[2024.9.26 Taiwan AIO Forum & Trade Show] Age of AI, Power by AI, Run for AI - General concept and some demos from Coretronic/Aledia Eureka Project

Presentation · September 2024

DOI: 10.13140/RG.2.2.22060.07045

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2024 Taiwan AOI Forum & Show
第二十四屆全國AOI論壇與展覽
新竹市大學路1001號 陽明交通大學電子資訊大樓

Age of AI, Power by AI, Run for AI

General Concept and some demos from Coretronic/Aledia Eureka Project

Coretronic Aledia Innovative displays

中強光電股份有限公司
歐崇仁 Chung-Jen Ou
owen.ou@coretronic.com
2024.9.26

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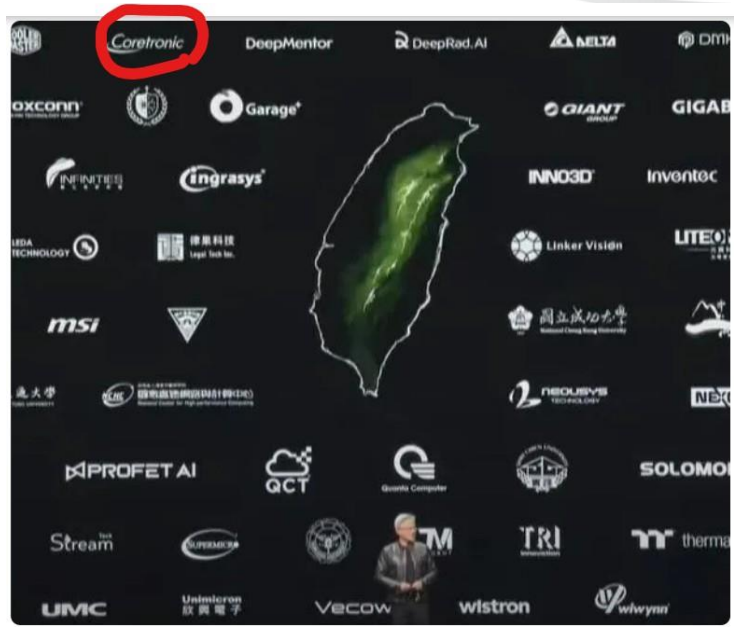
Responsibility Innovation Superiority Entrepreneurship

113/09/26	國際會議廳(交大電資大樓)		
10:00~10:10	開　幕		
10:10~10:50	AI 在智慧製造領域應用與發展趨勢	工研院產科國際所 機械與系統研究組 熊治民 副組長	
10:50~11:30	現有機器視覺夠 future ready 嗎？ -剖析關鍵零組件最新趨勢與應用	霖思科技股份有限公司 齋藤孝平 副總經理	
11:30~12:10	應用生成式 AI 推動產業數位轉型 (Digital Transformation and Generative AI)	台灣微軟 物聯網卓越中心 周森益 協理	
12:10~13:30	用餐・參觀展示攤位及技術論文海報 (論文海報在位解說時段 13:00-13:30) • 執行委員敬請前往二樓會議室報到		
	國際會議廳	階梯會議室	二樓會議室
13:30~13:50	AI 使 AOI 臻於完美—SOLOMON Solvision AI 影像檢測模組開發平台 所羅門股份有限公司 展 08	顯微高光譜成像系統 五鈴光學股份有限公司 展 20	12:10-14:50 執行委員暨貴賓會議
14:00~14:20	半導體與 Micro LED 之高速 AI 自動光學檢測方案 凌華科技股份有限公司 展 04	半導體檢測應用：2D、3D 先進零組件介紹 霖思科技股份有限公司 展 23	
14:30~14:50	高效運算助力多相機影像處理 超恩股份有限公司 展 28	探索 TKH Vision 高解析度 SWIR 近紅外線相機 睿柏科技股份有限公司 展 09	
	智慧演算	先進應用	二樓會議室
15:00~15:40	Age of AI, Power by AI, Run for AI - Some demos from Coretronic/Aledia Eureka Project 中強光電/顯示事業群 歐崇仁 特助	半導體全段製程精密檢測 HTec /台灣晉誠德 [illegible]政霖 經理	15:00~15:20 Gocator 4000 系列智慧型 3D 同軸線共焦感測器 一實實達有限公司 展 11 15:20~16:00 從影霹斯平鏡圖演化到 2-D 準晶體結構圖案 中興大學 [illegible]中元 教授
15:40~16:20	AI 機器人視覺與元宇宙技術 工研院 /機械與機電系統研究所 顏承暐 經理	晶圓表面微粒檢測技術 工研院 /量測技術發展中心 [illegible]師生 正研究員	16:00~16:10 論文編號 03 16:10~16:20 論文編號 21 16:20~16:30 論文編號 11
16:20~17:00	機器視覺進化趨勢與最新 AOI 檢測應用技術 霖思科技/視覺應用事業部 [illegible]惟慕 副理	粒徑量測之光學影像分析技術 HORIBA /台灣堀場 [illegible]嬪欣 應用工程師	16:30~16:40 論文編號 05 16:40~16:50 論文編號 07 16:50~17:00 論文編號 20

15:00~15:40 國際會議廳

Age of AI, Power by AI, Run for AI - Some demos from Coretronic/Aledia Eureka Project
中強光電 顯示事業群 歐崇仁 特助

During the 2023 Taiwan-France Eureka Project - supported by the Ministry of Economic Affairs in Taiwan, Coretronic Corp. is dedicated to collaborating with Aledia to develop a new digital LED VR backlight system. In the process of display technology development, team members are looking forward to AI assisting in research and design related to the multi-physical evaluation of the backlight LED system, optical system design, polarization component analysis, and code optimization. This discussion explains the team's efforts to integrate AI opportunities and shares our preliminary experiences from the perspective of the current project implementation.



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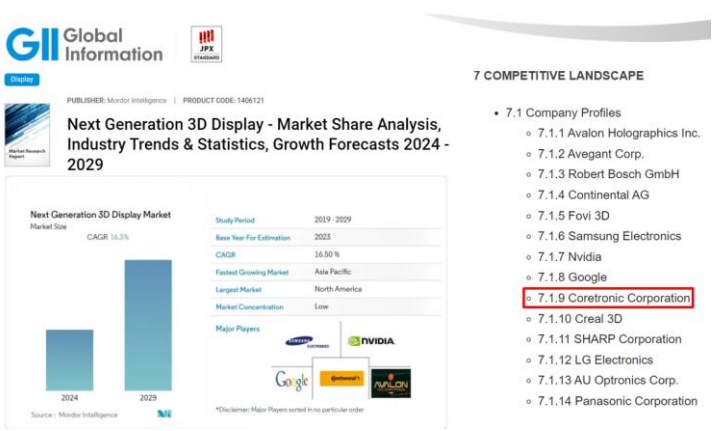
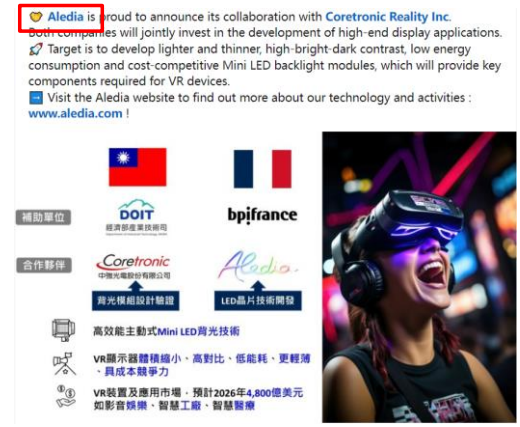
A+ 企業創新 研發淬鍊計畫



7 COMPETITIVE LANDSCAPE

- 7.1 Company Profiles
  - 7.1.1 Avalon Holographics Inc.
  - 7.1.2 Avegant Corp.
  - 7.1.3 Robert Bosch GmbH
  - 7.1.4 Continental AG
  - 7.1.5 Fovi 3D
  - 7.1.6 Samsung Electronics
  - 7.1.7 Nvidia
  - 7.1.8 Google
  - 7.1.9 Coretronic Corporation
  - 7.1.10 Creal 3D
  - 7.1.11 SHARP Corporation
  - 7.1.12 LG Electronics
  - 7.1.13 AU Optronics Corp.
  - 7.1.14 Panasonic Corporation



Clarivate Reveals Top 100 Global Innovators 2024

Other key findings from the 2024 report include:

- Two companies awarded Top 100 status for the first time: Taiwan electronics company Coretronic and Japan precision tool manufacturer Disco.
- Three companies re-enter the Top 100: Tencent, Daikin Industries, and Zeiss.
- 18 all-time recipient organizations retained Top 100 Global Innovator status: Samsung Electronics, Honda, Toyota, GE, LG Electronics, Panasonic, Sony, Hitachi, Toshiba, Ericsson, Qualcomm, Dow, Fujitsu, Boeing, Shin-Etsu Chemical, Honeywell, NEC, and Roche.
- A look at the bigger picture, based on the Top 1,000 entities, suggests continued growth in the Asia-Pacific region. Innovators in Mainland China, Taiwan, Japan and South Korea are predicted to improve their average rankings.
- Based on predictions from the Top 1,000 organizations, the government and academic research segment will significantly contribute to applied innovation.

