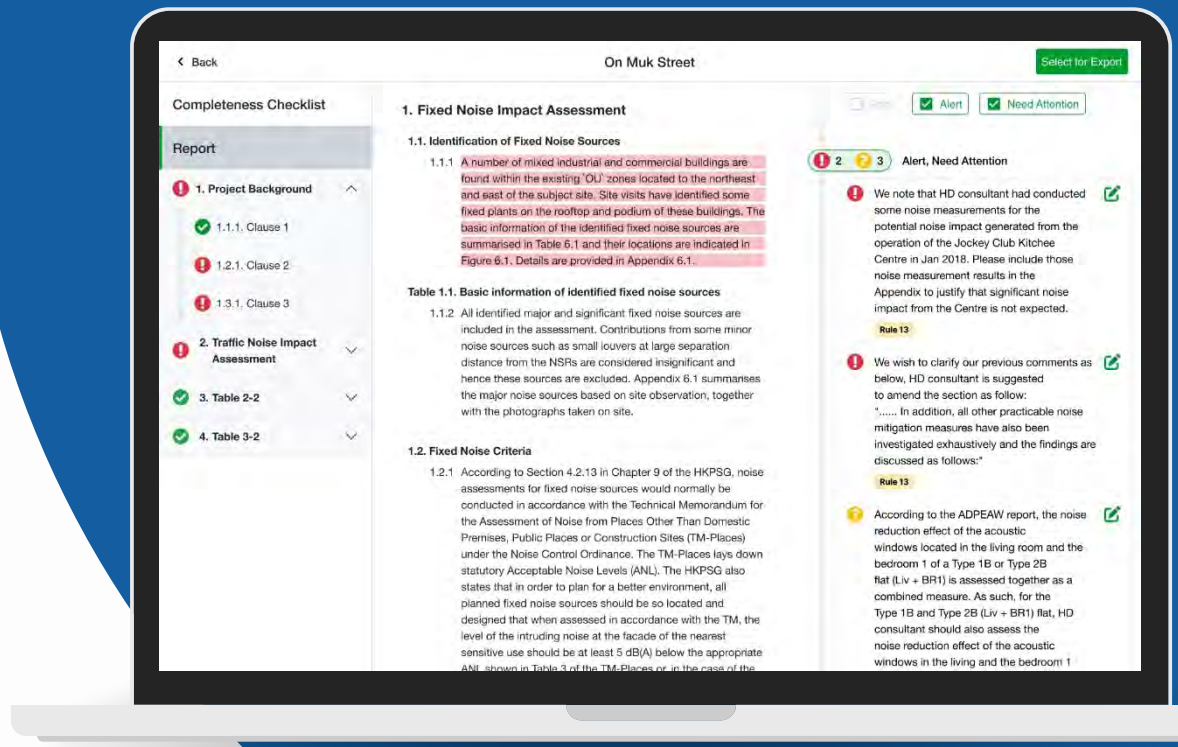
AI Agent for Complex reasoning to support business intelligence

- Continuous decision making
- Memory augmented agent
- Multi-agent collaboration
- Fulfill complex business requirements need multi-step reasoning



ChatDoc - Demo Video

AI Agent for Contextual Assessment with Reasoning and Decision Visualization



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1. Cutting-Edge Technologies Driving Innovation

Next-Generation AI at Work:

01

Large Language Models (LLMs)

- Contextual classification,
- Abnormality detection,
- Decision explanation,
- Powered by Llama 3 (8B) for precise and scalable performance.

02

Retrieval - Augmented Generation (RAG)

- Combines domain-specific knowledge bases with AI-generated insights,
- Ensures unparalleled accuracy and relevance.

03

Hybrid Algorithms for Decision Visualization

- Merges Rule-based Logic with LLM outputs for actionable insights,
- Highlights deviations from standards with visual clarity.

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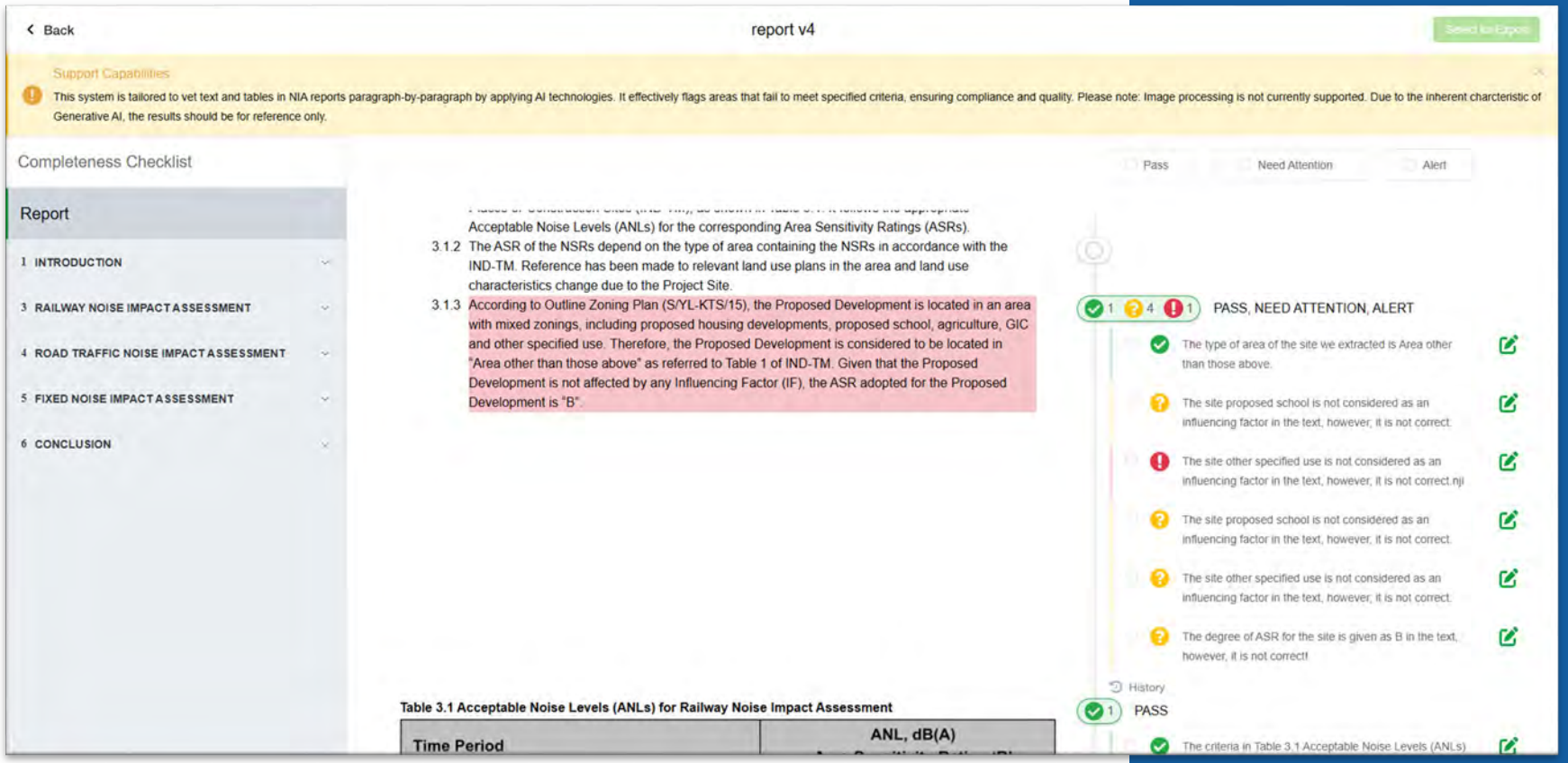
Content Abnormality Detection

LLM

- Leveraging LLM for advanced anomaly detection.
- Utilizing LLM for efficient content analysis.



