## GREEN AI TECHNOLOGY LIMITED





綠色人工智能科技公司



#### **Green Al**



- Established in June 2023, Green AI Technology Limited (**Green AI**) is an innovative spin-off company from the Hong Kong Industrial Artificial Intelligence & Robotics Centre (**FLAIR**). FLAIR, founded by Hong Kong Productivity Council (**HKPC**), is part of AIR@InnoHK established by **InnoHK** Clusters HKSAR Government.
- Mission: Transfer cutting-edge solutions of AI, IoT and automation technology from manufacturing technology to other industries.
- Experience to provide consultancy services to government body and public sector including EPD, ITC, EMSD, DSD, CEDD, CSD and MTR.
- Rich Experience in deployment of Government Funded Projects.
- Rich Experience in AI + Software Projects.



#### Background and Pain Point

#### Background

- The Hong Kong government is driving digital transformation but cannot fully cover all demographics.
- Elderly individuals or those less familiar with computers still rely on handwritten application forms.



#### Pain Points



#### Manual Data Entry

- Time Consuming;
- Handwriting text is complex and diverse
- Error Prone



#### Storage and Space

- Requires large Space
- Organizing and Maintaining Risk



#### Documentation

- Numerous Attachments
- Difficulty on searchability and analysis
- content checking

# Green Al - Total Solution For Application Form





#### Documents Type 文件類別

#### A) Structured Form 標準表格



#### A I

#### B) Unstructured Content 非標準內容





#### \*Fake data for demonstration only





#### **FEATURE:**



Multi-language

繁簡英多文體識別



SUPPORT HANDWRITTEN TEXT

支援手寫字

#### **Accuracy:**

Typed Text 電腦輸入文字 95%+

Handwritten Text 手寫繁簡體中英文字 80%+

Checkbox 選擇框 99%+



#### **Structure Form - Fill in The Blanks & Check Box**

Voluntary Registration Scheme for Vehicle Mechanics	Section A 個人資料 Personal Particulars
表格 Form 3	(1)姓名 Name: John Smith (英文 English) 約翰史密夫 (中文 Chine
申請更改註冊服務類別 Application for Change of Service Class of Registration	
	✓ 先生Mr
註 Note: 1. 中導人在無本本語表之前, 未先規則「表帝 3 的海飛飛丸」 和「志様中海―並計車報報を技工」 小冊子 - Applicant should read carefully the "Guidance Notes to Complete Form 3" together with the leaflet "How to Apply - Registered Vehicle Mechanic" before completing this application form.  2. 本中清晰的所有部分均离辽于福油客 - All sections of the application from should be completed in block letters.	(2)香港身份證號碼 HKID No.: Y1234567 2
<ol> <li>在向機電工柜補股交申请表之前 - 患在表格上数据及項上日前 -</li></ol>	(3)出生日期 Date of Birth: 2003-02-01 (年yyyy / 月mm / 日
5. 在本市每刊三七公司完成學位訓練的申請人。在史班所屬的工作問題前。可以申請申转時註冊預別此時、EID、B1(的)或 B2(b)、以 便只 进用於本地專利巴土公司之內進行"權裕"、"電工"、"即傳格室"、"申及指》及工作。 An applicant having completed sperenticethip in a local franchised bus company, but before attaining the required working experience, may apply for registration with special service class XIID, EID, B1(b) or B2(b) for carrying out "mechanical work", "electrical work", "body repair" or "body paining" respectively in franchised bus company only.	(4)日間聯絡電話 Day Time Contact Tel. No: 91235678
6.   在接貨位置加上 / 財 Tick where appropriate	(5)電郵地址 E-mail Address: johnsmith@yahoo.com.
Section A 部:個人資料 Personal Particulars	(6)通訊地址 Correspondence Address:
1) 姓名 Name :	82. Bond Street, London, United Kingdom.
4) 香港身份證號碼 HKID No.: Y 【23 4 56 7 (2) .	香港 Hong Kong
猶訊地址 Correspondence Address: 82 Bond Strut, London, United Kingdom.	(7)現職公司名稱及地址:Name & Address of Present Company
現職公司名稱及地址:	Flat 108 Cambridge Square, London.
Name & Address of Present Company: Flat 108・Cambridge Squart London. ) 電話號稿 Telephone No.: 3542 1123・(排放室の所定) 9123 5678・(手機Mobile)	
) 傳真號端 Fax No.: 123 4 5678・ (9) 電郵地址 E-mail Address: john swith @ yahoo . cawh .	□ 香港 Hong Kong □ 九龍 Kowloon □ 新界 New Territories
ection B 部: 現時註冊資料 Existing Registration Particulars	(8)傳真號碼 Fax No.: 12345678
註冊號碼 Registration No.: VM <u>【234 VA.M.</u>	(O)人 可磁体 雪草 Company Contact Tel No. 95434423
已註冊的服務類別: B1 B2 B1(b) B2(b) B2(c) B2(c) B2(c) B2(c) M(c) B2(c) M(c) B2(c) B2(	(9)公司聯絡電話 Company Contact Tel. No: 85421123
Registered Service Class : E	Section B 現時註冊資料
S5	(1)註冊號碼:VM 1234
se refer to the Registration Classifications and the Registration Requirements in the "How to Apply - Registered Vehicle Mechanic" leaflet.	/ /