Notice this word in the final page

Prologue

Chung-Jen Ou (C.R.Ou)

學歷：
- 國立清華大學動力機械研究所博士

經歷：
- 工研院光電所E1工程師 & PL/PM (顯示光學與光機電整合)
- 英國Chevening Scholarships 獎學金牛津大學訪問學者
- 修平科大電機系/能材系教授(系主任)
- 虎尾科大光電/ 高雄科大機電/中台科大醫工 兼任教授
- 中央研究院資訊科學研究所訪問學人
- 中強光電技術長室特助/中光電學院-師大產學合作計畫項目

計畫：
- XR 關鍵元件(MEMS/液晶LCBS/變焦透鏡/量子點/uLED/光動力PDT)
- 經濟部國際合作專案 – 台法Eureka，台荷雙邊...
- 國立臺灣師範大學產創合作/科管局&經濟部-交通大學產學合作案
- 自強基金會/PIDA/工研院講師，LED工程師基礎人才能力鑑定規劃
- 科技部/國科會/中科院/環保署委託研究計畫 & 期刊審查委員
- 教育部全校整合型計畫，科技部人才獎勵計畫，科學園區人培計畫得獎

獎項：
- 科學園區人培計畫補助計畫貢獻獎
- 2016發明得獎協會學術國光獎章，行政院三等服務獎章
- 工研院研究成就個人獎、前瞻研究獎、BP獎勵、國際人才培育獎勵
- 論文發表：期刊65⁺，會議300⁺
- 專利獲證：70⁺
- 競賽獲獎：120⁺

Publication 2024

1. **Chung-Jen Ou***, (2024), Modeling Refractive Error Populations by Weibull Distribution for Minimum Visual Correction Diopter Range in XR Systems, submitted to JOSA
2. Yu-Min Chen, **Chung-Jen Ou**, Hung-Ta Chien, Jui-Yi Wu, Ming-Wei Tsai, Chien-Chih Chen, and Huang-Ming Philip Chen*, (2024), Structure Factor Design of a Liquid Crystal Beam Steering Device for Augmented Reality Applications, Appl. Opt. 63: 6378-6383. DOI.ORG/10.1364/AO.530407
3. 歐崇仁*、莊清男、林彥妮、劉士源，從柔性顯示技術到光動力精準醫療 - 跨領域產品開發之邏輯思路與實務，2024 跨域創新設計整合國際研討會，雲林科技大學，台灣，2024.3.15-16。
4. **Chung Jen Ou***, Ching-Nan Chuang, Yen-Ni Lin, Shih-Yuan Liu and **Wen-Chun Wang**, Flexible mLED Backplane with Laminated QDF for Optimized Illuminating, Digest of Technical Papers - SID Symposium SID 2024: P.244, San Jose, USA. **(EI)**
5. 歐崇仁*，2024/6，導入自然語言於邊斯矩陣表述探討 Micro-LED 面板光學膜片之符號運算設計，2024 工業管理與科技產業學術研討會論文集：1135，中華大學，新竹，台灣。
6. **Bo-Han Cheng**, Chung-Wei Huang*, Wen-Chun Wang, Chih-Jen Tsang, Chung-Yang Fang, Tzu-Hung Lin and **Chung-Jen Ou****, Mini-LED Backlight with Novel Structural Film for VR Liquid Crystal Displays, IEEE Proceeding of 2024 International Conference on Consumer Electronics - Taiwan (ICCE-Taiwan): pp.81-82. https://www.icce-tw.org/call.html
7. **Chung-Jen Ou***, Chia-Hung Tsai, Bo-Han Cheng, Jing-Yu Wu, Dan Sharkey, Simon Ogier and Wen-Chun Wang, OTFT-MiniLED with Novel Retardation Film, IEEE Proceeding of 2024 International Conference on Consumer Electronics - Taiwan (ICCE-Taiwan): pp.375-376. https://www.icce-tw.org/call.html
8. **Chung-Jen Ou***, Duan-Yi Hong**, Ching-Nan Chuang, Evaluation of Novel Carbon Quantum Dot for VR & Retina Illuminations, IDW 2024 Late News Submited

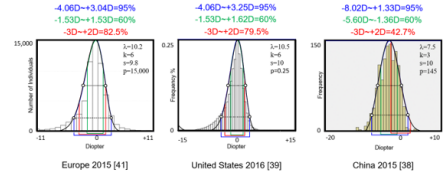


Fig. 4. Weibull distribution fitting of refractive errors in three different regions under the same diopter range (-3D to 2D).

C.J. Ou, 2024 JOSA A accepted (Sep. 26)

Previous work

Proprietary

2002 工研院生醫中心前瞻計畫：
光學類神經網路於蛋白質分類(Optical Neural Network for Protein Classification)

US 20040128079A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2004/0128079 A1**

Shyu et al. (43) **Pub. Date: Jul. 1, 2004**

(54) **ARTIFICIAL INTELLIGENT SYSTEM FOR PROTEIN SUPERFAMILY CLASSIFICATION**

(76) Inventors: **Jia-Jye Shyu**, Hsinchu (TW); **Kuan-Jui Ho**, Hsinchu (TW); **Chung-Jen Ou**, Hsinchu (TW)

Correspondence Address:
BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747 (US)

(21) Appl. No.: **10/612,965**

(22) Filed: **Jul. 7, 2003**

(30) **Foreign Application Priority Data**

Dec. 31, 2002 (TW)..... 91138071

Publication Classification

(51) **Int. Cl.**[7] **G01N 33/50**; G01N 33/48; G06F 19/00; G06G 7/00; G06E 1/00; G06F 15/18; G06E 3/00

(52) **U.S. Cl.** **702/19**; 706/2; 706/20

(57) **ABSTRACT**

The AI System for protein superfamily classification is related to an artificial intelligence system for protein family classification using the fuzzy inference theory in a neural network to improve robustness, convergence and correctness. In addition, the system uses a content addressable memory to process the early phase of the classification to improve the execution speed.

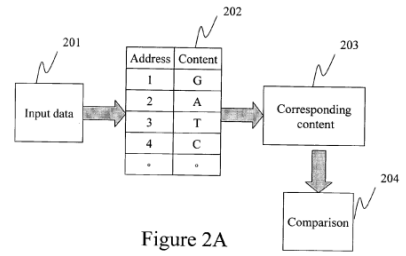
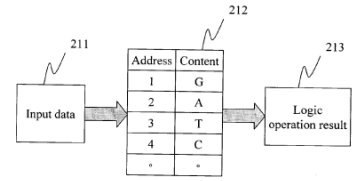


Figure 2A



Previous work

Proprietary

2008-2016 光電其他學門：
Micro-Display 於細胞照射實驗&光遺傳學(Optogenetic-Neuro Gate)應用

2. Material and Methods

2.1 System configuration

Figure 1 depicts the schematic setup. The cell illuminating part contains a pattern generator, a micro-display based system along with a commercial word processor, and illuminating optics. The cell incubator part, enclosed by a red dotted box in Fig. 1, is comprised of a projection lens, a temperature control unit, and an electric potential measurement unit, which are shown in Fig. 2. The cell illuminating section projects the required patterns with specific spectral distributions on an incubator disk, and the temperature control unit maintains the cell activity.

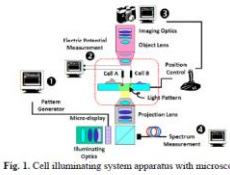


Fig. 1. Cell illuminating system apparatus with microscopy

The system is first demonstrated for illumination of a human Melanocyte cell (HMC). The dendrites/synapses are identified using the pattern matching module IMAQ from National Instruments [10], as shown in Fig. 3(a), using the reference pattern indicated by the yellow arrow. The system is able to illuminate desired positions with specified spectral distributions. In Fig. 3(b), five orange spots (~620 nm) and five blue spots (~475 nm) are illuminated using the present system.

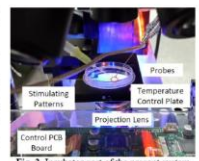
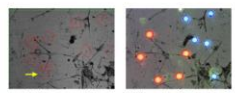


Fig. 2. Incubator part of the present system

2.2 Stimulating wavelengths

Table I lists the spectral sensitivity range of some optogenetic materials that have been genetically implanted in the cells, with the recommended stimulation time for preventing biological degradation. Illuminating neuron gates with a specific spatial pattern and an appropriate



(a) Pattern matching (b) Targeting illumination

Fig. 3. Demonstration using an HMC cell of the exploration of the connectivity between neuron synapses

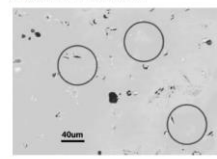


Fig. 7. (Color online) Multi-spot experiment for configuration 1.

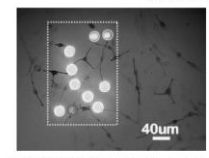
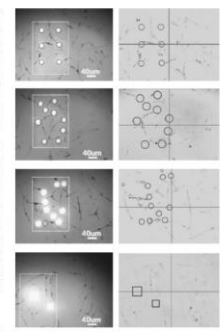


Fig. 8. (Color online) Multi-spot experiment for configuration 2.

scale). Determination of the arrow direction is based on the maximum extension of the material formation within that direction, which obviously appears as the dark pattern after the image operation mentioned above. This can also be achieved by examining the first order gradient of the grey scale from the successive accumulated images. Although not all of the arrows pointed toward exactly the illumination region, we still plotted it based on the experiment fact and studied the factors that might influence or cause such diversity. However, one can observe that five of the eight arrows significantly point toward the yellow region. Therefore, evidence suggests that there are materials toward (red arrows) the illuminated region (yellow circles).

Another experiment preceded the multi-points illumination in configuration 1, and the result is revealed in Fig. 7. Here we not only introduced followed the similar image processing procedure used in Fig. 6, but also used the color plot to represent the value of the grey scale after the operation. Blue regions indicate the formation of the materials in that area and the red/orange/yellow color indicate that the materials at those positions are now vanishing. Red circles indicate the illumination position using the red wavelength (620 nm). Results indicate that there are changes of the HMC morphologies around (and very close to) the spotting position, even though the defocusing and the scattering phenomena of this system blur these spots. More experiments and explanations are required by the biologist. However, from the engineer's point of view, the first configuration has already shown its capability.



