



THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

Seeing the Invisible: *Generating Non-invasive Angiography as an Alternative to Invasive Retinal Examinations*

The Hong Kong Polytechnic University

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- Every examination has its own limitation
- Different modalities provide complementary information

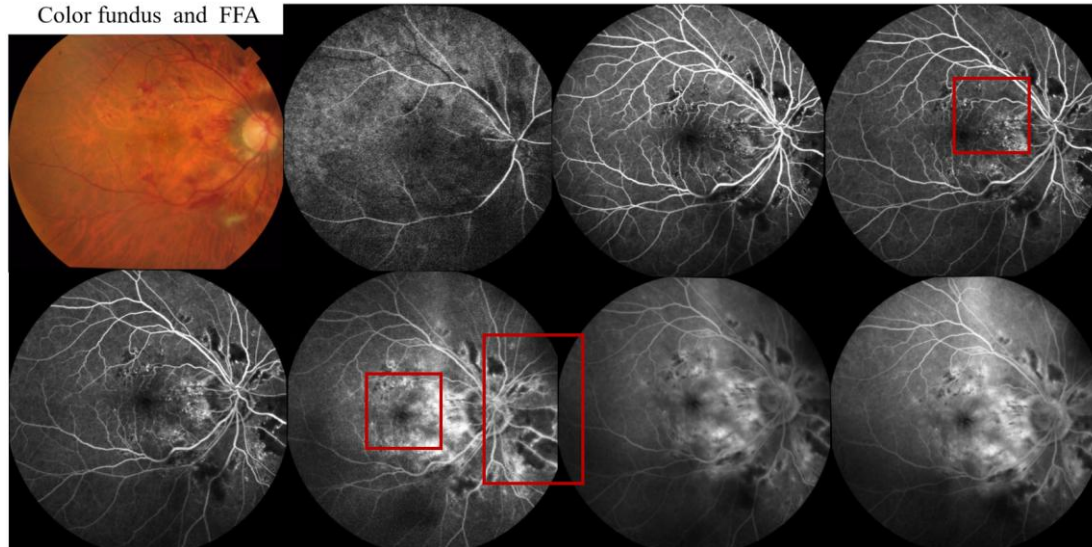


1. Get the most out of different modalities
2. Translate the invasive into non-invasive imaging

Fundus Angiography - Powerful Examinations



Color fundus and FFA



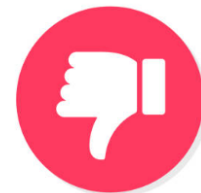
DR- an increasing global burden

FFA

- **Best for visualizing vascular lesions**
- **Essential for diagnosing & monitoring retinal diseases**



- **Invasive**
- **Time consuming**
- **High cost**



Examination

1. Color fundus
2. Color fundus + FFA
3. Color fundus + ICGA
4. Color fundus + FFA + ICGA

Single/Both Eye (HK)

- \$400 / \$800
/ \$3,900
/ \$3,900
/ \$5,500

Non-invasive Angiography powered by Generative AI

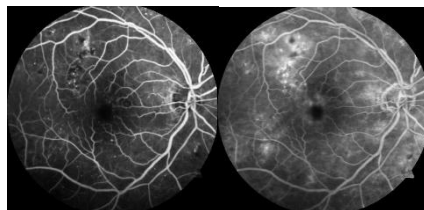


Take a shot of retinal scan
within seconds

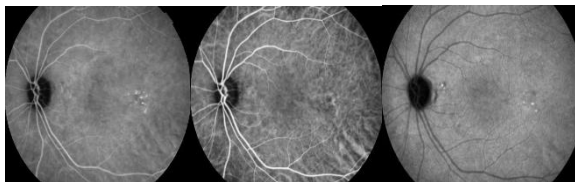
GenAI



Fundus Fluorescein Angiography (FFA)



Indocyanine Green Angiography (ICGA)



