



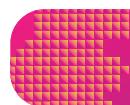
AI HPC Platform
The World's Fastest Deep Learning AI System



Main Features



Super
Fast AI



Terapixel
Image Platform



3D Image
Platform and AI

AI Explore comes with various applications for



Smart Healthcare



Smart Manufacturing



Smart City



aiexplore.ntust.edu.tw

Super Fast AI

AI system for real-time gigapixel analysis



- **Real-time AI inference**
3,600 times faster than existing AI systems
- **Rapid customized AI modeling**
Fast with adaptive AI (evolving AI)
- **>99% accuracy**
>99% accuracy in segmentation, detection, and classification
- **Unlimited scale up**
Various scales of storage and computing packages to choose for AI HPC
- **Work for small or large dataset**
AI models can be built based on limited data

Feature Description

Super fast AI system enables real-time analysis of gigapixel images and development of customized AI model in a short time based on a super fast and smart adaptive deep learning framework. AI models could be built to detect objects, defects, or even tissues of various types of cancers, syndromes, or diseases, and compute the quantitative information in an image. Moreover, AI models can be trained with **limited data** and produce accurate results. AI models could be easily improved and adapted by the smart-learning framework.

Benefits

- Real-time analysis of gigapixel images, fast modeling, and rapid optimization of deep learning AI models
- High-speed development of customized AI models
- Customized AI modeling service is also available
- AI models can be trained with limited data and produce accurate results

Existing AI Modeling Flow



Ai Explore New AI Modeling Flow



Wang CW* et al (2017) A Benchmark for Comparing Precision Medicine Methods in Thyroid Cancer Diagnosis using Tissue Microarrays, Bioinformatics (SCI, JCR 2016 5% (4/78) in MATHEMATICAL & COMPUTATIONAL BIOLOGY, IF=7.307)

Veta et al. (2015) Assessment of algorithms for mitosis detection in breast cancer histopathology images, Medical Image Analysis 20 237-248

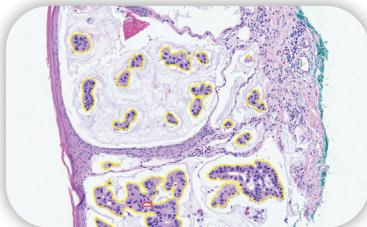
Wang* and Yu (2013) Automated Morphological Classification of Lung Cancer Subtypes using H&E Tissue Images, Machine Vision and Applications, Volume 24, Issue 7, Page 1383-1391

Buckley et al., The ΔNp63 proteins are key allies of BRCA1 in the prevention of basal-like breast cancer (2011), Cancer Research, 71: 1933

Wang*, Robust Automated Tumour Segmentation on Histological and Immunohistochemical Tissue Images (2011), PLOS ONE, 6:2, e15818

Super Fast AI Platform Utilities

AI platform utilities



Real-time AI Analysis

Real-time AI analysis on large or multi-dimensional data.

Report	
#P, %P:	11, 1.32%
Slide dimensions in pixel: 120259x44322pixels	
Annotation List	
admin_1_T1	admin_1_T1
E-Cadherin + EPI: MYO:	E-Cadherin + EPI: MYO:
P63 - EPI: MYO:	P63 - EPI: MYO:
CK14 + EPI: MYO:	CK14 + EPI: MYO:
CK5/6 + EPI: MYO:	CK5/6 + EPI: MYO:
Diagnosis -	Diagnosis -
HDAB2, Object: Ch3, Stain: Ch3	HDAB2, Object: Ch3, Stain: Ch3
Total Object: 78, Threshold: 71	Total Object: 39, Threshold: 71

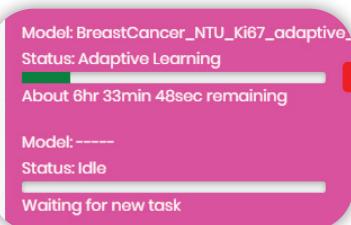
Quantitative Report

Automatic AI analysis and quantitative report.