\*Fake data for demonstration only



#### **Structure Form - Check Box**

請參閱 ** Please rel	er to the Registra , , , , 擬申請更	ee Class: 車輛維修技工」/ ation Classification	change of S	tration Requirem  2 - ervice Class o	f Registration	to Apply - Reg	B1(b)
B1 □+/□- S1	82 +/ 52	B1(b)	為增加 for addi B2(b) □+/□- S4 □+/□-	E □+/□- SS	E(b) 	M ★/	2)
S 內的服務期別課 Applicant applyin circle one of them class. 講會閱「怎樣申認 Please refer to the Section D 图	為芒項服務類別。 g for registration with a as the primary servi 情 - 註冊車輛繼修技 Registration Classif 3 : 資歷 Qual	thin Services M, E and ice class for registratio エ」小冊子外的駐冊 ications and the Regi	请多於一項服務類 d B for the first time on being applied fo 期別及註冊實格。 stration Requiremen	and applying for m r. Please do not ch nts in the "How to A	其中個出一項作為申 ore than one service coose service class with	lass within Ser hin Services <b>S</b> a side Mechanic	服務範圍 Service Scopes:  IC 內燃機車 EVE 電動車(基礎) EVL電動車(低電壓) EVH 電動車(高電壓) + - + - + +
資歷詳精(以支持所申請增加的服務類別) Details of Qualification (in support of additional service dass applied f						頒發院校/4	S1 S2 S3 S4 S5 S6 S7