**Generated Non-invasive
Angiography**

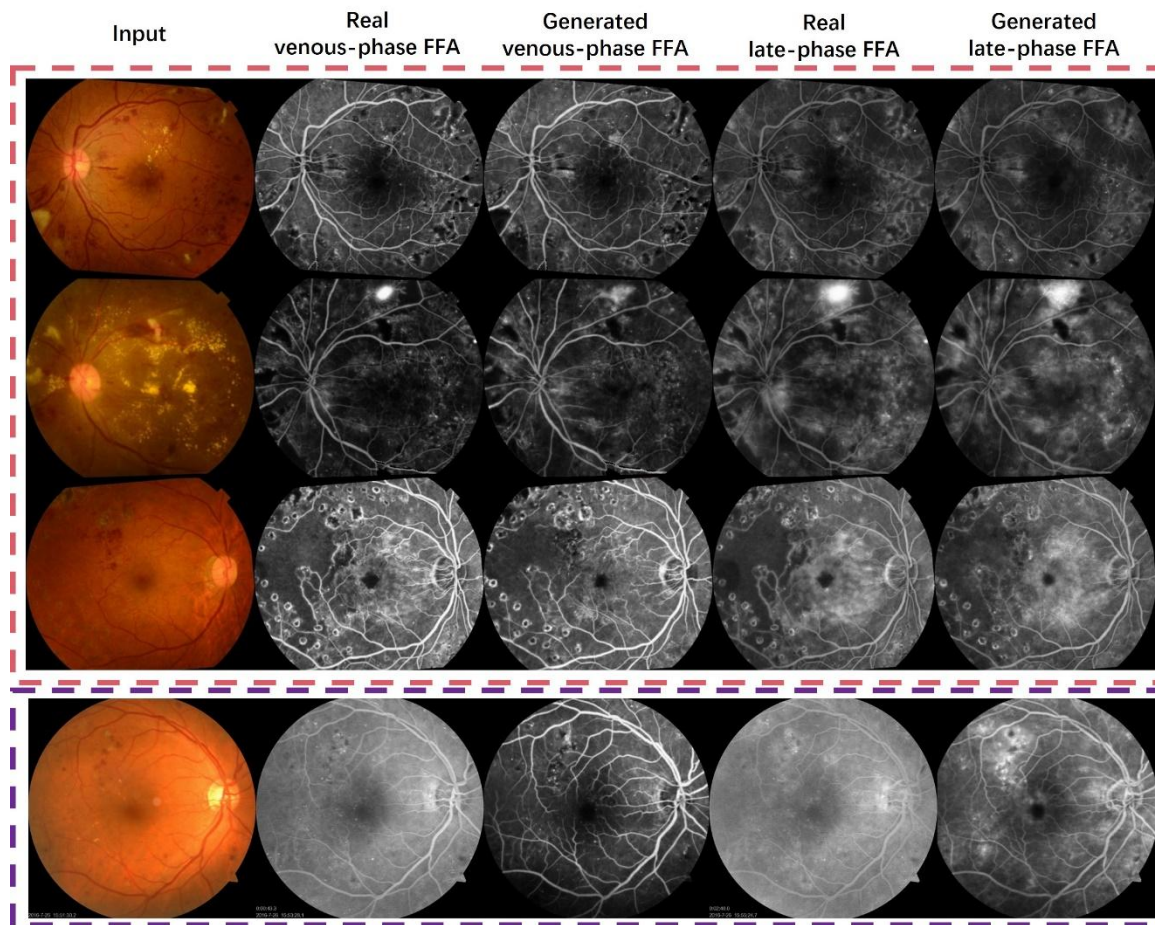
- Non-invasive examination
 - Cost-effective
- Multi-scenario application



Population-based Screening

- Diabetic retinopathy
- Retinal vein occlusion
- Age-related macular degeneration
- Multiple chorioretinal diseases
 - Cardiovascular diseases