Response to Comments (RtC)

Document Comparison

Correctness Verification

EPD - Comment

a.

a. S4.5.1 – Re. item 7a of R-to-C. The revised 1st bullet discussing fixed glazing is still confusing.

b.

b. S4.5.1 – Re. item 7c of R-to-C. The supplemented para. on the noise reduction mechanism of acoustic window shall be reviewed e.g. for the repeated discussions on the positions of its components. Besides, it shall be supplemented that the fixed glazing at the outer layers needs not be opened for ventilation and could only be opened by a special locking device (e.g. Allen key) for cleansing and maintenance purposes only.

c.

c. Table 4.3 – While S4.5.1 claims that the openable side of the acoustic window would be

Consultant - Response to Comment

Noted and revised. Instead of fixed glazing, fixed window is presented and discussed. See S.4.5.2.

Version 2

Date of submission:2024/11/06 **Location:** Page 17,18

1 / 1

4.5 Recommendation on Mitigation Measures

4.5.1 In order to further reduce the traffic noise impact, mitigation measures include fixed windows and acoustic windows (baffle type) have been adopted at residential blocks in this assessment.

4.5.1 Fixed window

4.5.2 Fixed windows are proposed to side windows with road traffic noise exceedance. To mitigate road traffic noise impact, fixed window with 6mm thick of window-pane (normally closed) is proposed to be installed at these locations to reduce the road traffic noise entering the flat. Fixed window shall not be opened for ventilation and could only be opened by a special locking device (e.g. Allen key) for cleansing and maintenance purposes. Future residents shall be advised that the fixed window should be closed to achieve the intended sound attenuation. See Section 4.5.7.

4.5.2 Acoustic Window (Baffle Type)

4.5.3 Acoustic window is designed with a side-hung window and fixed glazing as outer layer and a sliding glass panel as inner layer. The sliding glass panel should be behind the side-hung window while the fixed glazing at the outer layer should be kept closed and not to be opened for ventilation. It could only be opened by a special locking device (e.g. Allen key) for cleansing and maintenance purposes if and when such need is warranted. The schematic plans of proposed acoustic windows are shown in Figure 1-2 of Appendix 4.3, referring to the HD's Final Report of Acoustic Design and Performance Evaluation of the Acoustic Window (ADPEAW)

New Comment

Select for export

AI

Comment addressed. The response revised the previous sentence to clarify fixed window installation and usage for noise mitigation, addressing the comment's concern about confusion.
The report was revised based on comments, replacing "glazings and acoustic windows" with "fixed window" and adding details.

Revolutionary Features

Visualization-Driven Insights

- Dynamic dashboards highlight compliance status and anomalies in a user-friendly format.

Response to Comments (RtC) Document Analysis

- AI verifies modifications align with EPD comments, reducing manual review time.

Explainable AI (XAI)

- Transparent, natural-language explanations generated by LLMs.

Automated NIA Report Analysis

- Real-time validation of Noise Impact Assessment (NIA) reports using 42 custom rules.
- Ensures compliance with Hong Kong Planning Standards and Guidelines (HKPSG).

Self-Assessment Tool for Industry Stakeholders

- Enables consultants to pre-assess NIA reports for compliance before submission to the Government.
- Reduces rework and accelerates approval processes.

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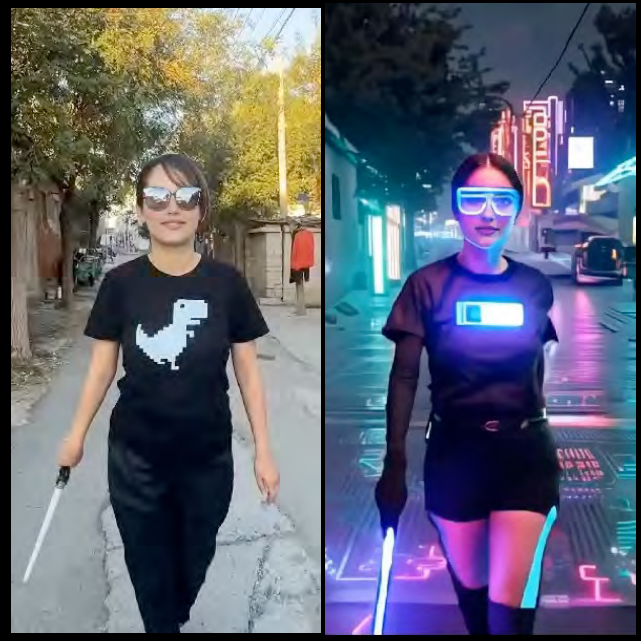
GenAI Realistic Avatar

Performance

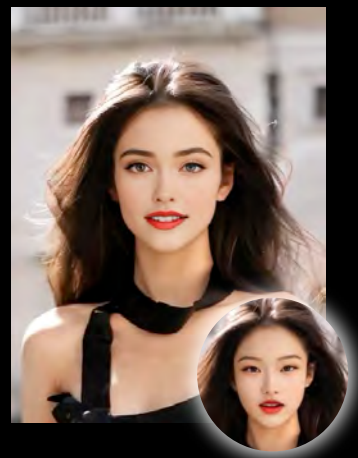
Full Body
4D
Free view

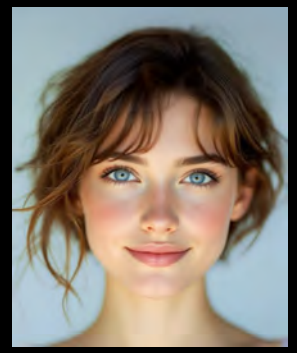
Real-time



Half Body
3D

Head/Face
2D
Offline





Face Gen-

Talking Head

Face/Head Swap

Copyright Protection
Emotion & Gesture

Twins Digital
Live Broadcasting & Transformation

Movement & Interaction

Functionality

Face Fusion by StyleGAN

Wave2Lips

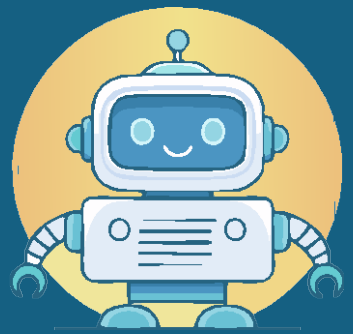
Face Reenactment by Thin-Plate-Spline-Motion Model

Diffusion Model

Feature Transfer model

Contrastive Language-Image Pre-Training + Diffusion Model

Interactive AI



Hello !

What's your name?

I'm Xiao A.

...

Text-driven

- Chatbot
- Predictive interaction

Supervised Deep Learning, Transformer

i Amy, What can I help?

I'm planning a trip to Tokyo. Could you plan for me?

ure, how many days are there?

5 days in Tokyo.

...