Training		Testing	
AI Model Name	Accuracy	AI Model Name	Accuracy
Breast Type	0.9935		
Lung Type	0.9967		

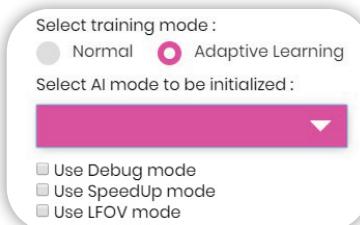
AI Leaderboard

Automatic evaluation and ranking of AI models.



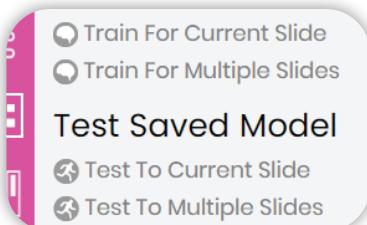
Multiple GPU Nodes

GPU resource manager.



Evolving AI

Train with adaptive learning (evolving AI).



One or Multiple Slides

Train or test for one or multiple images/data.

Time Cost: 8 months - 1 year Conventional AI Modeling: Lengthy and Costly



6 months - 1 year

1 month

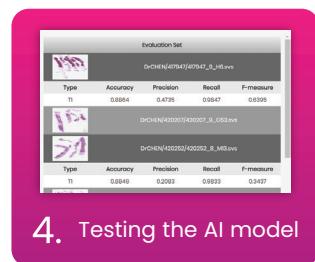
hours

One Specific Area

Time Cost: 2 days



Rapid AI Modeling



1 day

seconds

Ai Explore

- Smart Healthcare
- Smart Manufacturing
- Smart City

Terapixel Image Platform

Super fast terapixel server



Full compatibility

We support all types of image format and image scanners

24x faster

24 times faster than Leica

Cross-platforms

Web-based platform for Windows, Linux, iOS, Mac, Android, etc

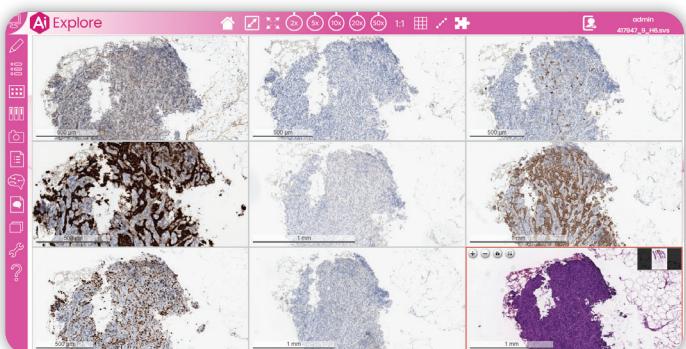
Feature Description

Super fast terapixel server allows multiple users to view and analyze gigapixel and even terapixel images with mobile devices, such as iPhones, iPads, Android devices, or laptops at the same time. Users could annotate and analyze the data using the built-in tools such as 3D effect, color deconvolution, color quantification, nuclei/object detection, length and area measurement, and quantitative reporting system.

Benefits

- Real-time analysis of gigapixel images, fast modeling, and rapid optimization deep learning AI models
- Analyze large scale microscopic images in real-time
- Compatible with many scanners, such as Leica, Hamamatsu, 3DHISTECH, Motic
- The terapixel platform in your pocket
- Wireless & wired internet device
- Allow multi-user to access at the same time
- Compatible with various file formats, such as JPG, TIFF, SVS, DICOM, NDPI, MIREX, SCN, BMP, PNG

Multi-view



Terapixel Platform in Your Hand

Enjoy fully functional terapixel image platform right in your hand.



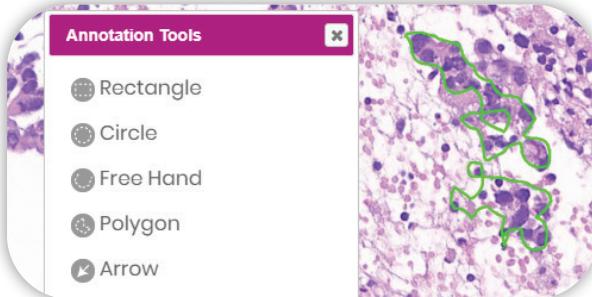
Wang C.-W.*, Huang C., Hung C. (2015) VirtualMicroscopy: ultra-fast interactive microscopy of gigapixel / terapixel images over internet, Nature-Scientific Reports 5: 14069 (SCI, JCR 2015 (7/63) in MULTIDISCIPLINARY SCIENCES, IF=5.228)