#### \*Fake data for demonstration only



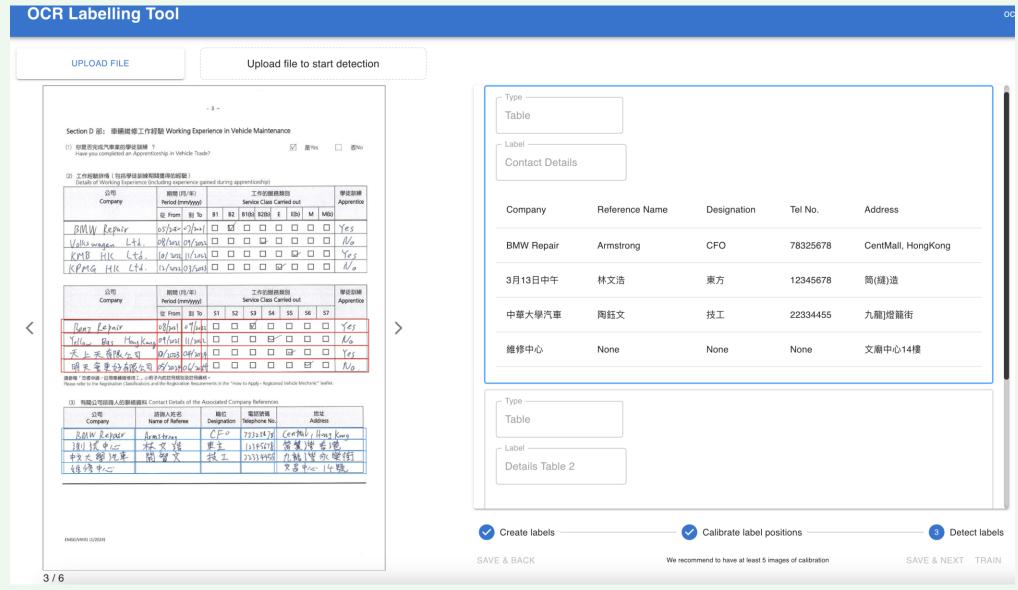
#### **Structure Form - Table Format**

							服務範圍 Service Scope	es:						
							IC 內燃機車	EVE 電動車	(基礎)	EVL電動車	(低電壓)	EVH 電動車	豆(高電壓)	
							_ +	_ +		_ +		_ +		
	B: 擬申請更改 Service Class to		-		2	n Being Applied for	電動車资歷 Relevant Qu 取得由事辆製造商或 車辆維修技術委員會	其授權的售後服務	务提供者推蘑		格提交内部訓絲	東紀作雷核)		
B1 □+/□-	B2	B1(b)	B2(b)	E -/	E(b)	M M(b)	B1 B2	B1(b)	B2(b)	Е	E(b)	М	M(b)	S1
S1	52	S3	54	\$5	56	57	_ + +	-   +   -			+ -	_ +		-+
_+/					D+/Ø-	_+/	S2 S3	S4	S5	S6	S7			
circle one of them 请参照「怎樣中記	n as the primary service 有一註用車輛維修技工	e class for registration 。小冊子內的註冊!	tion being applied for 類別及註冊資格。	x. Please do not choo	ose service class with	ice class within Services M, E and B shall in Services S as the primary service class. nicle Mechanic" leaflet.	Section D 資歷							
	: 資歷 Quali 支持所申請增加的原		's of Qualification	(in support of add	fitional service clas	s applied for)	資歷名稱		獲頒日期			頒發院校	/機構	
Desc	實歷名稱 cription of Qualific	ation	Date (按時間	頭日期 of Award <i>即順序列出)</i> ological order)	Issuing	頒發院校/機構 g Institution/Organization	HKDSE		Aug 2020	)		HKIVE.		
HRS	ISE		Aug 2	020	HK	IVE.	Lexus		Aug 201	9		Japan		
1 e x			Aug 2		Jeg									
-			111	018		MW	FAW		Aus 2018	3		Toyota		
FA	C		Aug 2	017	18	7.7								
FA		作經驗 Wor					GAL		Ang 201	7		BMW		
G A Section E 部	:車輛維修工 情 (以支持所申請)	<b>能力0台/根研</b> 的分	Details of Working	g experience (in se	pport or addition	al service class applied for)								
GA Section E部 (1) 工作經驗對		期的	間(月/年) d (mm/yyyy)	g experience (in se	工作的版 Service Class	<b>反務類別</b>	Section F 市研维修工作	4≅ <b>E</b> ♠						
GA Section E部 (1) 工作經驗對	情 (以支持所申請) 公司	期的	間(月/年) d (mm/yyyy)		工作的服	<b>反務類別</b>	Section E 車輛維修工作	經驗						
G A Section E 部 (1) 工作経験針	情 (以支持所申請) 公司 Company	期i Period 從 From	間(月/年) ed (mm/yyyy) m 到 To	B1 B2	工作的版 Service Class B1(b) B2(b)	R K A A A A A A A A A A A A A A A A A A	Section E 車輛維修工作 (1) 工作經驗詳情	經驗						
GA Section E部 (1) 工作經驗訓	情 (以支持所申請) 公司 Company Com Limi	脚 Period 從 From そと Sep 201	間(月/年) Id (mm/yyyy) m 到To 120 Procent	B1 B2 D	工作的版 Service Class B1(b) B2(b)	RR務類別 Carried out E E(b) M M(b)	(1) 工作經驗詳情	經驗 期間(月/年	F)			工作服務的類	別	
G A Section E 部 (1) 工作経験針	情 (以支持所申請) 公司 Company Com Limi	期i Period 従 From そと Sep 20 Sep 201 Sep 201	間(月/年) ed (mm/yyyy) m 到 To	B1 B2	工作的版 Service Class B1(b) B2(b)	R K A A A A A A A A A A A A A A A A A A	1 1100-17 111		F) 到To	B1 E	32 B1(b)	工作服務的類 B2(b) E		M