AI Agent

- Voice conversation
- Generative interaction

Reinforcement Learning, LLM

Role Model

- Job: lawyer, sales, teacher, etc
- Behavior: build confidence, build trust, make a deal, etc

Supervised LLM Fine-Tuning

Continuous Learning

- Auto-training for AI growth
- Personality
- Diversity of character

Semi-Supervised Data Labelling Model

GenAI as a Second Brain

Data Sources

ERP systems

Financial Statements

Case Law databases

Regulatory Guideline

Recorded Conversations

Contracts, agreements

AI Agent
-Data Driven
-Automated
-Personalized

ChatDoC
ChatBI
STT / TTS
Virtual Avatar

AI-Powered Use Cases

Compliance Checking

Legal Research

Contract Review
Document Drafting

Financial Report Summarization

Chatbot

- Integrated Knowledge:
  Internal + External, Structured + Unstructured
- Data > Insights > Actions
- Sophisticated Decision-Making

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Multimodal Gen AI for Advanced Office Automation

Present

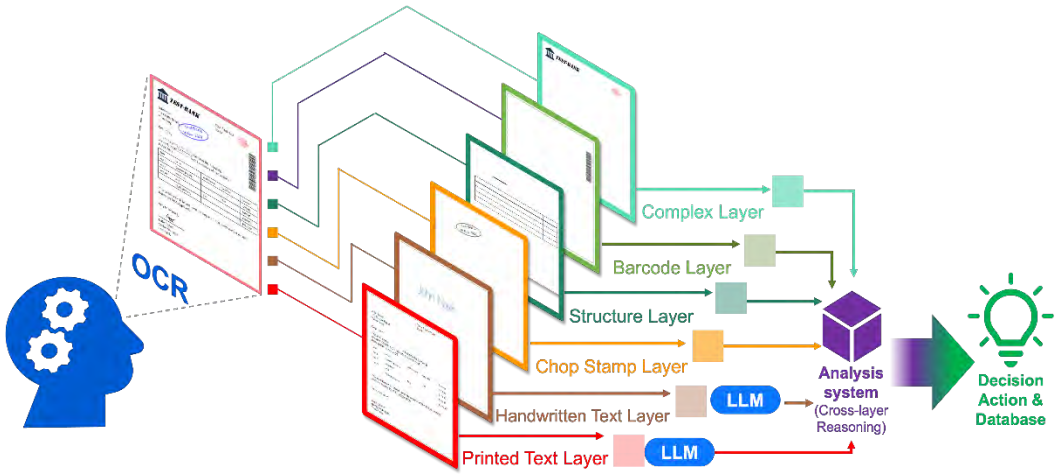
Universal Information Extraction from Unstructured Data Sources

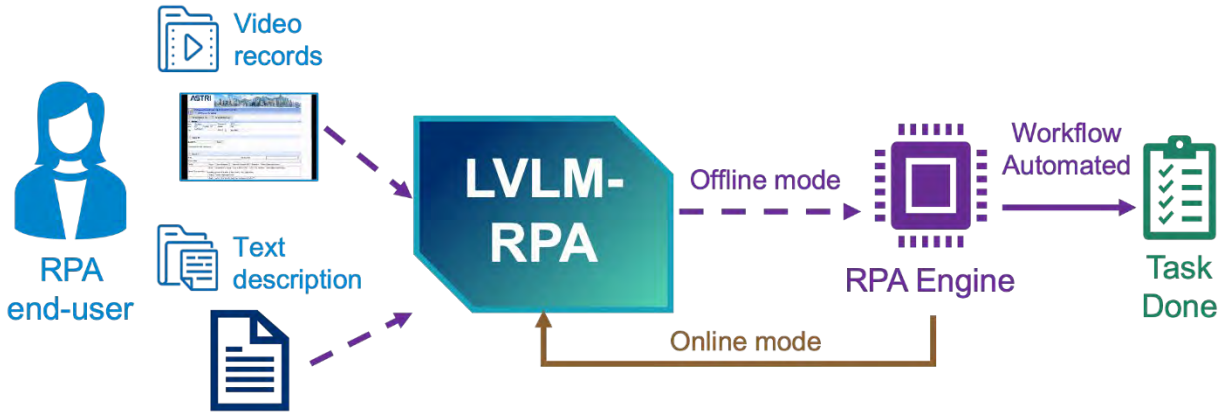
- Form/Document/Certification verification
- Fast handwritten form recognitions
- Adopted by many partners

Future

AI-driven Robotic Process Automation through Large Vision Language Model

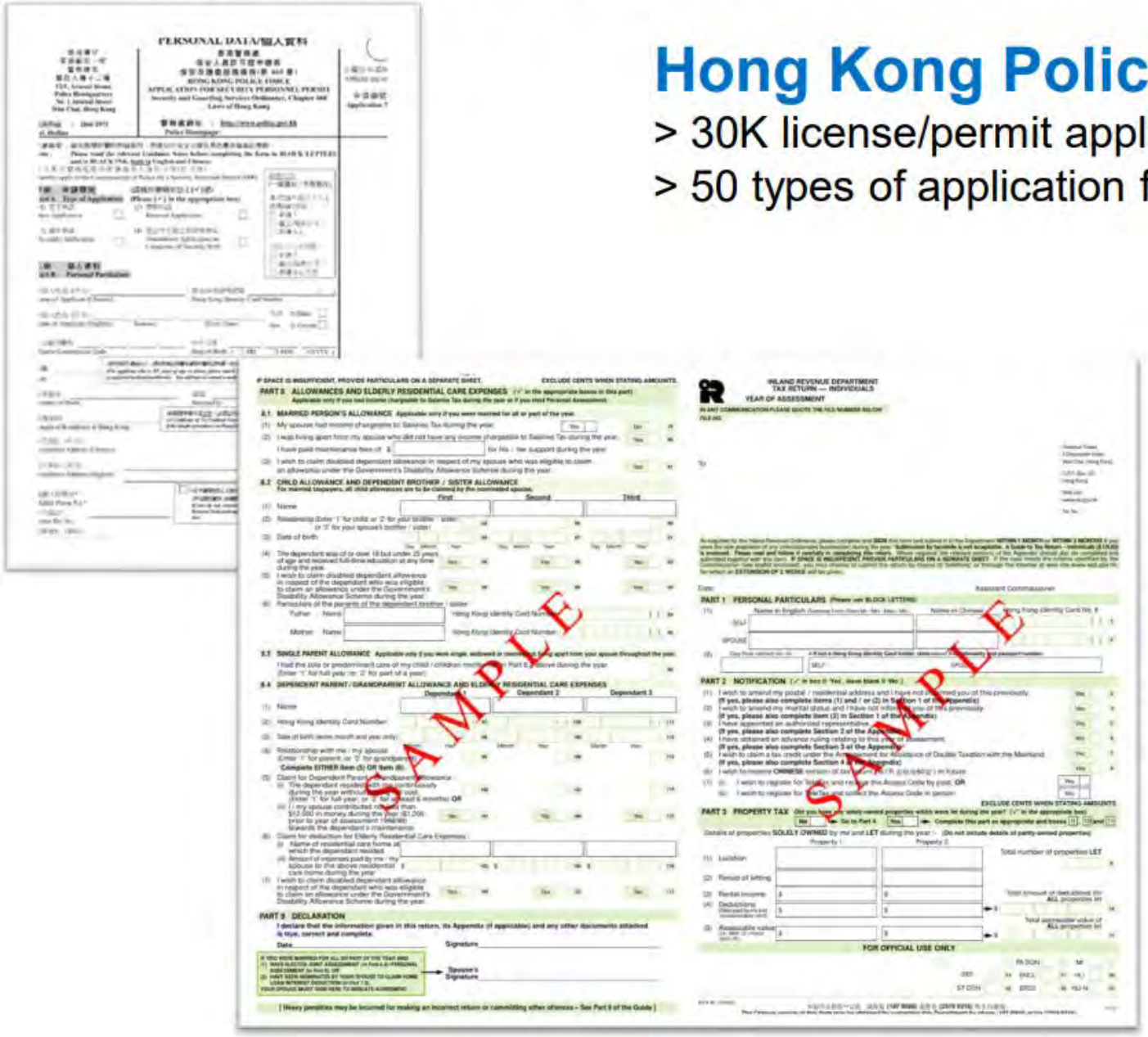
- Flexible end-to-end workflow generation and execution.
- Novel method of taking a short video to configure RPA software.
- Benefit organizations with heavy use of RPA software. Save cost and improve efficiency