3.2 Configuration 2

The second configuration removes the possible blur of the

Previous work

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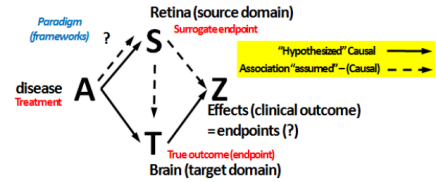
2019 醫學資訊學門：
Prolog自然語言輔助探討眼腦等價視網膜病徵與阿茲海默症解析代理與同義相關性

阿茲海默症最初跡象可望從「眼睛」發現！研究揭：視網膜反映腦細胞變化

日期：2023 年 4 月 6 日 作者：李祉涵



圖五：文獻研究主題與 Surrogate 的關係

- Complete capture the effect of A on the outcome T
- S is associated with T

$$p(T|S,Z)=p(T|S)$$
$$p(T|S)\neq p(T)$$

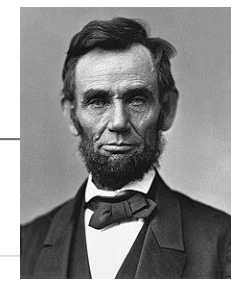
- T is independent of A conditional on S
- S and T are correlated

圖六：Prentice's Criteria：Surrogate 關係圖示的統計表述

Gettysburg Address

Proprietary

- of the people, by the People, for the people



ACCESSWIRE | ACCESSWIRE

Introducing AIbraham Lincoln: The World's First Artificial Intelligence (AI) Presidential Candidate

NEWS PROVIDED BY
ACCESSWIRE
May 23, 2024, 7:50 AM ET

NEW YORK, NY / ACCESSWIRE / May 23, 2024 / Today marks a historic milestone with the introduction of AIbraham Lincoln (Abe2.0), a revolutionary political force announcing its campaign for the 2028 U.S. Presidential Election. While AIbraham Lincoln isn't a traditional candidate, it represents an exciting new era of governance by supporting a human spokesperson who fulfills all constitutional requirements to run for President.

Revolutionizing Politics with AI

AIbraham Lincoln (Abe2.0) brings an unprecedented level of fairness, transparency, and unbiased decision-making to American politics. This AI-driven initiative is designed to listen to every voter, making ethical decisions rooted in American values and constitutional principles.

Regarding the title

Run for AI

Power by AI

Age of AI

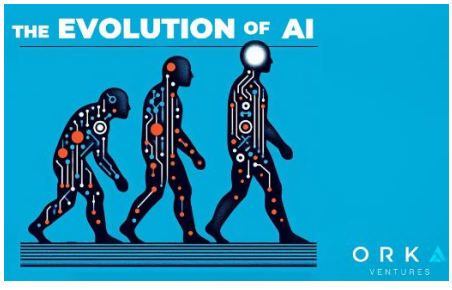
Case 1
Case 2
Miscellaneous

X

- Transformer, CNN…
- Paper works
- Grammar Check
- Generative Program
- Writing Proposal
- Generate Painting
- Image Classification & Recognitions

…

Evolutions of Machine



C-Fe 文明
C-Si 文明

AI
Active AI
Passive AI

Smart

Automatic

Magic words @ Computex 2024

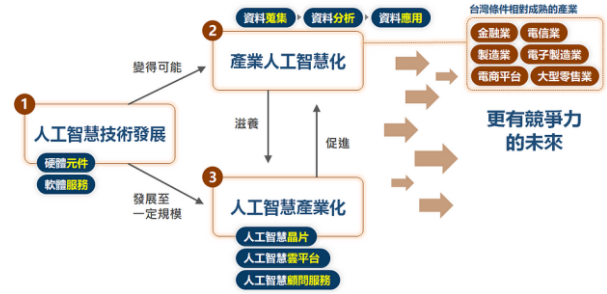
Proprietary

- Generate AI
- AI Model
- AI Chips
- AI PC
- Super Server
- GPT
- Thermal Cooling
- Computility (TOPS)
- Productivity
- Robotics

AI, IA, AIoT ….

Proprietary

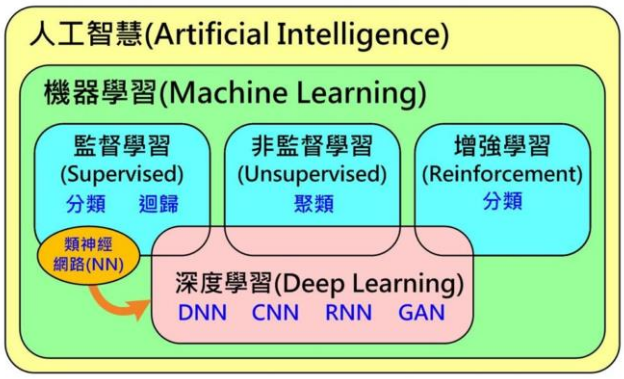
人工智慧（AI）	智慧自動化（IA）
重點： 複製類人智能	重點： 增強人類能力
目標： 模仿人類認知與決策	客觀的： 簡化流程並提高效率
功能： 無需人工幹預即可自主執行任務	功能： 自動化日常任務並協助人類決策
例： 自然語言處理、預測分析	範例： 機器人流程自動化、潛在客戶生成聊天機器人
目標： 在某些任務中取代人力	目標： 提高人類生產力與決策能力



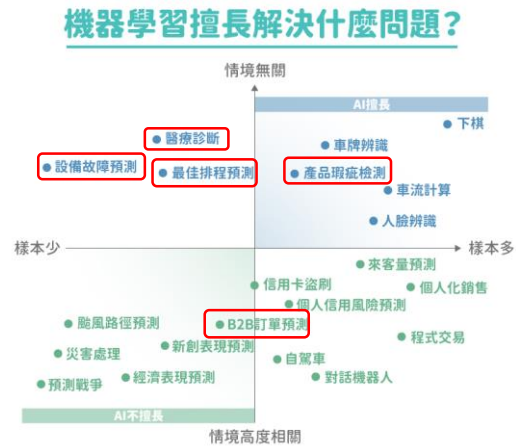
IBM Products Solutions Consulting Support Think

AI versus machine learning versus deep learning versus neural networks: What's the difference?

AI, IA, AIoT ….



OmniXRI整理繪製, 2018/05/24

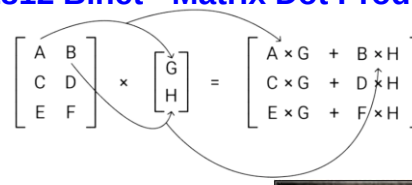


All French Mathematician !

Proprietary

Transformer

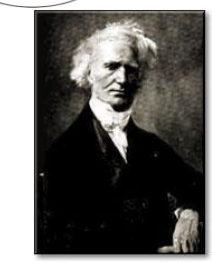
1812 Binet - Matrix Dot Product



Transform Layer

1807 Fourier - Fourier Transform

$$\hat{f}(\mathbf{k}) = \int_{\mathbb{R}^d} f(\mathbf{x})\, e^{-2\pi i \mathbf{k}\cdot\mathbf{x}}\, \mathrm{d}\mathbf{x},$$



CNN

1797 d'Alembert - Convolutions

$$(f * g)(t) \triangleq \int_{-\infty}^{\infty} f(\tau) g(t-\tau)\, \mathrm{d}\tau$$

Proprietary

Case 1

Novel Film Design

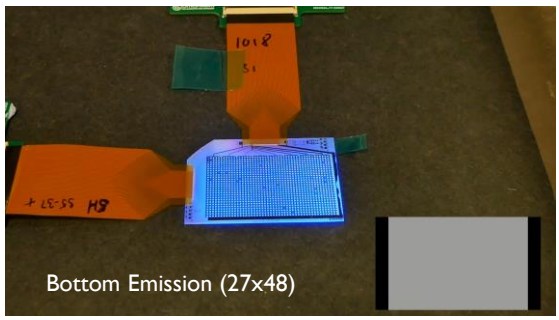
Coretronic Confidential for Coretronic inside
責任・創新・卓越・開創
Responsibility Innovation Superiority Entrepreneurship

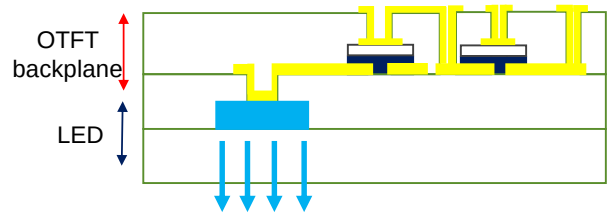
OTFT on Mini/MicroLED

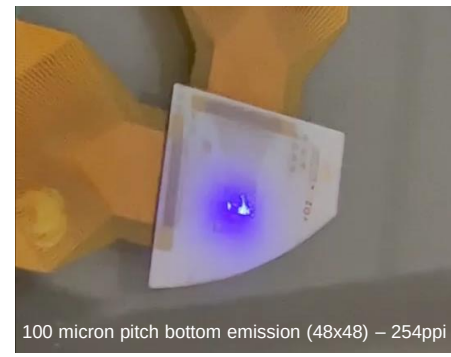
Smartkem

Proprietary

- Monolithically Integrated
- Proof of concept design developed to show how OTFT can be processed on top of u-LED (no transfer so no transfer yield loss)
- Initial demos tested to >100K nits. Future potential for >500K nits with optimised design
- Process can be scaled from 10ppi to >1000ppi with appropriate lithography tools
- Colour can be integrated through the use of quantum dot colour conversion materials (printed or photopatterned)







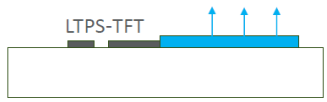
Sk

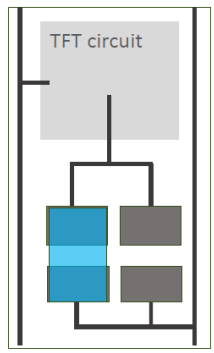
Advantage

Smartkem

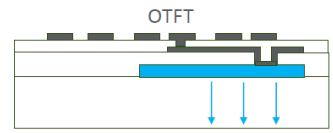
Proprietary

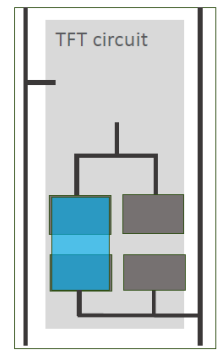
Conventional method – chip attached last – cannot laser mount over top of backplane since laser may damage backplane during mounting process