<sup>\*</sup>Fake data for demonstration only



#### **Structure Form - Labelling Tool**



<sup>\*</sup>Fake data for demonstration only

#### **Unstructured Content**



### - Large Language Model (LLM) Content Extraction 非標準內容 – 大型語言模型LLM 内容提取

#### **FEATURE:**



UNSTRUCTURED DATA EXTRACTION 提取非結構化數據



DOCUMENT CLASSIFICATION 文件分類



Auto-filing 自動歸檔

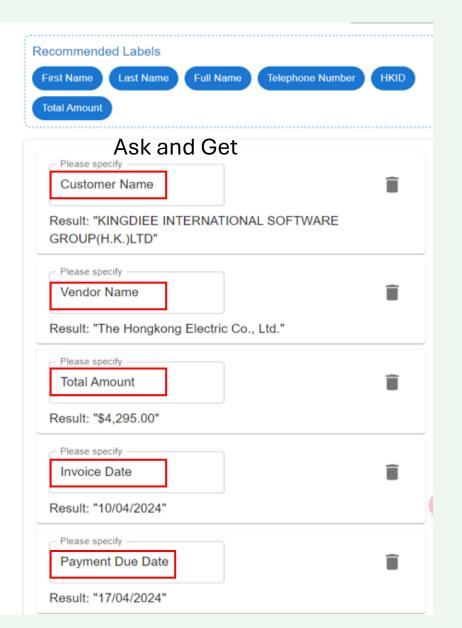


Semantic analysis – Understand, judge and modify text extraction content 透過智慧語義分析 - 理解、判斷及修正文字提取内容