AI Document Analysis & OCR

AI Handling of Hand-Written Document



Hong Kong Police Force (Licensing / OPS)

> 30K license/permit applications per month

> 50 types of application forms

Inland Revenue Dept.

> 2.5 Million handwritten BIR60 per year in Digits, English or Chinese characters.

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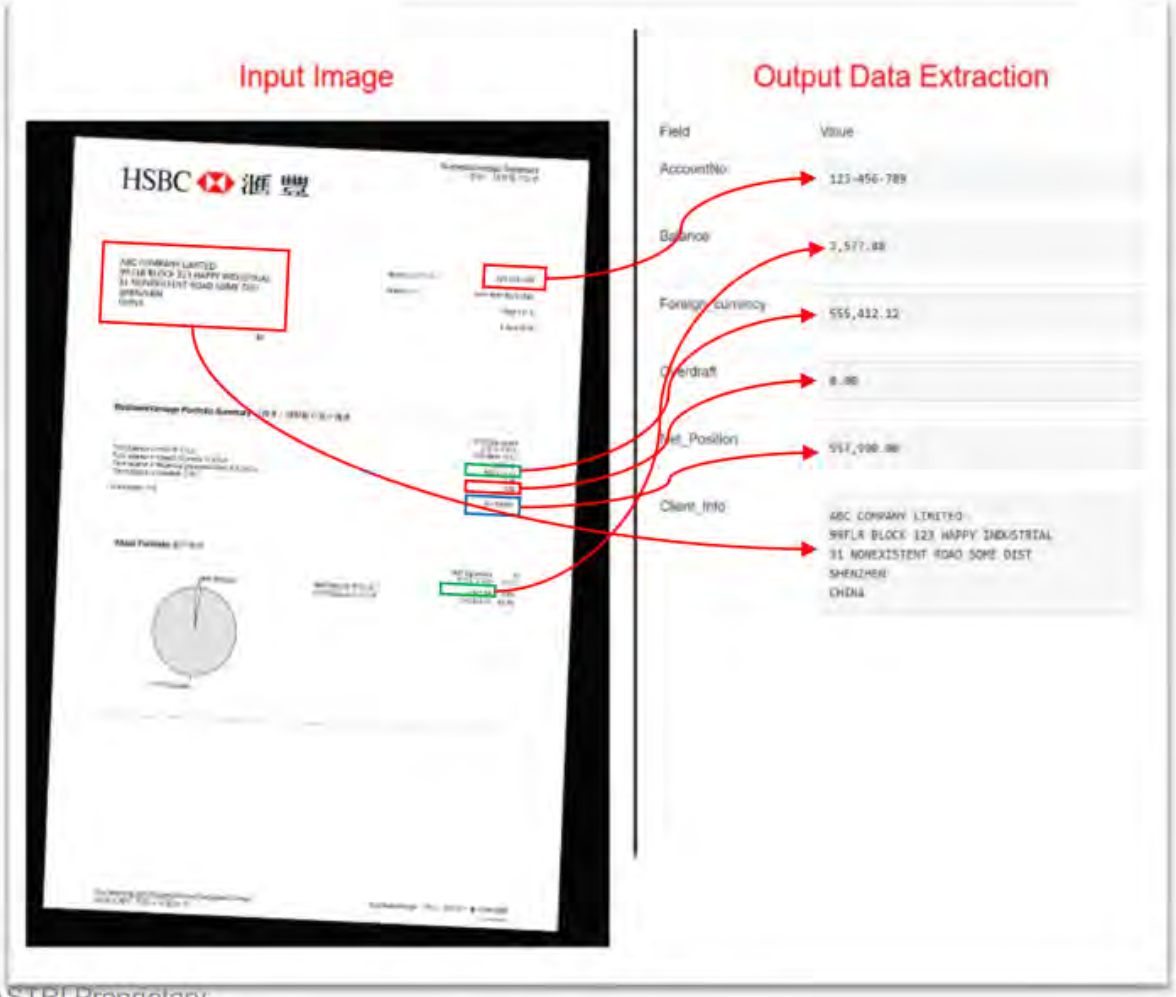
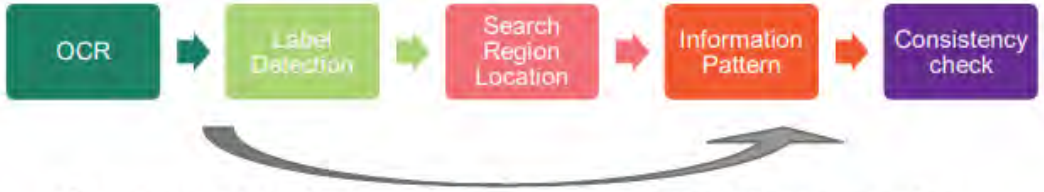
AI Document Analysis – Data Extraction and Processing

- A generic approach to extract entities from a document with customizable (by human or machine learning) rule sets related to **spatial** and **contextual** information.





Customizable (trainable) rules to control the extraction

- The platform provides functions for users to construct their own entity extraction systems.
- There is capability for users to incorporate third party software.
- Rules are defined as in json format and users can modify easily.
- Spatial and contextual information are defined intuitively.
- If users provide a set of exactly the same format documents, the platform can be extended to train its rule set.
- Quotations, Invoices, bank statements, HKID cards, BR, CR, NAR1, etc. various can be applied.