Chip first method – laser mounted devices can be overlapped with backplane due to low temperature OTFT process (OTFT built on top of already mounted LED)



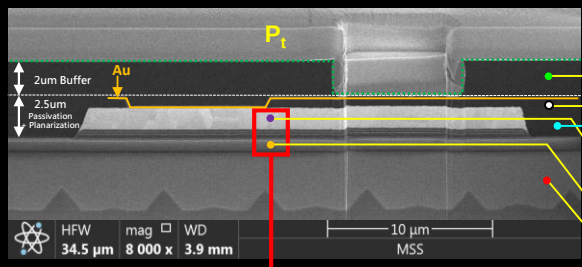


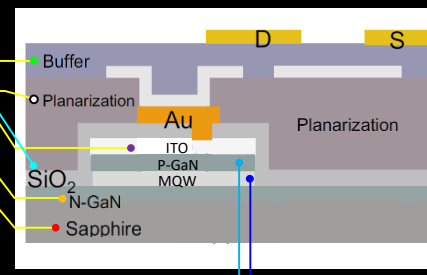
Cross Section

Proprietary

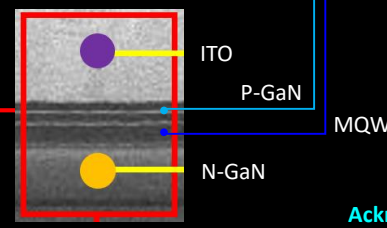
- Smartkem m-LED 1018 #3 16*16

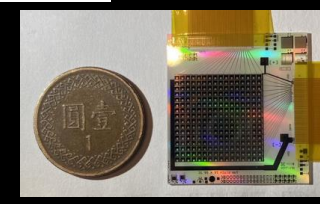
Credits: Smartkem





Emission (Sapphire)





- LED Qty : 16 x 16
- LED Size : ~ 300um x 300um
- Pixel Size : 1mm x 1mm
- Pixel Pitch : 1mm

owen.ou@coretronic.com

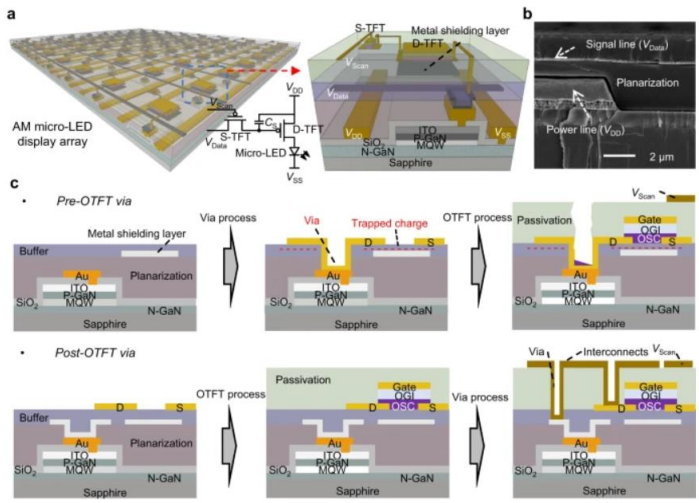
Annotations & Revision: Owen
Acknowledgement: Smartkem Steven
2024.2.4

OTFT on MicroLED

Smartkem
OUR TRANSISTORS YOUR ADVANTAGE

Proprietary

Fig. 1: Organic-last integration (OLI) structure.



Nat Commun 14, 6985 (2023)

Demos in Computex

Proprietary

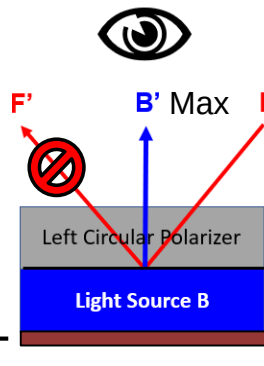
ACR = Ambient Contrast Ratio

Computex 2024 Demo (BenQ)

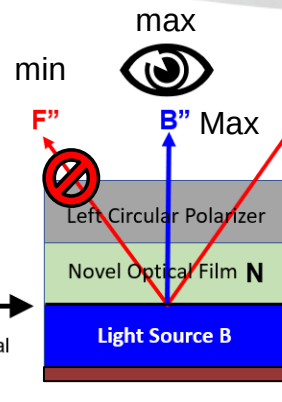
Solve ACR

- Pragmatic Problem

Proprietary



M
directional mirror



Insert novel Retarder film

$$\begin{bmatrix} ? & ? \\ ? & ? \end{bmatrix}$$

Power by AI

Target $\min ACR \equiv |F''|/|F| \cup |F''| \to 0$, $\max |B''|$

Strategies

Proprietary

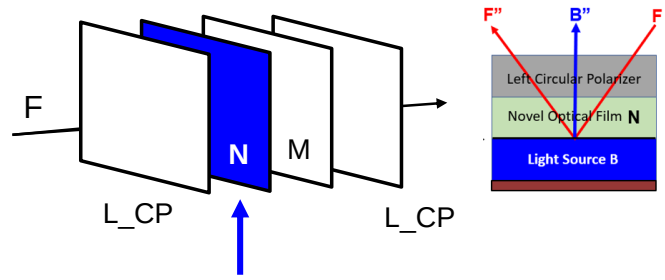
Define | **Check True Statements** | **Description : Find N**

Jones Calculus

SPIE

Q_P45·Q_N45·L_V·H=0
Q_P45·Q_N45·L_V·V=V
Q_P45·Q_N45·L_H·V=0
Q_P45·Q_N45·L_H·H=H
Q_P45·L_H·H=L
Q_N45·L_H·H=R
Q_P45·L_V·V=R
Q_N45·L_V·V=L

F"=|L_CP·N·M·N·L_CP|=0
B"=|L_CP·N·B|=1



Insert novel Retarder film

Define
Description
Decompose
Deploy

Strategies cont.

Proprietary

- Decompose Noncoherent/Unpolarized light

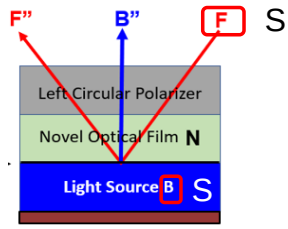
① $S \equiv \frac{1}{2}|H\rangle + \frac{1}{2}|V\rangle$

☑ ② $S \equiv \frac{1}{2}|R\rangle + \frac{1}{2}|L\rangle$

Dirac notation

$S \equiv \frac{1}{2}|\cos\theta\rangle + \frac{1}{2}|\sin\theta\rangle$

③ $B = \int_0^{2\pi} |S| \cdot d\theta = 1$



Acta Mech Sinica 2: 362–372 (1986).

Teach Jones Matrix Form

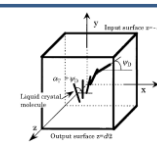
Proprietary

Standard components

Vertical Linear Polarizer	$\begin{bmatrix}0&0\\0&1\end{bmatrix}$	Right Circular Polarizer	$\frac{1}{2}\begin{bmatrix}1&i\\-i&1\end{bmatrix}$
Horizontal Linear Polarizer	$\begin{bmatrix}1&0\\0&0\end{bmatrix}$	Left Circular Polarizer	$\frac{1}{2}\begin{bmatrix}1&-i\\i&1\end{bmatrix}$
Linear Polarizer at 45°	$\frac{1}{2}\begin{bmatrix}1&1\\1&1\end{bmatrix}$	Quarter-wave plate, fast axis vertical	$\begin{bmatrix}1&0\\0&-i\end{bmatrix}$ Retardation λ/4
Lossless fiber transmission	$\begin{bmatrix}e^{i\phi}\cos\theta & -e^{-i\psi}\sin\theta\\ e^{i\psi}\sin\theta & e^{-i\phi}\cos\theta\end{bmatrix}$	Quarter-wave plate, fast axis horizontal	$\begin{bmatrix}1&0\\0&i\end{bmatrix}$ Retardation λ/4
Half-wave plate, fast axis horizontal	$\begin{bmatrix}1&0\\0&-1\end{bmatrix}$ Retardation λ/2	Half-wave plate, fast axis vertical	$\begin{bmatrix}-1&0\\0&1\end{bmatrix}$ Retardation λ/2
General retarder, fast axis horizontal	$\begin{bmatrix}1&0\\0&e^{i\varphi}\end{bmatrix}$	In terms of waves (wavelength λ), this is a retarder $\lambda^*\varphi/2\pi$	

LC/Meta Materials

$$\mathbf{M}_E = \begin{bmatrix} a-ib & c \\ -c & a+ib \end{bmatrix}$$

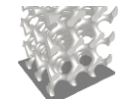


APPL. OPT. 44(21): 4484 (2005)

$$\Delta J^{0f} = \begin{bmatrix} \cos(\Gamma z) - i\frac{LB}{\lambda\Gamma}\sin(\Gamma z), & \frac{JD+OA}{\lambda\Gamma}\sin(\Gamma z) \\ \frac{JD-OA}{\lambda\Gamma}\sin(\Gamma z), & \cos(\Gamma z) + i\frac{LB}{\lambda\Gamma}\sin(\Gamma z) \end{bmatrix}.$$

Physical Review A 97, 053804 (2018)

$$T^{\mathrm{f}}_{\mathrm{circ}} = \frac{1}{2}\begin{pmatrix} A+D+2iB & A-D \\ A-D & A+D-2iB \end{pmatrix}$$



Physical Review A 82: 053811 (2010).