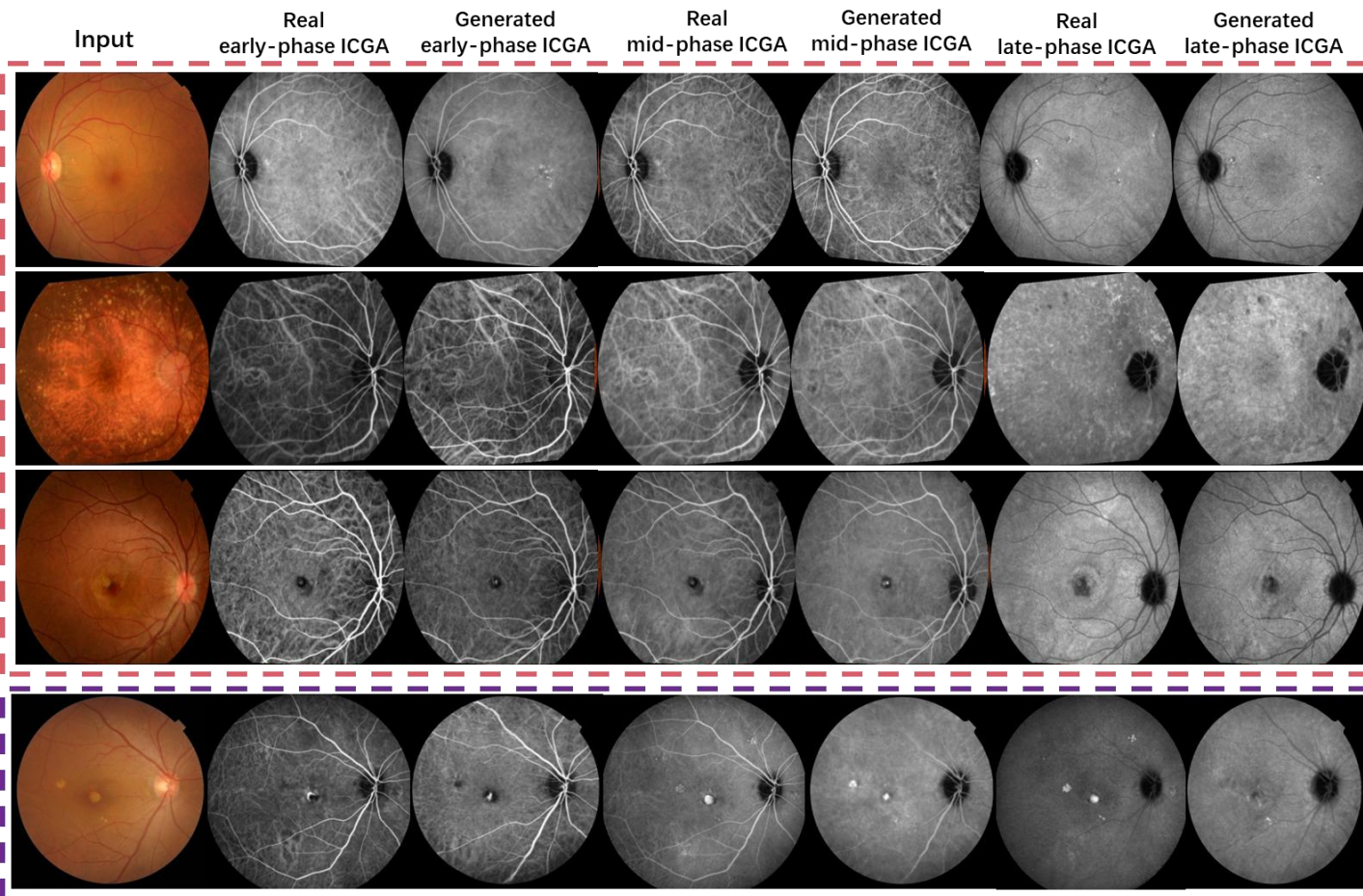
Fundus to FFA Translation



Internal test

External test

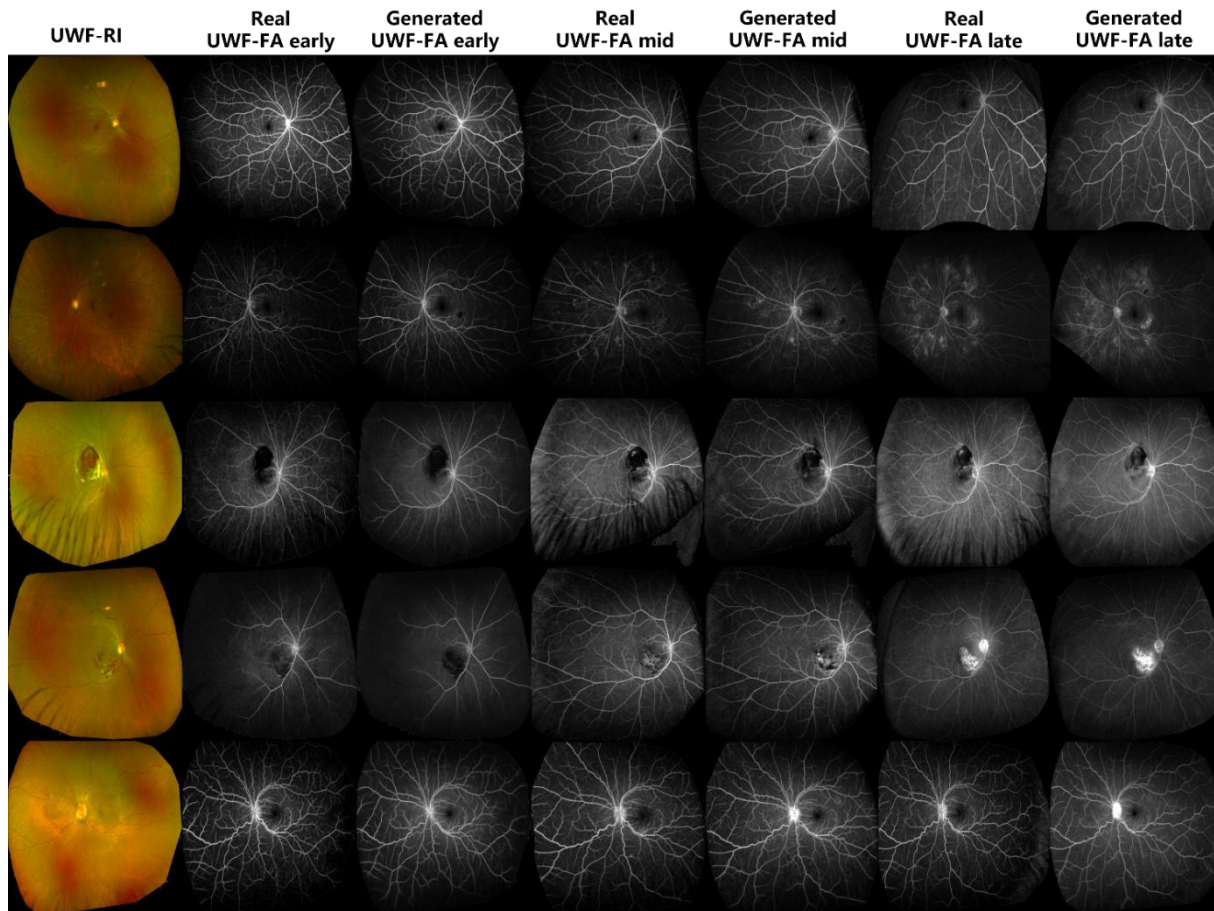
Fundus to ICGA Translation



Internal test

External test

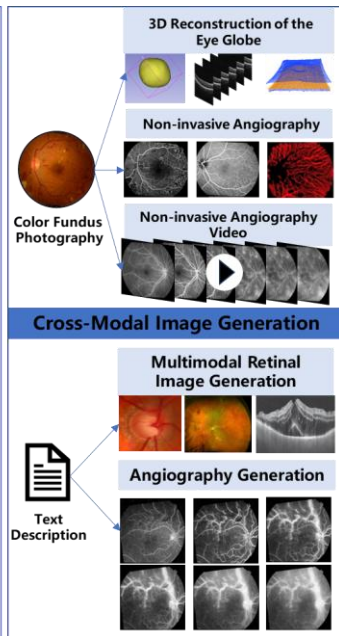
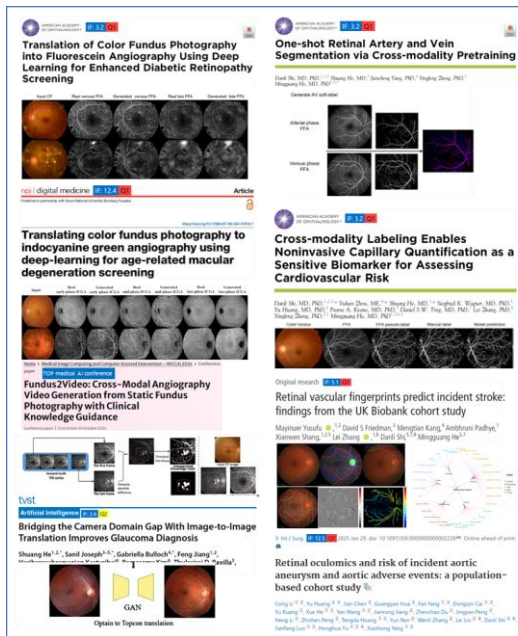
Ultrawide Field Angiography Generation





Retinal Angiography Generation

- Transforming invasive imaging into a non-invasive one
- Making the invisible visible
- Improving image quality