Evaluated Bank statements
Dah Sing Bank -HKD Current Account
HSBC - BusinessVantage - BusinessDirect
HSBC -Statement of Account
Hang Seng Bank - Business Partner Statement of Integrated Account
Hang Seng Bank - Statement of Current Account
HKBEA - Statement
HKBEA -CorporatePlus Account
OCBC Wing Hang - Current A/C Customer
ShangHai Commercial Bank -Consolidated Statement
Standard Chartered
NCB (Nanyang Commercial Bank)
ICBC
Bank of China BIA

ASTRI Proprietary

ASTRI

AI-related Fraudulency in Hong Kong

2023年8月25日 時事脈搏 港聞

涉AI換臉冒認身份網上借貸 6人被捕

有詐騙集團涉嫌利用人工智能換臉技術，冒認已經報失身份證的市民，企圖瞞騙人臉識別系統，以完成銀行或借貸公司的網上申請程序，警方拘捕6名涉案男女。

國際 / 即時國際 出版：2024-05-30 21:10 更新：2024-05-30 21:34 撰文：許誼安

騙徒Deepfake假冒跨國公司CFO 誘香港員工開視像會議騙近4百萬元

> 香港警方稱，再有騙徒利用深偽技術（Deepfake）冒認跨國公司高層職員，要求在港分公司負責人轉賬近400萬元。這是本港第二宗同類案件。警方在「守網者」Facebook專頁披露案情。

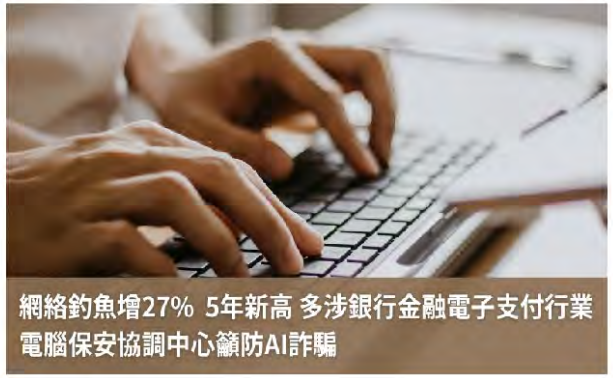
警方稱，日前再有一間跨國公司職員收到WhatsApp訊息，對方自稱公司首席財務總監並要求與職員進行Zoom視像會議。這名「假上司」在開會期間指示職員轉款接近400萬元至不同戶口，作為開分公司的資金。

網絡釣魚增27% 5年新高 多涉銀行金融電子支付行業 電腦保安協調中心籲防AI詐騙

AI HKCERT 人工智能 生成式AI 網絡保安 網絡攻擊 網絡釣魚 香港電腦保安事故協調中心

2024-02-02

【明報專訊】香港電腦保安事故協調中心（HKCERT）去年接獲3752宗涉及網絡釣魚的保安事故，為5年新高，按年增27%；與網絡釣魚相關的連結則突破1.9萬條，按年增22%。中心表示，網絡釣魚主要集中銀行、金融及電子支付行業，其次是電子商貿。生產力局數碼轉型部總經理兼HKCERT發言人陳仲文稱，人工智能（AI）發展令網絡威脅更普遍，呼籲企業參考國際標準制訂預防措施。



AI詐騙新手法　陌生來電打來千萬別回答　聲紋複製後果隨時很嚴重

撰文：風傳媒

出版：2024-05-19 11:00 更新：2024-05-19 11:00

> AI技術也能幫助詐騙？近日傳言若接到陌生電話，對方開頭就問「聽得到嗎」時，千萬別出聲，否則將被AI分析聲音、模仿，進一步變造人聲後詐騙。對此，台灣事實查核中心也提出看法。

ASTRI

Gen AI Fraud Detection

Present

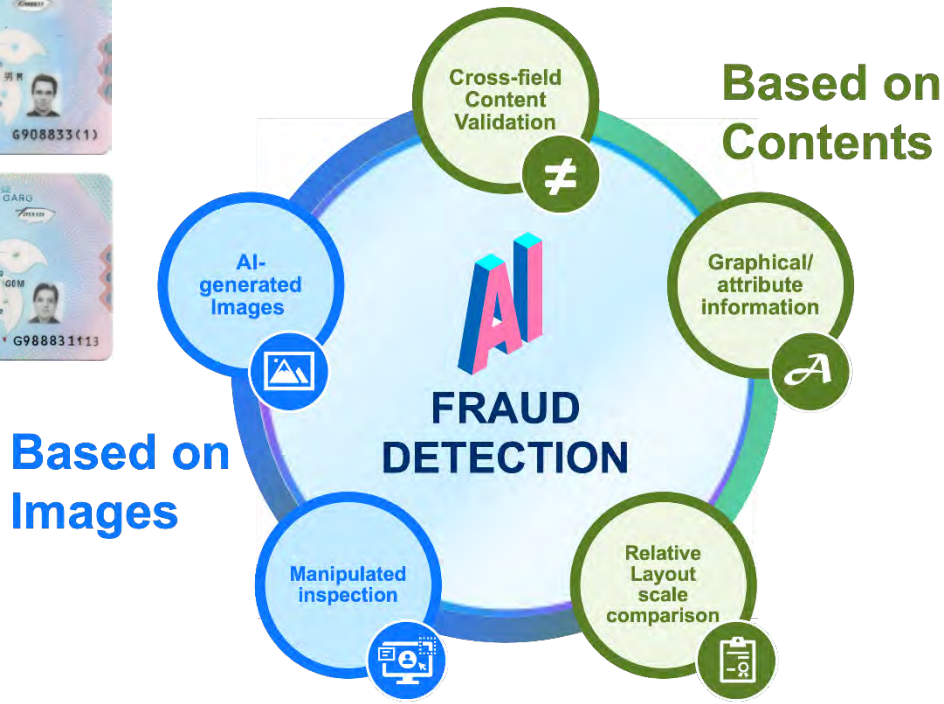
Fraud Detection using AI for Image-based Documents

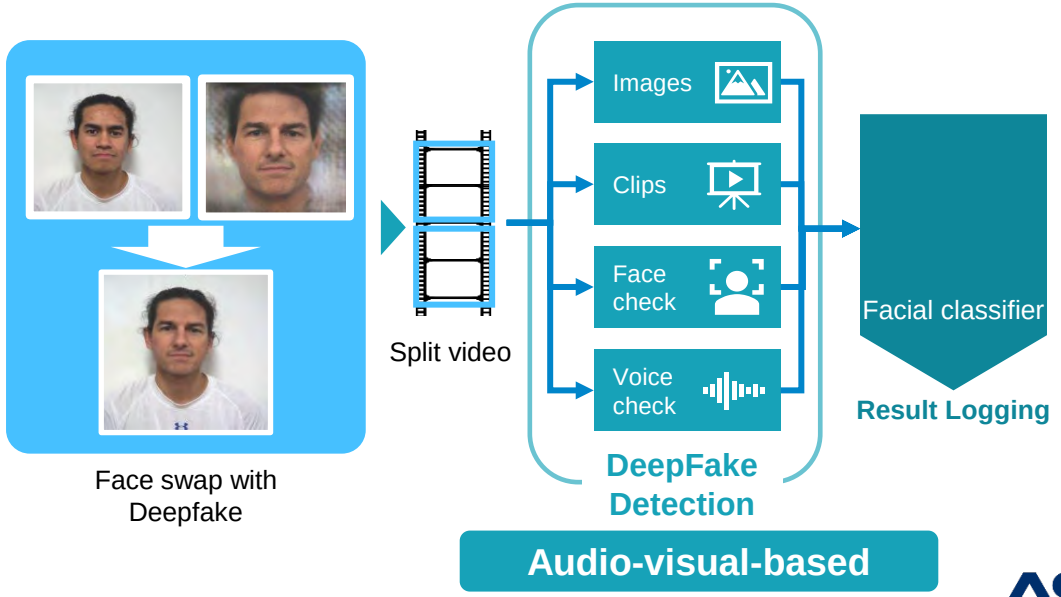
- New AI technology for manipulated document and AI-generated image detection.