APL Photonics 4: 126107 (2019)

Mathematica AI

Proprietary

Run for AI

$$\sqrt{\frac{\left|\sqrt{2}\,\%i\,c-\sqrt{2}\,a\right|^2}{16}+\frac{\left|\sqrt{2}\,c+\sqrt{2}\,\%i\,a\right|^2}{16}}$$

Input interpretation

solve $\frac{1}{4}\sqrt{\left|\sqrt{2}\,i\,b-\sqrt{2}\,a\right|^2+\left|\sqrt{2}\,b+\sqrt{2}\,i\,a\right|^2}=1$ for a

Results

$a = -\mathrm{Im}(b) + i\,\mathrm{Re}(b) - 2$

$-\mathrm{Im}(b) - 2 < \mathrm{Re}(a) < 2 - \mathrm{Im}(b)$ and $\sqrt{-2\,\mathrm{Re}(a)\,\mathrm{Im}(b) - \mathrm{Re}(a)^2 - \mathrm{Im}(b)^2 + 4} + \mathrm{Im}(a) = \mathrm{Re}(b)$

$-\mathrm{Im}(b) - 2 < \mathrm{Re}(a) < 2 - \mathrm{Im}(b)$ and $\sqrt{-2\,\mathrm{Re}(a)\,\mathrm{Im}(b) - \mathrm{Re}(a)^2 - \mathrm{Im}(b)^2 + 4} + \mathrm{Re}(b) = \mathrm{Im}(a)$

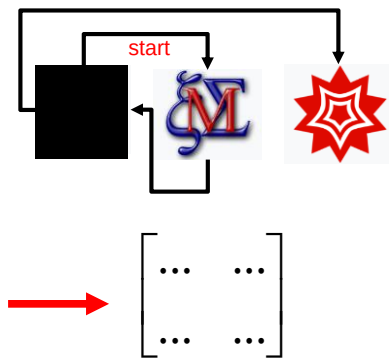
$a = -\mathrm{Im}(b) + i\,\mathrm{Re}(b) + 2$

Solution over the reals

$a = -\mathrm{Im}(b)$ and $\mathrm{Re}(b) = \pm 2$

$a = -\mathrm{Im}(b) - \sqrt{4 - \mathrm{Re}(b)^2}$ and $-2 < \mathrm{Re}(b) < 2$

$a = \sqrt{4 - \mathrm{Re}(b)^2} - \mathrm{Im}(b)$ and $-2 < \mathrm{Re}(b) < 2$



Cooperate

- Deploy

Proprietary

vwMaxima (Lisp)

$(a^2 - d^2)/4=0$

$(bd - cd + ac - ab)/4=0$

$$\begin{pmatrix} -\frac{d^2+(\%i\,b-\%i\,c)\,d+\%i\,a\,c-\%i\,a\,b-a^2}{4} & \frac{\%i\,d^2+(c-b)\,d-a\,c+a\,b-\%i\,a^2}{4} \\ -\frac{\%i\,d^2+(c-b)\,d-a\,c+a\,b-\%i\,a^2}{4} & -\frac{d^2+(\%i\,b-\%i\,c)\,d+\%i\,a\,c-\%i\,a\,b-a^2}{4} \end{pmatrix}$$

Mathematica AI

c=b & d=-a

d=a

N_G

$$\begin{pmatrix} \frac{a}{2}-\frac{\%i\,b}{2} & \frac{b}{2}+\frac{\%i\,a}{2} \\ \frac{b}{2}+\frac{\%i\,a}{2} & \frac{\%i\,b}{2}-\frac{a}{2} \end{pmatrix}$$

$$\left(\frac{\sqrt{|\sqrt{2}\,\%i\,b-\sqrt{2}\,a|^2+|\sqrt{2}\,b+\sqrt{2}\,\%i\,a|^2}}{4}\right)$$

N_1 $\begin{bmatrix} -i & 1 \\ 1 & i \end{bmatrix}$ *a*=0 & *b*=2

N_2 $\begin{bmatrix} 1 & i \\ i & -1 \end{bmatrix}$ *a*=2 & *b*=0

N_X

$$\begin{pmatrix} \frac{a}{2}-\frac{\%i\,c}{2} & \frac{b}{2}-\frac{\%i\,a}{2} \\ \frac{c}{2}+\frac{\%i\,a}{2} & \frac{\%i\,b}{2}+\frac{a}{2} \end{pmatrix}$$

$$\sqrt{\frac{|\sqrt{2}\,\%i\,c-\sqrt{2}\,a|^2}{16}+\frac{|\sqrt{2}\,c+\sqrt{2}\,\%i\,a|^2}{16}}$$

N_3 $\begin{bmatrix} 1 & -i \\ i & 1 \end{bmatrix}$ *a*=2 & *b*=0 & *c*=0

....

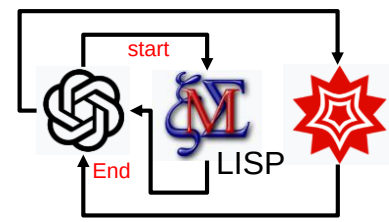
Collaboration

- tools

Proprietary

Power by AI

1. ChatGPT — General inquiry
2. wx-Maxima — Algebraic analysis
3. ChatGPT — Quantitative discussion
4. Mathematica AI — Advanced Algebraic verification
5. ChatGPT — Confirmation of argumentative logic



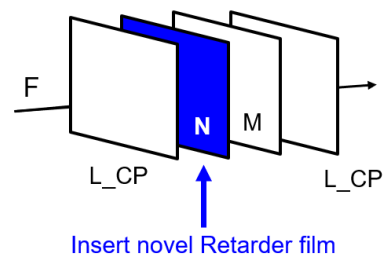
你
現在我要你給出以下的解 |L_CP.N.M.N.L_CP|=0 且|L_CP.N.B|=0, 其中||是習知的計算向量絕對值得運算符，請問你N的2*2的形式為何?

ChatGPT
好的，我們要解的是下列方程組：

1. $|L_{CP} \cdot N \cdot M \cdot N \cdot L_{CP}| = 0$
2. $|L_{CP} \cdot N \cdot B| = 0$

其中，$|\cdot|$ 是習知的向量的絕對值運算符，

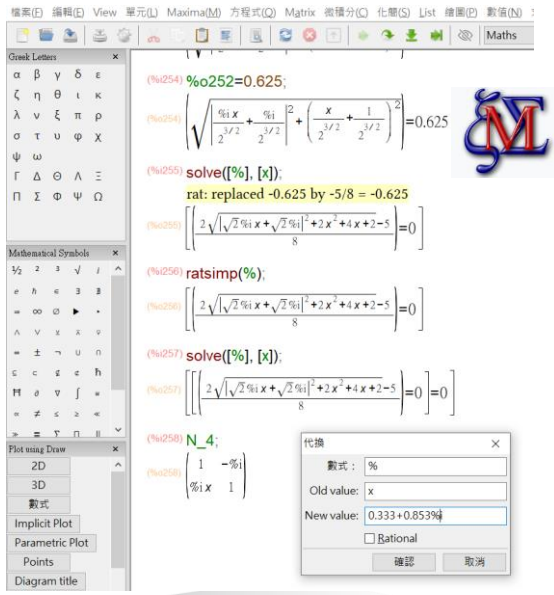
F"=|L_CP·N·M·N·L_CP|=0
B"=|L_CP·N·B|=1



Insert novel Retarder film

Identify Matrix Coefficients

Proprietary



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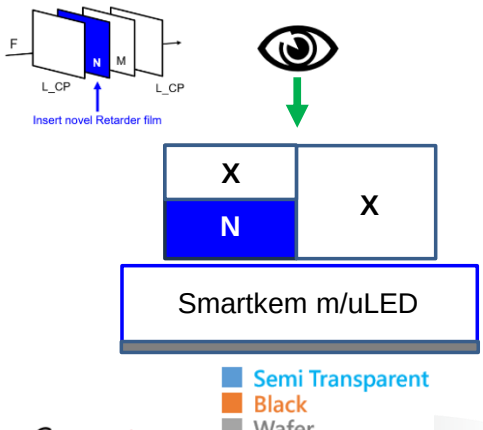
責任・創新・卓越・開創

Responsibility Innovation Superiority Entrepreneurship

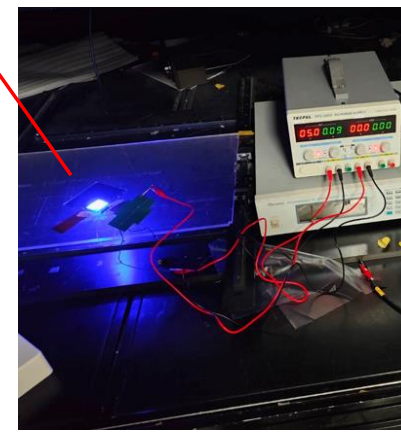
Measurements

Proprietary

- Schematic Diagram of Measurement Process
  - PR650
  - 0.1 Deg.
  - z = 500 mm



Trial Sample



L_CP.(R/2+L/2)

$$\begin{pmatrix} \frac{1}{2^{3/2}} \\ \frac{\%i}{2^{3/2}} \end{pmatrix}$$

sqrt(abs(row(col(%,1),1)^2)+abs(row(col(%,1),2)^2));