Wang, C.-W., Hung, C, Gigapixel/Terapixel Interactive Real Time Visualization and Cloud System, USA Patent (9,047,318)

Wang, C.-W., Hung, C, Ultra-high-resolution interactive video display and cloud system and its management methods, Patent, Taiwan(1574762)

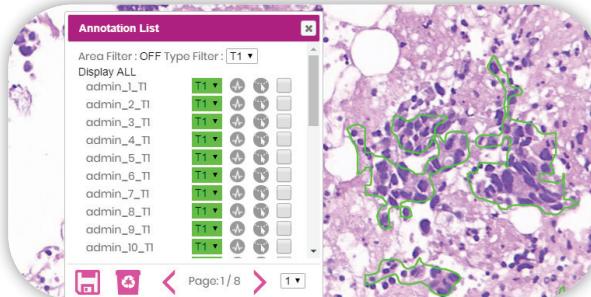
Terapixel Image Platform Utilities

Packed with useful utilities for your images



Annotation Tools

Draw your annotation for your analysis with our most flexible annotation tools.



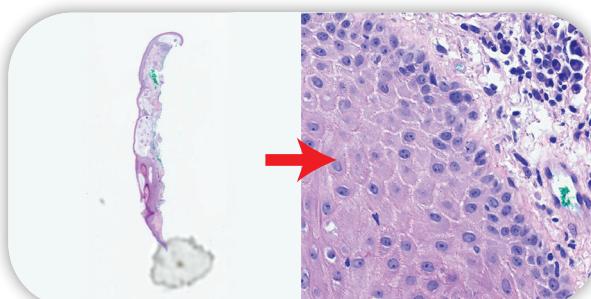
Annotation List

Review and modify your annotations. Add attributes, reshape, and so many more.



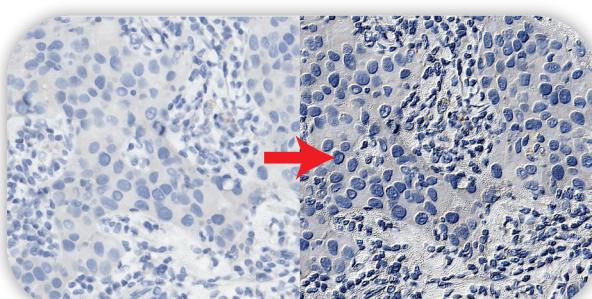
Microscope Slide Labels

Add your microscope slide labels to the terapixel image platform database.



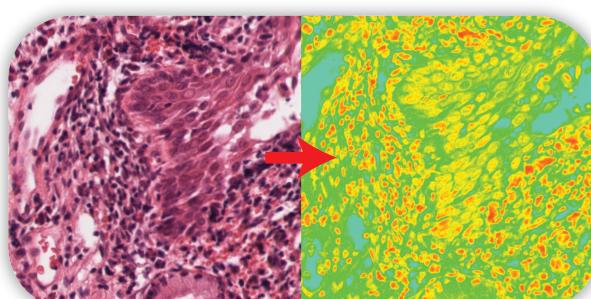
Zoom-in, Zoom-out, No Lag

Get the details of your terapixel images smoothly. Zooming through the web browser has never been this fast.



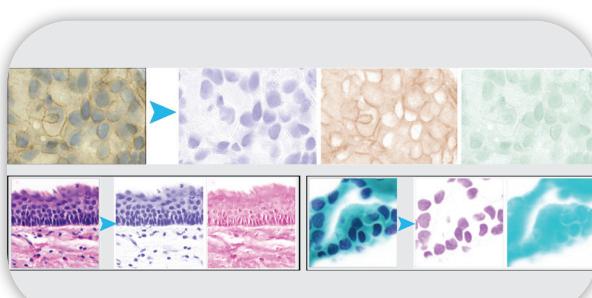
3D Analysis

Apply 3D analysis for your terapixel images.