Future

Face Deepfake Video and Image Detection

- Multi-modal AI-based technology to detect deepfake videos.
- Analyse single frame (spatial domain), multiple frames (spatial-temporal), and audio-visual data in the input video to detect the authenticity of the face inside.





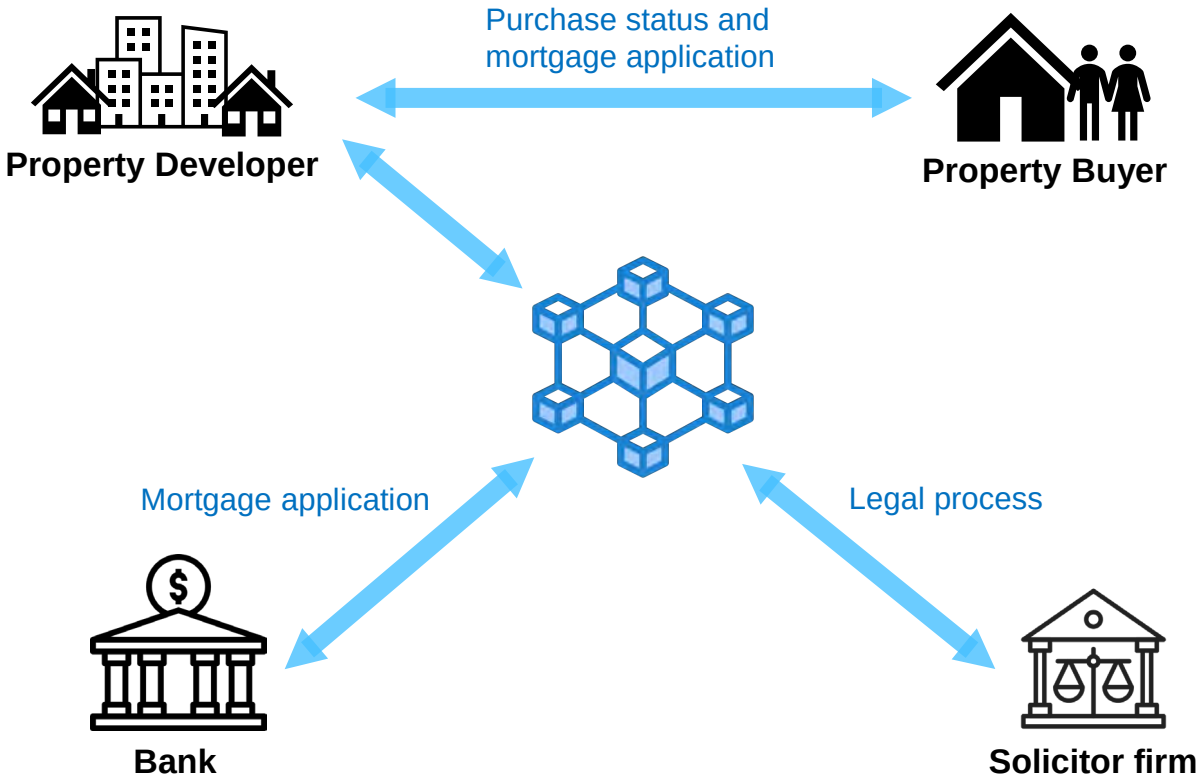
ASTRI

Trust Technologies – Blockchain

Blockchain application - Transforming Property-buying Experience

BLOCKCHAIN ENABLED “PROPERTY-PURCHASE 2.0” PLATFORM

Provides an **ALL-IN-ONE SUPPORT SERVICE** to first-time buyers, banks, property developer, legal firms and related bodies in the property-purchase ecosystem



- Hong Kong’s first PROPERTY-PURCHASE BLOCKCHAIN
- Links service providers involved in the process
- SAVES TIME AND RESOURCES for all
- Buyers enjoy a FAST AND CONVENIENT USER EXPERIENCE

COMMERCIALISATION
Created with New World Development and with BoCHK as the first bank participated

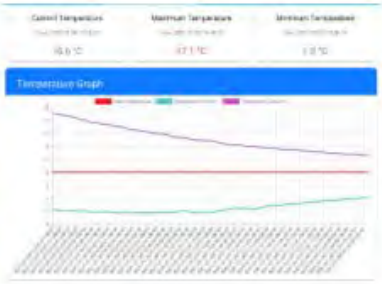
ASTRI

Blockchain application – Smart Contracts & Data Traceability

Cross Boundary Cold Food Import Safety Management

- integrated IoT and blockchain technology (smart contract)
- for trusted continuous compliance tracking and food traceability

食物環境衞生署
Food and Environmental Hygiene Department



Inventions Geneva

DIPLÔME

International Exhibition of Innovations of Geneva, 2022

ASTRI

Cold Food Import Safety Management for FEHD

1. Digitalization of Export/Import Documents

2. 24x7 auto-issuing "Import Licence" by Smart Contract

中国海关 China Customs

食物環境衞生署 Food and Environmental Hygiene Department

Importer

Health Certificate (paper document)

e-Health Certificate (XML Format)

Online applying "Import Licence"

24x7 auto-issue digital "Import Licence"