- Enhancing downstream applications: disease screening, vessel segmentation

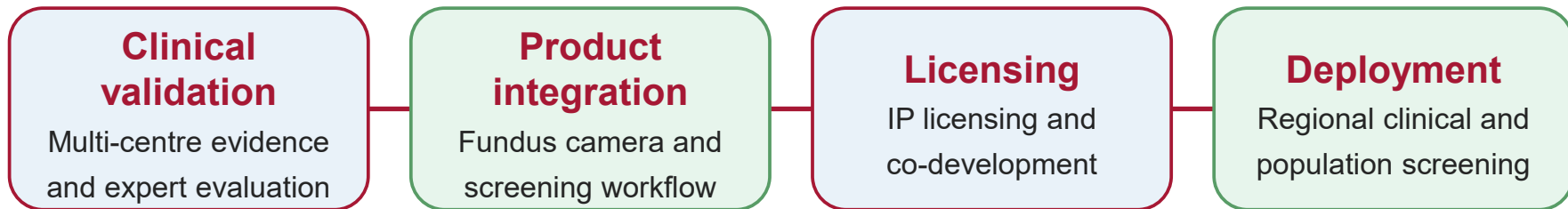


Patents

- 一种眼底彩照的视网膜动静脉及毛细血管自动分割方法 (CN114782338A)
- 一种基于条件生成对抗网络的眼底彩照毛细血管标注方法 (CN114782339A)
- 一种基于眼底彩照直接生成OCTA图像的方法 (CN115251829A)
- 一种利用眼底彩照自动生成荧光造影图像的方法 (CN115272255A)
- 一种从2维到3维的跨模态视频生成方法、介质和电子设备 (Submitted)
- EYELASH REMOVAL FOR HIGH-RESOLUTION ULTRA-WIDE-FIELD FUNDUS IMAGES (PAT-1662-US-NP)
- METHOD FOR AUTOMATICALLY GENERATING FLUORESCEIN ANGIOGRAPHY IMAGES BASED ON NONINVASIVE FUNDUS IMAGES (Submitted)



Translating non-invasive retinal angiography generation into scalable clinical and screening applications



Seeking partners for: clinical validation • device/platform integration • commercial translation • regional deployment

From invasive imaging alternatives to accessible retinal disease screening



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Thank you for your attention!

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