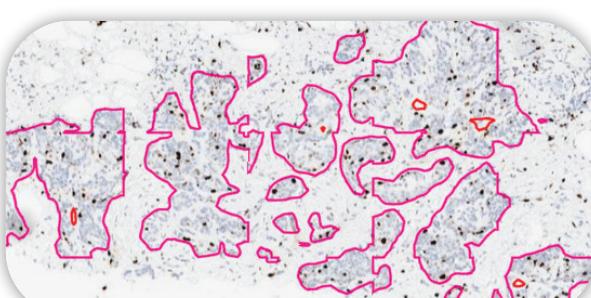
Gradient Map Visualization

Give your terapixel images a gradient map visualization.



Quantitative Analysis and Stain Separation Tools

Conduct quantitative analysis and stain separation using our platform.



Tumor Detection

AI will assist pathologists to find tumors on WSIs.

3D Image Platform and AI

Super fast 3D reconstruction and analysis server, now with an AI



Feature Description

Super fast 3D reconstruction and analysis server provide the interactive real time 3D reconstruction platform for users to analyze 3D shapes of images more precisely and accurately. It provides real-time 3D reconstruction of data and various image processing tools. Now, our 3D images platform is equipped with super fast AI. Our award-winning platform can do volumetric segmentation with high accuracy.

Automatic segmentation of 3D object/tumor/organ/syndromes from various scanner modalities can be done **in only seconds**.

Benefits

- Real-time and interactive
- 3D reconstruction image analysis
- Wireless & wired device
- Allow multi-user at the same time
- Provide fully automatic image registration and difference analysis function, enabling fusion and comparison of multiple 3D or 2D datasets. For data with higher or lower dimension, customized models could be built
- 3D AI to perform segmentation of 3D object/organ/tumor

AI-powered

Our 3D image platform is also equipped with 3D AI in segmentation

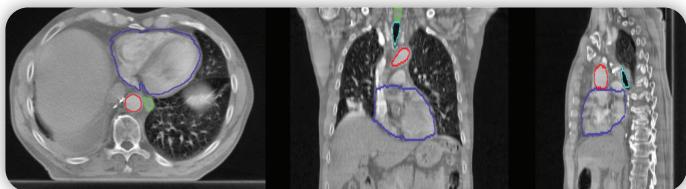
Unlimited scale up

Various scales of storage and computing packages to choose

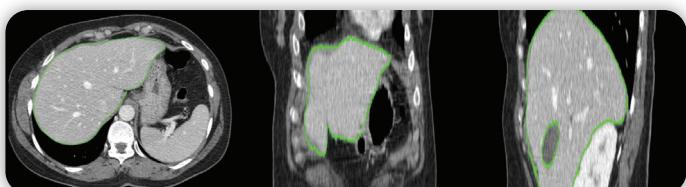
Cross-platforms

Web-based platform for Windows, Linux, iOS, Mac, Android, etc

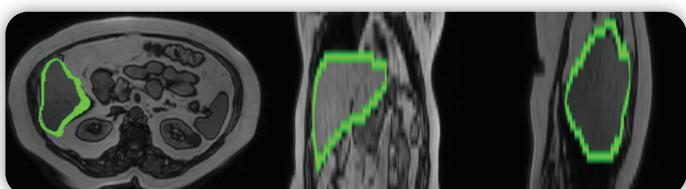
Examples



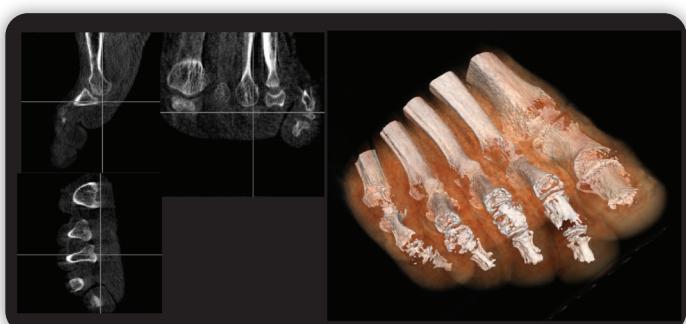
Automatic segmentation of thoracic organs-at-risk in CT images (heart, aorta, trachea, esophagus) in seconds by 3D AI