ASTRI

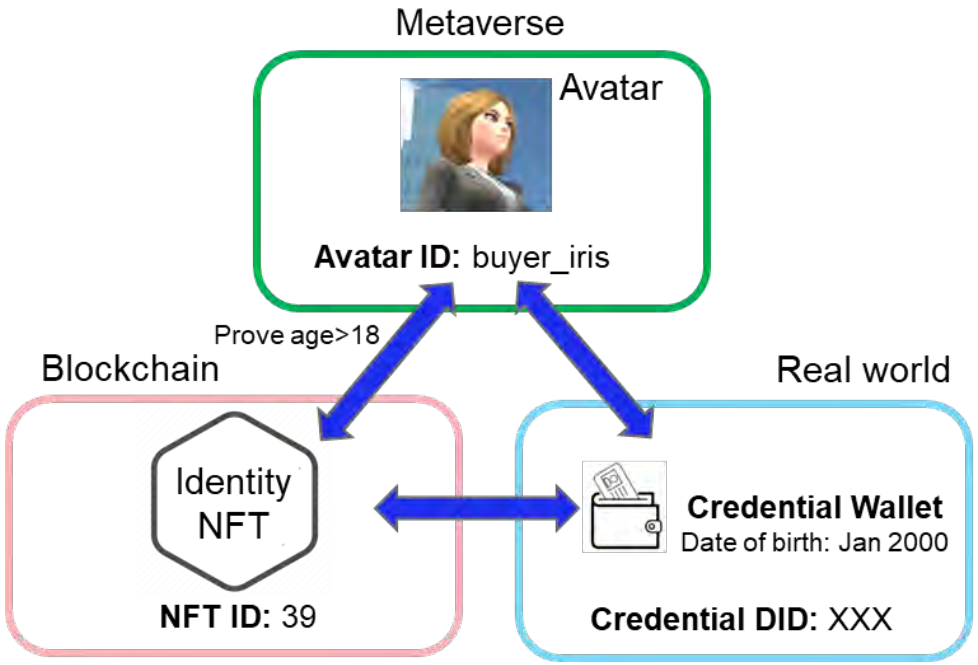
Digital Currencies & Tokenized Assets

- Support eHKD and Tokenized Asset ecosystem in Hong Kong

Present

Secure Metaverse Identity for Businesses

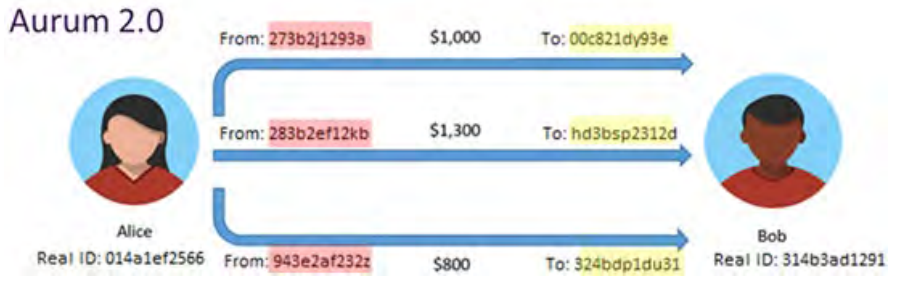
- Identity NFT links Metaverse, Blockchain, & Real World
- SSI proves credentials without revealing detail
- ZKP identity NFT authentication reduces identity theft



Present

R-CBDC Pseudonym on Privacy Enhancement (with HKMA and BIS)

- Over-issuance, repeated-redemption, & double-spending prevention
- Privacy-preserving transaction with traceability



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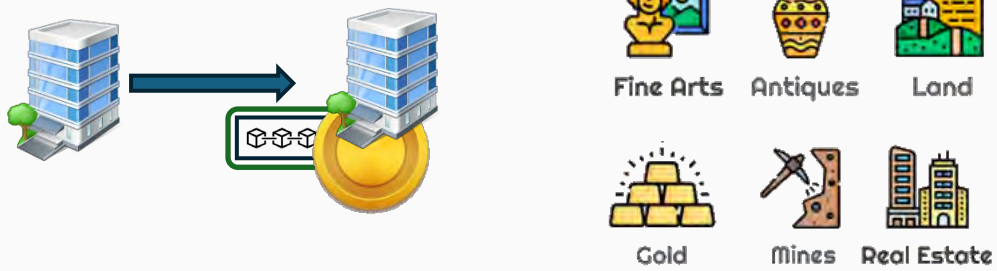
Digital Currencies & Tokenized Assets

Future

Tokenized Assets

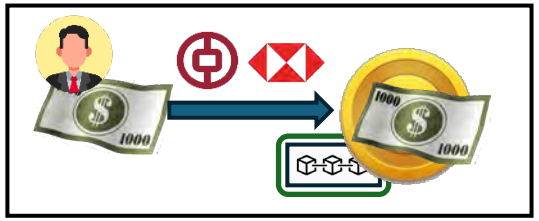
Recording of virtual and real-world asset as token on the asset management blockchain



Digital Currencies

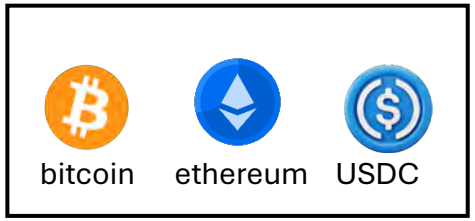
Tokenized Deposit

Recording of bank client's deposit as stable value token



Cryptocurrencies

Virtual currencies, stablecoins



Transaction, governance

Transaction

Privacy & Security Enhancement Framework for Tokenized Asset Systems

- KYC orchestrated user aliases to prevent transaction tracing
- Verifiable asset governance to protect voters' privacy
- Asset migration for market extension to prevent counterfeit assets

ASTRI

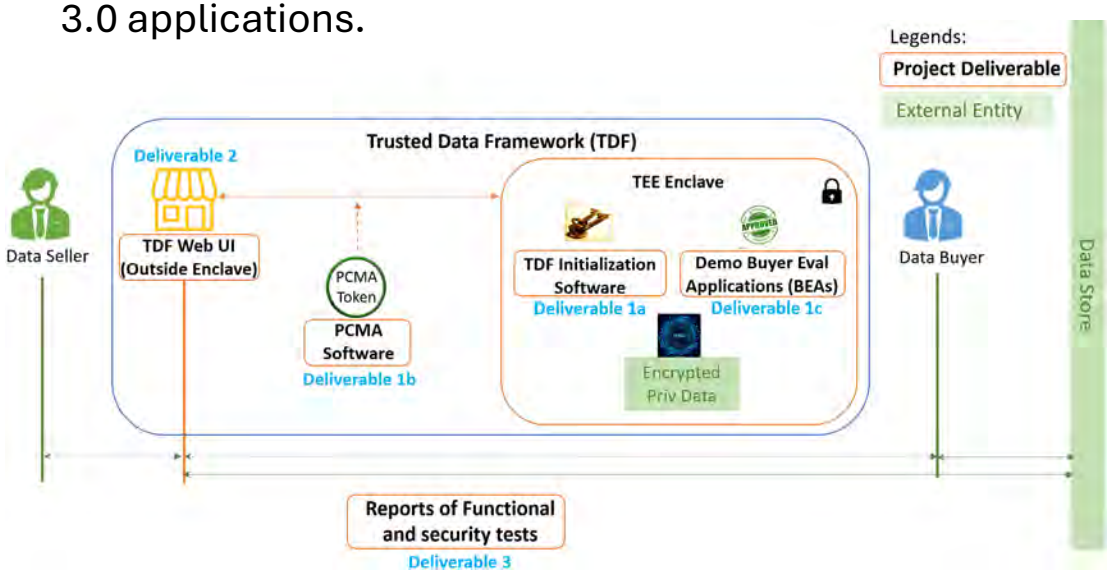
Data Exchanges, Valuation and Data Rights Protection