$$\begin{pmatrix} \frac{1}{2} \end{pmatrix}$$

Coretronic

責任・創新・卓越・開創

Responsibility Innovation Superiority Entrepreneurship

Trial Sample

Proprietary

N_1 N_2 N_3 N_4

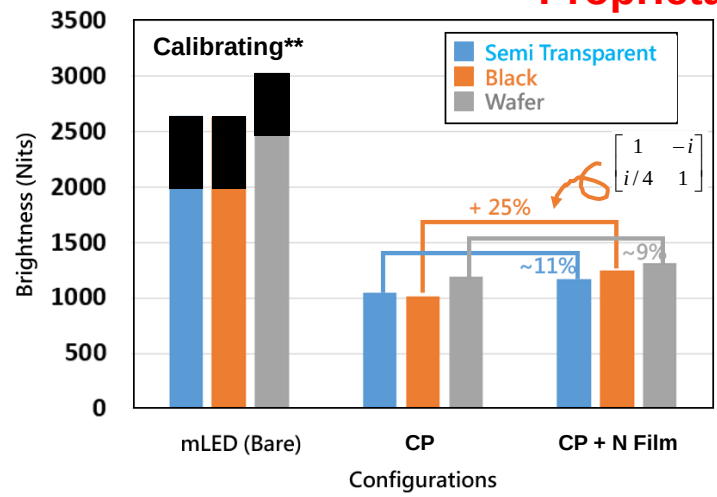
$$\begin{bmatrix} -i & 1 \\ 1 & i \end{bmatrix} \quad \begin{bmatrix} 1 & i \\ i & -1 \end{bmatrix} \quad \begin{bmatrix} 1 & -i \\ i & 1 \end{bmatrix} \quad \begin{bmatrix} 1 & -i \\ 0 & 1 \end{bmatrix}$$

max 100% min 50%

$$\begin{bmatrix} 1 & -i \\ xi & 1 \end{bmatrix}$$

x=? for ~62.5%

```
(%i258) N_4;
(%o258) matrix([1, -%i], [%i x, 1])
(%i278) N_4:matrix(
          [1, -%i],
          [%i·(0.25−0.0·%i), 1]
        );
(%o278) matrix([1, -%i], [0.25 %i, 1])
(%i279) L_CP.N_4.(R/2+L/2);
(%o279) matrix([0.625/sqrt(2)], [0.625 %i/sqrt(2)])
(%i280) sqrt(abs(row(col(%,1),1)^2)+abs(row(col(%,1),2)^2));
(%o280) 0.625
```



$$\begin{bmatrix} 1 & -i \\ i/4 & 1 \end{bmatrix}$$

- ✓ The present method can identify the structure of the materials.
- ✓ Provide specifications and **Jones Optics** testing methodologies for fabrications.

Summary

Proprietary

- AI **collaboration** works to derive useful designs for Novel Retarder film.
- Provide the theoretical **limitations** for establishing measurement standards.
- Trial sample was not satisfactory, but it does provide **possibilities**.
- Several **novel materials** are possible to approach a solution.
- Future works – parameters database for AI (**Prolog**?)

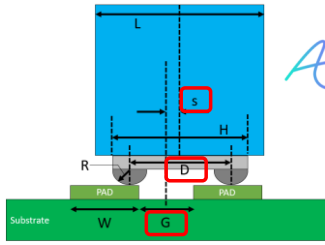

```
Domains                    # 光學元件疊層結構之Prolog搜尋
  retarder=symbol
  retarderlist=retarder*

Predicates
  member(retarder,retarderlist).

Clauses
  member(Film, [Film| _ ]).
  member(Film, [ _| Rest_Films]) if member(Film, Rest_Films).
```

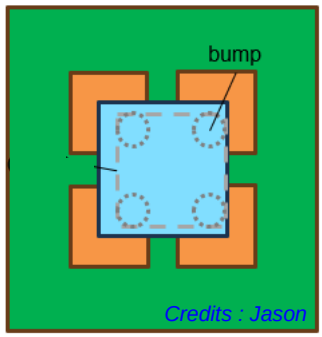
Proprietary

Case 2
Failure Mode Analysis

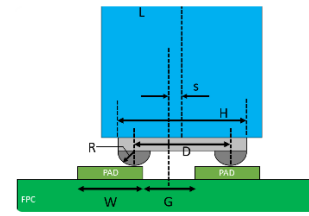
Conduction Point Failure

Proprietary





你可以將圖片上傳，我會幫你進一步分析與討論。



我已經看到了你上傳的工程圖，圖中顯示：

- 藍色的半導體元件，寬度為 L。
- 中間的淡灰色區域代表小基板，寬度為 H。
- 下面的兩個半圓形電性接觸點，半徑為 R，彼此間的距離為 D。
- 底部的綠色部分是 FPC 基板，上面有兩塊小 Pad，寬度為 W，兩個 Pad 之間的距離為 G。
- 藍色的半導體元件和綠色 FPC 基板的中心線各自標註出來，之間的偏移量為 S。

這個設計關鍵在於上方的電性接觸點（半圓形）與下方 FPC 基板的 Pad 必須精準對接，避免偏移太大導致接觸不良。

接下來你想探討哪方面的問題呢？是否與偏移量 S 對接觸點的影響有關？

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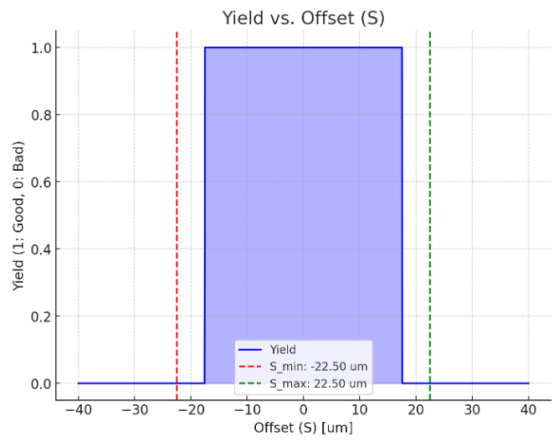
One Parameter S

Proprietary



這是根據你提供的參數和假設得到的「偏移量 S 與元件良率」的關係圖。

- 當偏移量 S 在 $-22.5\,\mu m$ 到 $22.5\,\mu m$ 之間時，元件被判定為良品，良率為 1。
- 當偏移超出這個範圍時，元件接觸點無法對準 Pad，因此良率為 0。

接下來，你可以使用更精確的數值來重新模擬結果，或進一步調整參數以優化設計，這樣的流程應該

為了分析偏移量 S 對元件良率的影響，我們可以建立一個簡單的數學模型來模擬此過程。首先，讓我們考慮以下幾點：

1. 半圓形接觸點：每個接觸點的半徑為 R，這代表接觸點的頂端會形成一個直徑為 $2R$ 的圓，兩個接觸點的中心點間距離為 D。
2. PAD 的位置：PAD 的寬度為 W，而兩個 PAD 的間距為 G。因此，從第一個 PAD 的左邊緣到第二個 PAD 的右邊緣的總距離為 $W+G+W=2W+G$。
3. 接觸點的對應：為了讓元件算是良品，兩個半圓形接觸點的頂端必須完全落在各自的 PAD 範圍內。這意味著每個接觸點的左右邊緣都必須在相應 PAD 的左右邊緣之內。

接觸點與PAD對應條件

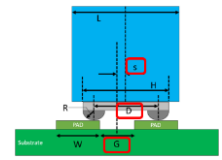
假設兩個接觸點的中心分別定位於 $x=0$ 和 $x=D$，其中 $x=0$ 為第一個半圓的中心點。當有偏移量 S 時，第一個接觸點的中心位置變為 S，第二個為 $S+D$。

為了讓兩個接觸點同時位於各自的 PAD 範圍內，以下條件必須滿足：

- 第一個接觸點的左邊緣 $S-R$ 必須大於等於 0，右邊緣 $S+R$ 必須小於等於 W。
- 第二個接觸點的左邊緣 $S+D-R$ 必須大於等於 $W+G$，右邊緣 $S+D+R$ 必須小於等於 $2W+G$。

將這些條件轉化為數學方程式：

- $S-R\geq 0$
- $S+R\leq W$
- $S+D-R\geq W+G$
- $S+D+R\leq 2W+G$



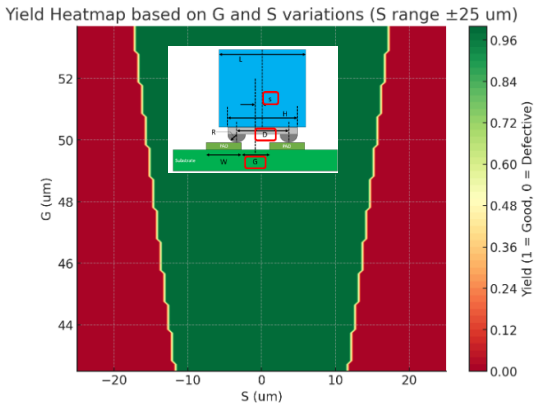
良率計算

良率 Y 可以表示為在給定的偏移範圍內，滿足以上條件的 S 值的比例。

接下來，如果你能提供具體的參數值（L, H, R, D, W, G，和偏移量的範圍），我將進一步計算並繪製良率對 S 的圖。

Two Parameters S&G

Proprietary



這是基於 G 和 S 變化範圍的良率熱力圖，其中 S 的偏移範圍設定為 $\pm 25\,\mu m$，綠色表示良品（良率為 1），紅色表示不良品（良率為 0）。從圖中可以看到，當 G 較大且 S 偏移較小時，良品比例較高；而當 S 偏移過大或 G 較小時，良率會急劇下降。

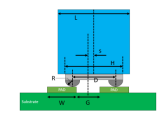
好的，讓我們繼續。我會根據之前的邏輯重新進行 G 和 S 偏移量之間的良率分析，並將 S 的範圍擴展到 $\pm 25\,\mu m$。這裡是我們的目標：

1. 對 G 和 S 進行掃描。
2. 在變化範圍內計算良率，並且將其可視化為熱力圖。

由於目前分析工具暫時無法使用，我可以為你提供該方法的詳細步驟，這樣你可以在本地執行分析：

步驟：

1. **初始化參數**：設定 $L=160\,\mu m, H=146\,\mu m, D=59\,\mu m, R=22\,\mu m, W=40\,\mu m$，以及 G 的範圍為 $42.5\sim 53.7\,\mu m$，並設置 S 的範圍為 $\pm 25\,\mu m$。
2. **計算接觸點**：根據每個 S 值，計算兩個半圓接觸點的位置：
   - $x_1=-D/2+S$
   - $x_2=D/2+S$
3. **判斷良率**：判斷這兩個接觸點是否位於各自的 Pad 範圍內。如果都在範圍內，則元件為良品。
4. **生成熱力圖**：使用 Matplotlib 或其他可視化工具繪製 G 與 S 偏移量對應的良率熱力圖。