#### **Invoice Key Information Extraction**

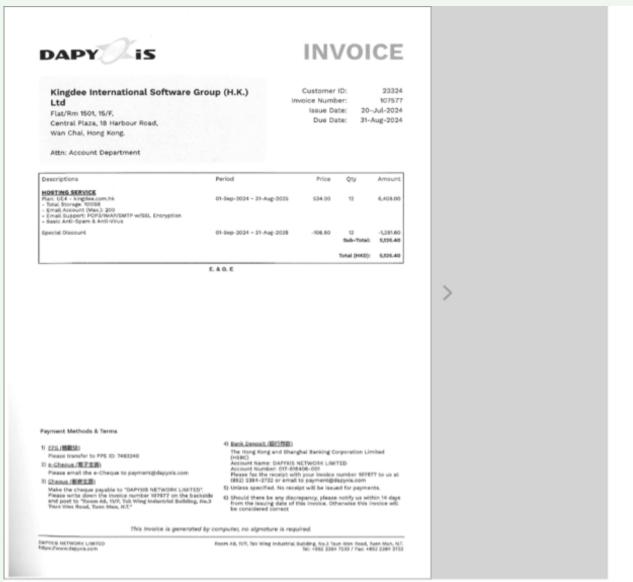


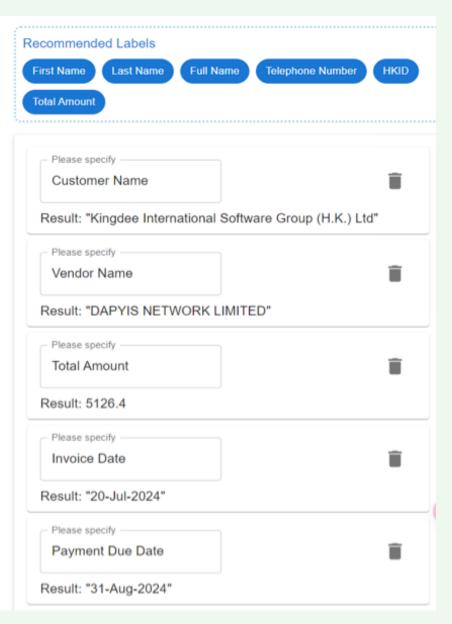






#### **Invoice Key Information Extraction**







#### **Process Flow**

Document Upload

Image Preprocessing

Document Classification

Postprocessing

Key Value Pair Extraction

Layout Analysis User Validation

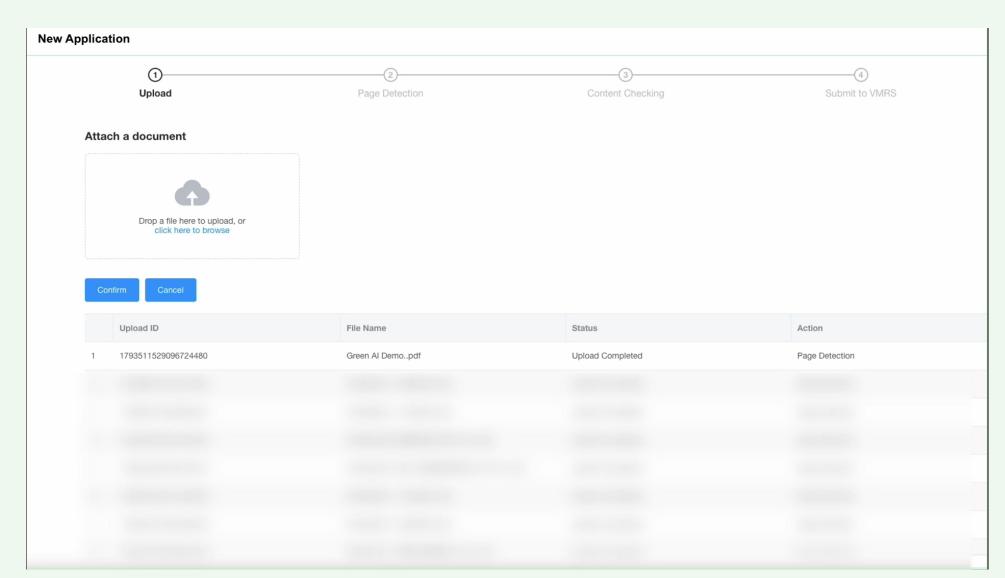
Confirmation

System Integration



#### **Job Reference – EMSD Handwritten**

Document Classification -> Data Extraction -> Database Entry



#### Job Reference – EMSD Handwritten Form – Test Accuracy Result



		Character	Check box	
Predefined Form	No. of Files	Accuracy	Accuracy	
Overall:	76	92.81%	99.64%	

Supporting Document	No. of Files	Data Extraction Accuracy
Training Record	53	91.26%
Qualification Certificate	18	98.61%
Working Experience	17	96.08%

#### Job Reference – EMSD Handwritten Form – Test Accuracy Methodology



#### Accuracy formula:

#### Content Accuracy:

There are 3 types of error: insertions (i), substitutions (s) and deletions (d) Character Error Rate (CER) CER = [(i + s + d) / n]\*100Where  $n = total \ number \ of \ character$ Accuracy % = 1 - CER

#### Example:

(5) 通訊地址 Correspondence Address:

#### 遊角整為東部盗風樓 月月室

Ground Truth = 葵涌葵盛東邨盛圍樓801室 AI Model Output = 葵涌葵盛東屯盛圍木婁80室

Deletion: "1"=1 Insertion=1:婁 substitution=2:屯,木 Total error=4 CER=4/13 Accuracy=69.2%

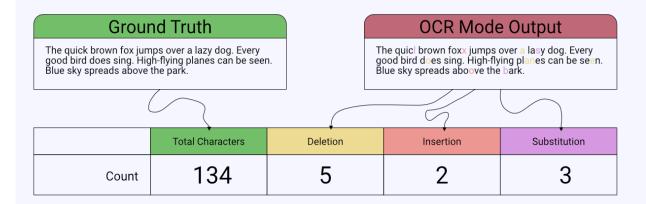
#### Check Box Accuracy:

No. of correct check box / Total number of check box

#### CALCULATING CHARACTER ERROR RATE (CER)

$$CER = \frac{S + D + I}{N}$$

- (S)ubstitution: This is the count of characters that are incorrectly recognized and replaced with another word.
- (D)eletion: This is the count of characters that were not recognized and are thus missing in the OCR output.
- (I)nsertion: This is the count of characters that are incorrectly added in the OCR output.
- (N): Total Number of characters in the ground truth document.



CER = 
$$\frac{3+5+2}{134}$$
 = 0.074 = 7.4%





#### We support

#### **Cloud API**

#### **Flexibility**

Easy integration into existing applications.

#### **Scalability**

Easily scalable to accommodate varying workloads.

#### **Low Upfront Cost**

Pay-as-you-go

#### **Cloud Platform**

#### Easy to use

Get result with just a few clicks. No technical knowledge required.

#### **Zero Installation**

No software installation is necessary.

#### **Low Upfront Cost**

Pay-as-you-go

#### **On-premises**

#### **Control**

Full control over hardware, software, and data.

#### **Customization**

Greater flexibility for customization

#### Compliance

Easier to meet specific regulatory and compliance requirements

#### **Project Milestone**



Stage	Description of Services	
0	Project Initiation	
1	Requirement Study & System Design	
2	Building a prototype with database	
3	OCR and AI Model Training	
4	Development, UAT and Delivery of OCR Engine and AI Data Extraction	
5	Development, UAT and Delivery of the System	
6	System Integration with other systems	
7	Training and Documentations	
8	Nursing Period	

#### THANK YOU









## RECYCLE TODAY REVIVE TOMORROW TOGETHER FOR A SUSTAINABLE FUTURE

今日回收 明日重生 共同創造可持續未來





Hong Kong Industrial Artificial Intelligence & Robotics Centre

香港工業人工智能及機械人研發中心

Unit 1207-1211,12/F, Building 19W, Hong Kong Science Park, Shatin, NT, Hong Kong

香港新界沙田香港科學園19W大樓 12樓1207-1211室





Green Al Technology Limited

綠色人工智能科技有限公司

Room 556, 5/F, Building 19W, Hong Kong Science Park, Shatin, NT, Hong Kong

香港新界沙田香港科學園 19W大樓5樓556室