Automatic segmentation of liver from CT data in seconds by 3D AI



Automatic segmentation of liver from 3D MRI data in seconds by 3D AI

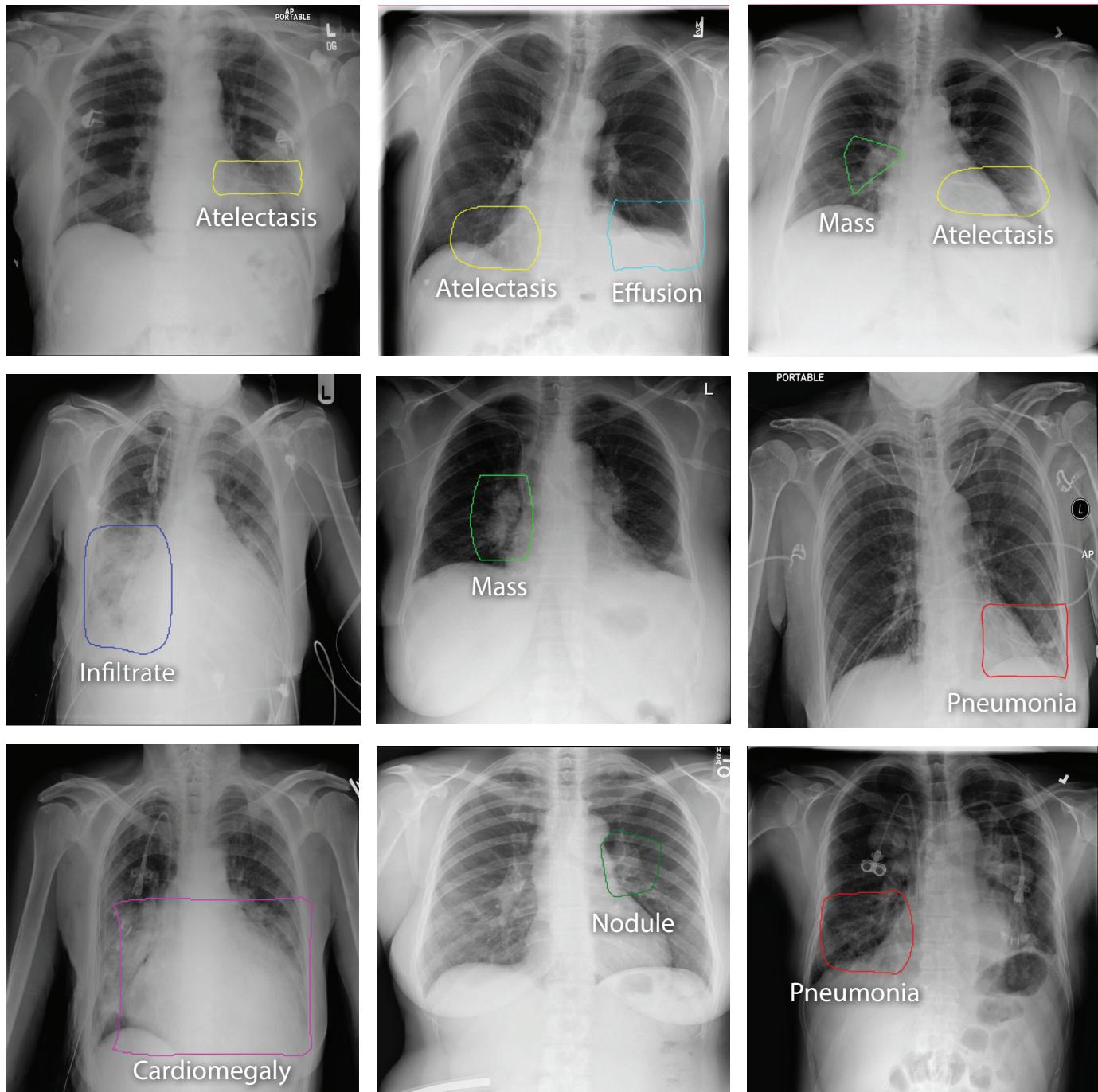


Interactive and real-time 3D reconstruction of serial 2D images

Chest X-Ray Fast Screening

Enjoy our chest X-Ray quantitative analysis service

AI for Chest X-Ray



Our Service

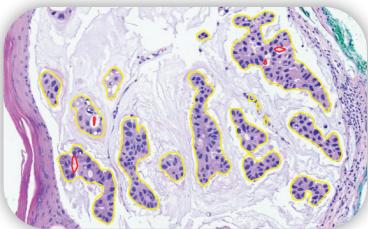
- Provide online reading by computers, tablets, & smart-phones
- Provide instant quantitative analysis
- Provide interactive annotation tools
- Automatic output customized format reports