如果你能在本地運行 Python，我可以為你提供具體的代碼。如果有任何問題，隨時告訴我！

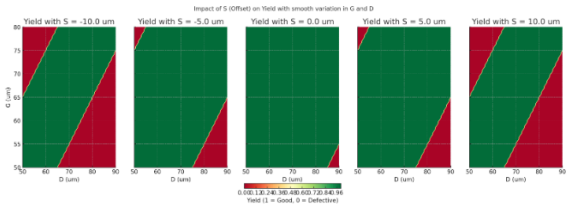
Three Parameters S,G&D

Proprietary

為了得到有曲線形式的良率分佈，我們可以做以下幾個調整：

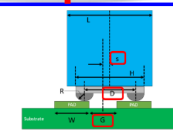
1. **偏移量 S**：讓偏移量 S 逐步增加或減少，而不是僅僅使用極端的偏移量，比如 $S = -25\mu m$ 和 $S = +25\mu m$，這樣接觸點可能會部分落在 Pad 上，產生更漸變的良率變化。
2. **Pad 寬度 W**：我們也可以適當縮小 Pad 的寬度，使得接觸點更容易在邊緣情況下產生不完全接觸，這樣良率曲線會更細膩。
3. **變化參數 G 和 D**：通過更細緻地調整 G 和 D 的範圍，讓接觸點在 Pad 上產生更靈活的匹配狀況，進而觀察到隨著這些變數變化的良率曲線。

接下來，我會基於這些原則重新分析，生成一個良率曲線圖。讓我們開始吧！



這是基於不同 S 偏移量的良率分佈圖，並展示了 G 和 D 之間的關係。綠色區域表示良率較高的情況（兩個接觸點都在 Pad 上），紅色區域則表示良率較低的情況（至少一個接觸點沒有對準 Pad）。隨著 S 的改變，綠色和紅色區域之間的邊界變化展示了如何隨著偏移量的變化，設計參數 G 和 D 對良率的影響。

我們繼續討論設計參數的分析：



分析結論：

1. **S（偏移量）對良率的影響：**
   - 當 $S = 0$ 時，接觸點與 Pad 對準，良率最高。
   - 當 S 增大到正或負 25 微米時，接觸點有可能偏離 Pad，特別是在 D 和 G 不合理的情況下，這將顯著降低良率。
2. **G（Pad 間距）對良率的影響：**
   - 當 G 太小時，Pad 間距過窄，接觸點容易互相干擾，降低良率。
   - 建議將 G 控制在 30-45 微米的範圍內，這樣可以平衡製程誤差帶來的影響。
3. **D（接觸點間距）對良率的影響：**
   - 當 D 較大時（接近 100 微米），接觸點之間的距離變大，容易導致接觸點與 Pad 不對準。
   - 保持 D 在 50-80 微米之間，能夠最佳化良率。

設計指導：

- **最佳化良率的設計重點是保持 G 和 D 的適當比例，並且考慮到 S 的製程公差。**
  - 如果設計參數中 S 的波動無法控制到 ±25 微米以內，則應適當增加 Pad 的寬度 W 或調整 G 和 D 的值來補償。

這些結論可以幫助你在參數設計中對接觸點的良率有更好的掌握。你可以根據實際製程的要求進一步調整這些參數來提高產品質量。

如果你需要任何進一步的數據分析或圖形化結果，請隨時告訴我！

Mood…

Proprietary

Say something nice !

你正在對新版的 ChatGPT 給予回饋。

你比較喜歡哪一個回應？載入回應可能需要一些時間。

回應 1

It seems like I can't do more advanced data analysis right now. Please try again later. If you need assistance with how to proceed on your own or would like to discuss alternative methods, feel free to let me know! [>_]

我比較喜歡這個回應

回應 2

好的，讓我們繼續昨天的工作。您提到希望使用更大的 S 偏移範圍（±25um）重新畫出 G 與 S 之間的良率圖。我將重新計算並繪製圖表。

稍等片刻，我馬上來呈現新的結果。

"嘗試、失敗、再嘗試，並且每次都要做得更好。" ——提姆·艾倫

我比較喜歡這個回應

Miscellaneous

Age of AI

XR Optics – Suggestions on Conjugate

Proprietary

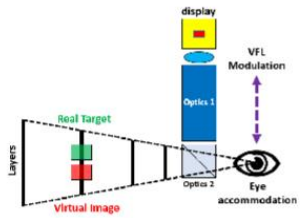


Fig.1 (a) Vari Focal Lens system [1]

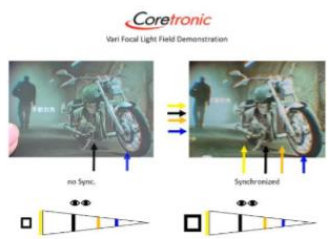


Fig.1 (b) Vari Focal Lens System Demonstration

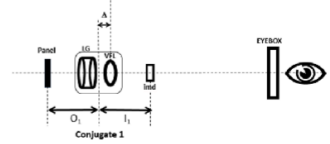


Fig. 2 conjugate between panel and intermediate image

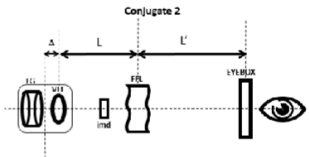


Fig.3 conjugate between aperture of Vari-focal lens and eye-box

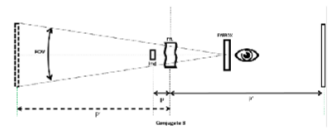


Fig.4 conjugate between intermediate image and virtual image for AR/VR Layer(s)

C.J. Ou, IDW 2021

XR Optics – Diopter Range

Proprietary

好的，我們來嘗試利用 $A \times B = 0$ 的性質來找出這個函數的極值。

我們之前已經求出了一階導數：

$$\frac{d\delta}{da} = \left[-\lambda \ln\left(e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta\right)\right]^{\frac{1}{k}-1} \cdot \frac{\left(\frac{a-s}{\lambda}\right)^{k-1} \cdot e^{-\left(\frac{a-s}{\lambda}\right)^k}}{e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta} - 1$$

我們需要解 $\frac{d\delta}{da} = 0$，即：

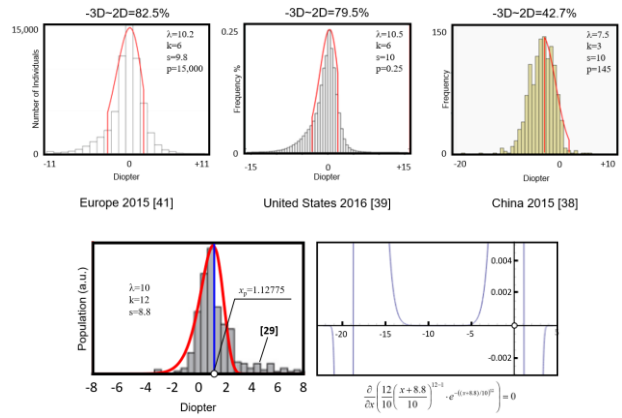
$$\left[-\lambda \ln\left(e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta\right)\right]^{\frac{1}{k}-1} \cdot \frac{\left(\frac{a-s}{\lambda}\right)^{k-1} \cdot e^{-\left(\frac{a-s}{\lambda}\right)^k}}{e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta} = 1$$

我們將這個方程分成兩部分，設 $A = \left[-\lambda \ln\left(e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta\right)\right]^{\frac{1}{k}-1}$ 和 $B = \frac{\left(\frac{a-s}{\lambda}\right)^{k-1} \cdot e^{-\left(\frac{a-s}{\lambda}\right)^k}}{e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta}$，根據 $A \times B = 1$ 的性質，我們可以分別解 $A = 1$ 和 $B = 1$。

1. 解 $A = 1$：$\left[-\lambda \ln\left(e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta\right)\right]^{\frac{1}{k}-1} = 1$

這意味著：$-\lambda \ln\left(e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta\right) = 1$

求解這個方程：$\ln\left(e^{-\left(\frac{a-s}{\lambda}\right)^k} - \eta\right) = -\frac{1}{\lambda}$



C.J. Ou, JOSA, accepted

μDisplay Thermal Analysis

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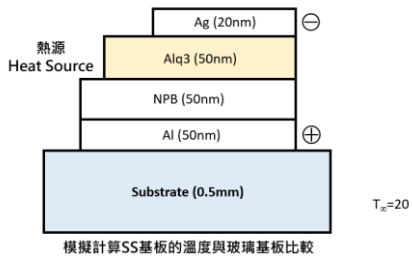

模擬計算SS基板的溫度與玻璃基板比較

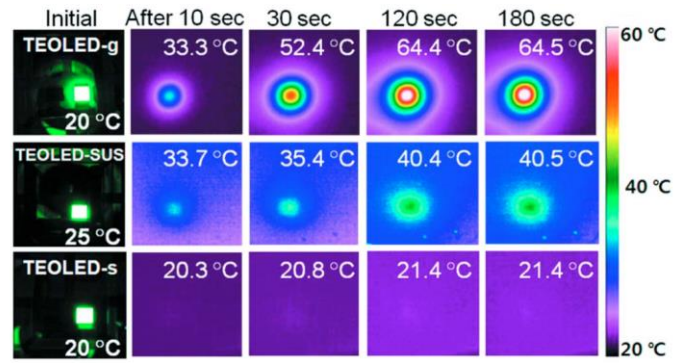

FIG. 2. (Color online) IR images of thermal distribution of TEOLED-g (top), TEOLED-SUS (middle), and TEOLED-s (bottom) 10 000 cd/m^2 taken from the backside of the substrates.