➢ Facilitate Data Exchange development for local and cross-border data transfer

Present

Trusted Data Framework for Data Exchanges

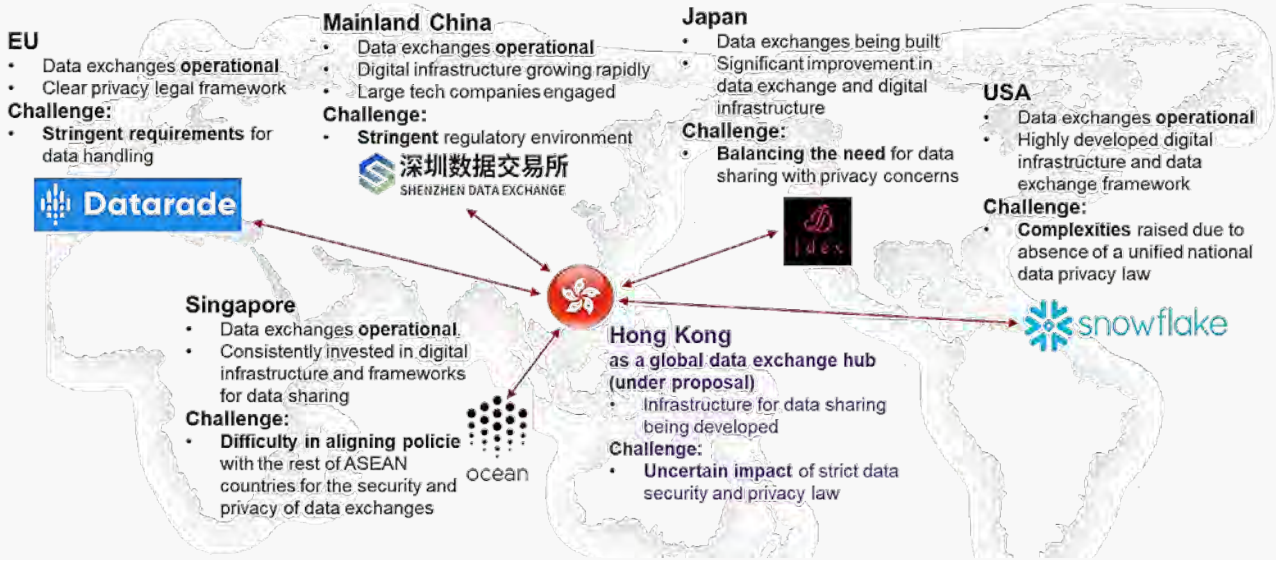
- Crypto-TEE-based framework enables full private dataset assessment while minimizing privacy leakage.
- Innovative Polynomial Commitment Multiple Access (PCMA) solution manages multiple encrypted data credentials.
- Can be stored on public blockchains, suitable for Web 3.0 applications.



Future

Valuation and Simulation for Trusted Data Exchanges

- A data valuation transformer based on self-supervised learning for recommending a data price to make buyer and seller agree on a price quickly.
- A simulation environment based on multi-agent reinforcement learning for data valuation model optimization.



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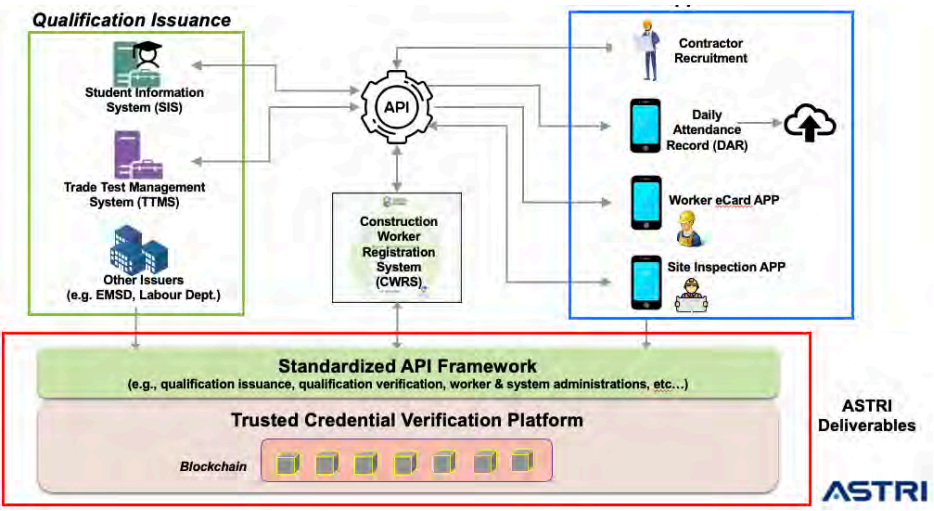
Trusted Data Sharing Platform Based on AI and Blockchain

- Distributed ledger and Data integrity analysis
- Facilitate Green Finance including Carbon credit, Green loan, Climate risk

Present

Worker Credential Verification Platform for Construction Industry

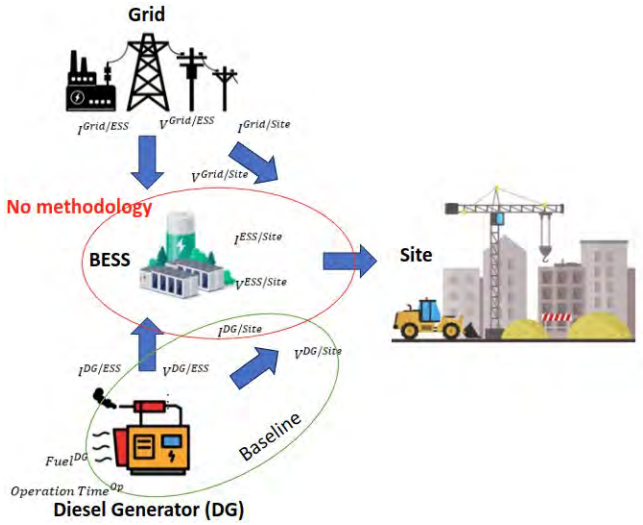
- Distributed ledger with private data
- 4 Verification Flows



Present

Trusted Carbon Credit Verification Platform

- Algorithms to combat Greenwashing and Double Counting
- New urban-based carbon crediting methodology



Future

Green Loan & Sustainable Linked Loan Assessment Platform

- Trusted carbon tracing and green assessment with distributed ledger
- Green assessment standardization

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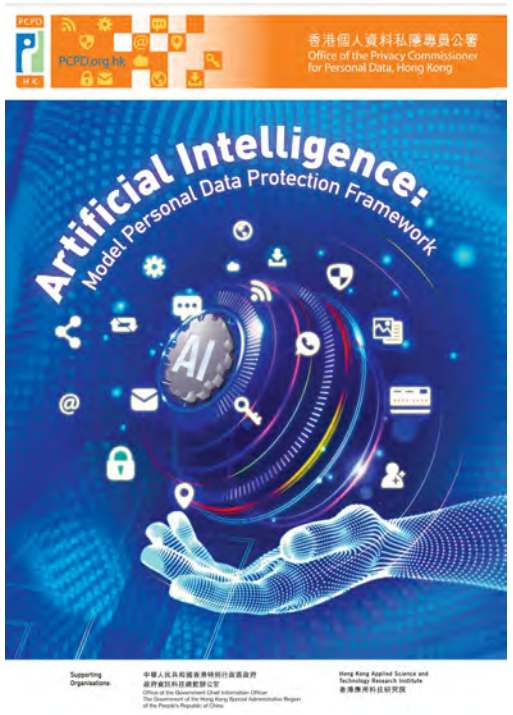
AI Ethics and Governance

AI: Model Personal Data Protection Framework

- 個人資料私隱專員公署發布《人工智能：個人資料保障模範框架》
- 《模範框架》涵蓋四個範疇的建議措施
  - 制定人工智能策略及管治架構
  - 進行風險評估及人為監督
  - 實行人工智能模型的定製與人工智能系統的實施
  - 管理和促進與持份者的溝通及交流



Summary:

Start with pain-points

Pick for Low-Hanging Fruits

	Initiatives	Target Group
Private ChatGPT (ChatDoc)	• Instant, confidential answers to employee queries. • Summarizing legal memos, email threads, or case notes.	• Internal users
AI Agent	• Analyze and summarize contracts, flagging key clauses, risks, deviations and obligations. • Legal Research • Financial KPI Dashboards • Audit Trail Analysis	• Internal users
ChatBot Voicebot	• Client Communication Answering routine client inquiries, directing client to the right professionals	• External
Blockchain	• Smart Contracts • Real-time Auditing • Fraud Prevention Single source of truth	• Internal & External

Thank you

TECH FOR EVERYONE

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