AI Chest X-Ray Fast Screening

- Infiltration
- Pleural Thickening
- Cardiomegaly
- Atelectasis
- Fibrosis
- Emphysema
- Effusion
- Hernia
- Mass
- Nodule
- Pneumothorax
- Pneumonia
- Edema
- Consolidation

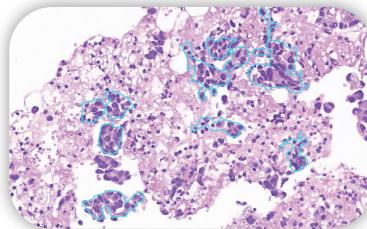
Smart Healthcare

See AI Explore in action for smart healthcare applications



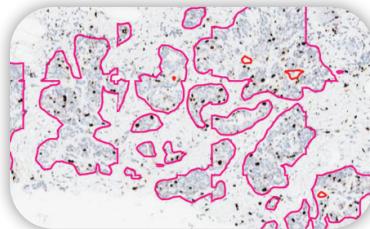
Breast Cancer

Digital pathology and AI for breast cancer analysis.



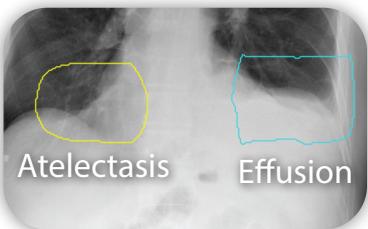
Lung Cancer

Conduct a fast and accurate lung cancer identification.



Tumor Segmentation

AI can perform tumor segmentation on large images.



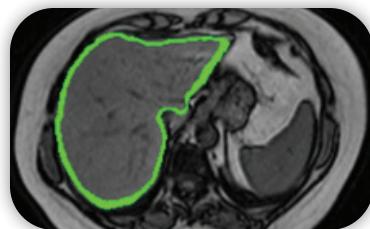
AI for Chest X-Ray

Chest X-ray fast-screening.



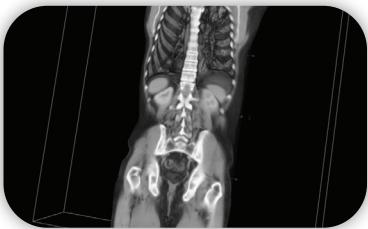
3D AI in CT

Perform automated Computed Tomography segmentation in seconds.



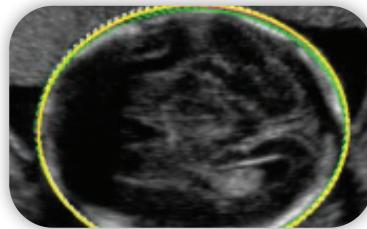
3D AI in MRI

Perform automated Magnetic Resonance Imaging segmentation in seconds.



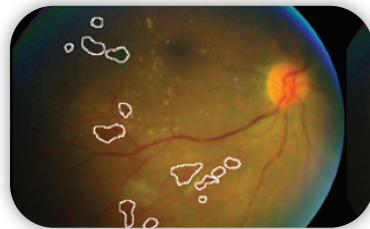
3D AI Platform

Interactive 3D reconstruction and visualization.



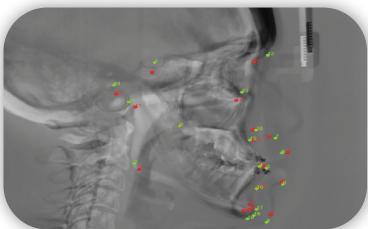
Fetal Ultrasound

Perform biometric measurements using AI fetal ultrasound.



Diabetic Retinopathy

Robust lesion localization using multi-scale pixel & lesion-level descriptors.