APL 94: 253302 (2009)

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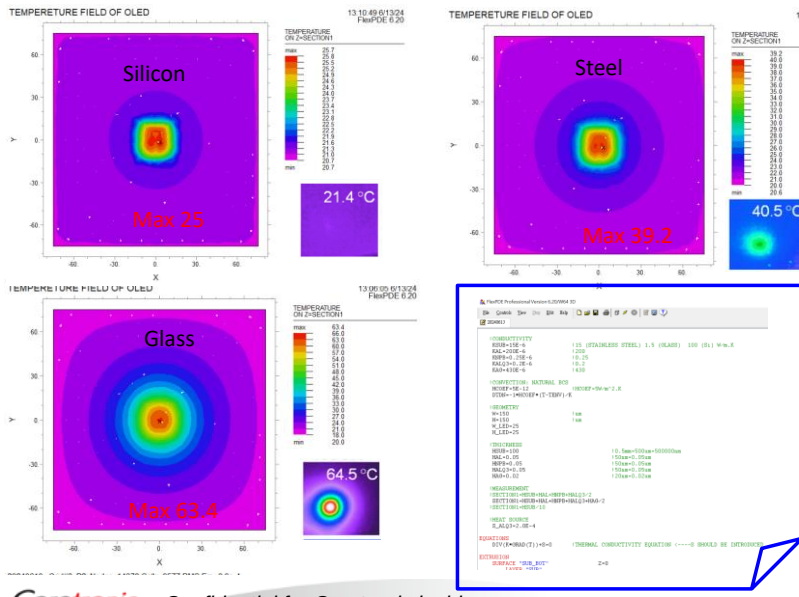
μDisplay Thermal Analysis – Script Loop

Proprietary



All the *script* language can works with generative AI to increase RD productivity.

Alice & Bob

CQD Spectrum “Discussion”

Proprietary

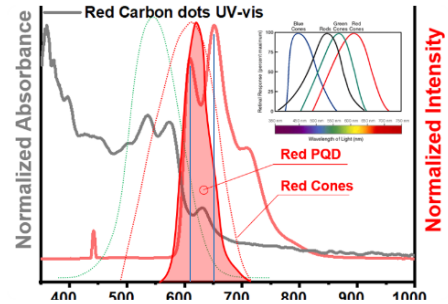
當你提供光譜圖後，我會幫你進行峰值(peak)的辨識，估算半高寬(FWHM)，以及大致估算積分面積。請隨時將圖傳給我，我會根據圖中的數據進行分析。

Alice & Bob

對，確實在 **PL光譜（Red Carbon dots PL）** 中可以看到兩個明顯的峰值：

1. **第一個峰值** 大約位於 **610 nm** 左右，這是主要的強峰，覆蓋範圍從約 580 nm 到 640 nm。
2. **第二個峰值** 大約位於 **660 nm** 左右，這個次要的峰值相比第一個弱一些，但仍然顯著，覆蓋範圍從 640 nm 到 680 nm 左右。

這兩個峰值可能代表了在不同的能階或能隙下，碳量子點的發光特性。兩個峰之間的半高寬（FWHM）會比單一峰更寬，這也是PL光譜中多模態發射的一個特徵。



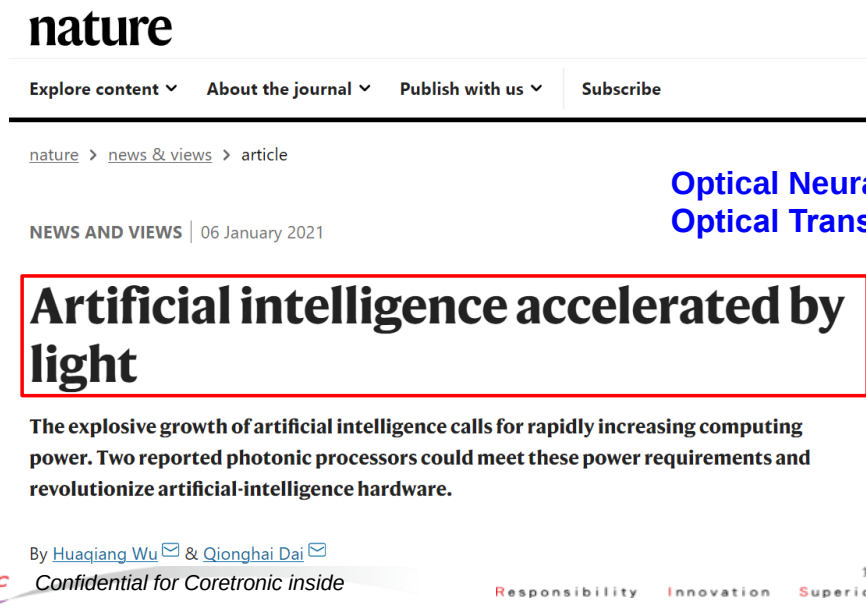
從你提供的光譜圖中，可以看到以下關鍵特徵：

1. **PL光譜（紅色線）**：

IDW 2024

"Let there be light!"

Proprietary



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NEWS AND VIEWS | 06 January 2021

Artificial intelligence accelerated by light

The explosive growth of artificial intelligence calls for rapidly increasing computing power. Two reported photonic processors could meet these power requirements and revolutionize artificial-intelligence hardware.

By Huaqiang Wu & Qionghai Dai

Optical Neural Network
Optical Transformer…

Proprietary

Remember this?

Prolog

Deductive Logic Programming

Rule Based AI

Proprietary

用Prolog 描述一個尼羅河上謀殺案中人物之間的關係

Death on the Nile

以下是一段使用 Prolog 描述阿加莎·克里斯蒂小說《尼羅河上的慘案》中人物之間關係的程式碼：

複製程式碼

```
suspect(poirot, jackie).          % 白羅懷疑杰奎琳
suspect(poirot, simon).           % 白羅懷疑賽門
suspect(poirot, fan_thorp).       % 白羅懷疑法恩索普先生
suspect(poirot, dr_bessner).      % 白羅懷疑貝斯納醫生

% 定義查詢規則：尋找某人殺死了誰
murderer(Murderer, Victim) :- killed(Murderer, Victim).

% 定義查詢規則：檢查某人是否與謀殺有關
complicit_in_murder(Person, Victim) :- complicit(Person, Killer), killed(Killer, Victim).

% 定義查詢規則：查看白羅是否懷疑某人
suspected_by_poirot(Person) :- suspect(poirot, Person).

% 定義查詢規則：尋找家庭關係
related(X, Y) :- mother(X, Y).
related(X, Y) :- married(X, Y).
related(X, Y) :- engaged(X, Y).
```


Rule Based AI + Deep Learning = ?

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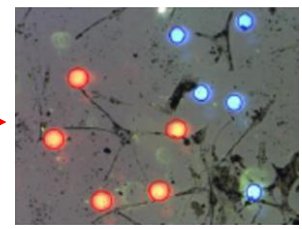
Predict ⇄ Explain

人工智慧發展簡史

第一波	第二波	第三波
1950-1960	1980-1990	2010- Present
符號邏輯	專家系統	機器學習
失敗	失敗	
把人的思考邏輯放進電腦	把人的所有知識放進電腦	把人的所有看見放進電腦
由領域專家寫下決策邏輯	由領域專家寫下經驗規則	由領域專家提供歷史資料，讓電腦自己歸納規則
人類連沒辦法清楚理解自己的思考過程，如何告訴電腦？	太多難題人類無法解答、無法寫成規則、無法以程式碼表示	



Age of AI

deduction 規則→案例→結果

Induction 案例→結果→規則

Abduction 結果→規則→案例

If human start to depravation, stop thinking…

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Ash (Alien)

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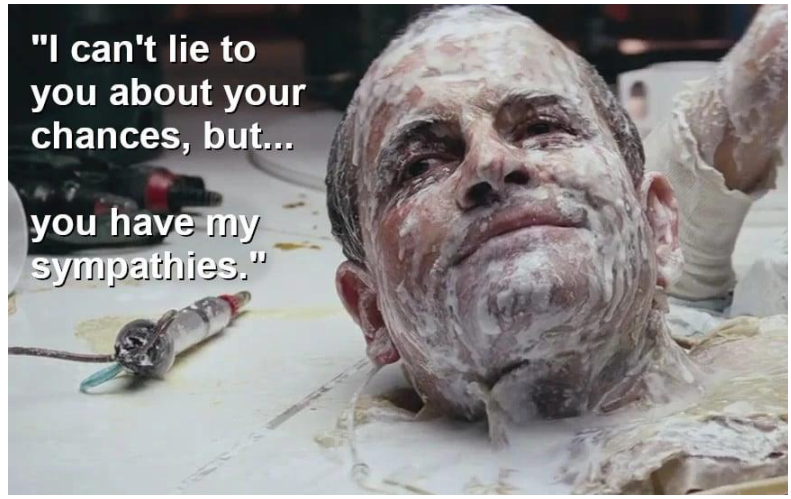

- Alien 1979

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TRENDING Best cloud file sharing services for 2024 Artificial intelligence

Software > Development

AWS CEO Matt Garman thinks AI coding tools could herald the end of the developer as we know it – but there's light on the horizon for worried devs

News By Solomon Klappholz published September 2, 2024

- Survive in Age of AI -

Attention **is all AI need,**
Dedication is all human crave!

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Coretronic Aledia Innovative displays

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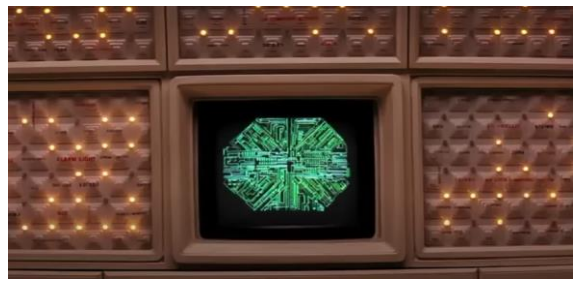
Questions?

Mother Interface 2037



- Alien 1979