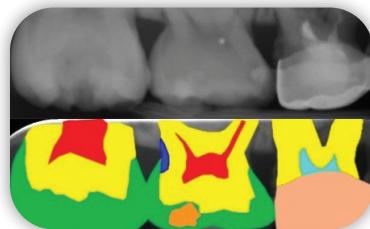
Dental X-Ray Difference

Conduct an analysis of dental X-ray difference.



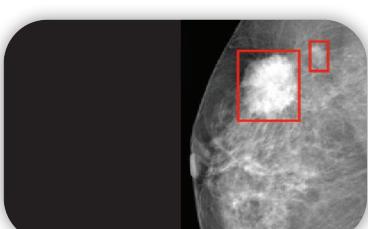
Landmark Detection

Perform landmark detection on X-ray images.



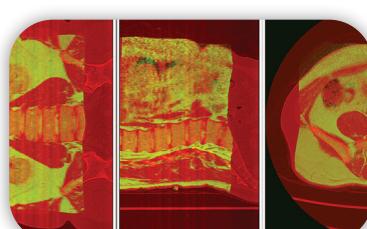
Dental X-Ray Image Analysis

Analyze a dental X-ray image accurately.



Breast Cancer X-Ray

Identify breast cancer using AI mammogram.



Automatic Alignment

GPU-based automatic alignment & fusion of 3D CT & MRI.

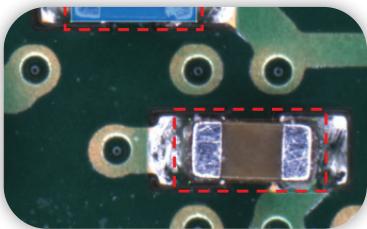


Sleep Apnoea Diagnosis

A novel real-time non-contact based adaptive breathing monitoring system.

Smart City and Smart Manufacturing

See our remarkable AI platform on smart city and manufacturing applications



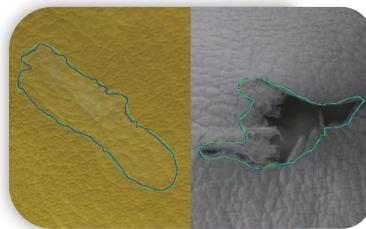
PCB Inspection

Our AI platform enables users to perform PCB inspection rapidly.



IC Inspection

Fast and accurate IC inspection.



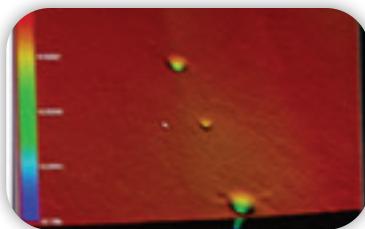
Real-time Defect Detection

Rapid AI inference and customized AI modeling.



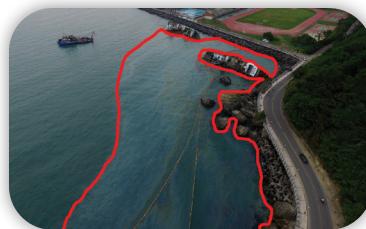
Occluded Object Detection

Users can perform object detection even in occluded scene.



LCD Panel Inspection

The platform can perform LCD panel inspection.



Oil Spill Analysis

Our custom oil spill analysis can segment the area of oil in no time.



Traffic Analysis

Real-time computation of the number of car, truck, bus, scooter, and pedestrian.



Crowdness Analysis

Perform crowdness measurement.



Illegal Parking Detection

Identify illegal parking scenes.



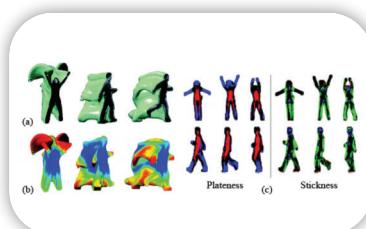
Face Recognition

Use our accurate face recognition technology for many applications.



Action Recognition

Determine human actions with our advanced technology.



Behavior Analysis

Behaviour analysis can be performed through our remarkable platform.



Accident Detection

Notify the bus driver about occurring accident and its fallen passengers.



Field Health Analysis

Monitor and analyze the field health through our agriculture platform.



Forest Fire Detection

Prevent the spread of forest fire using our AI platform.

International Award-winning AI Platform

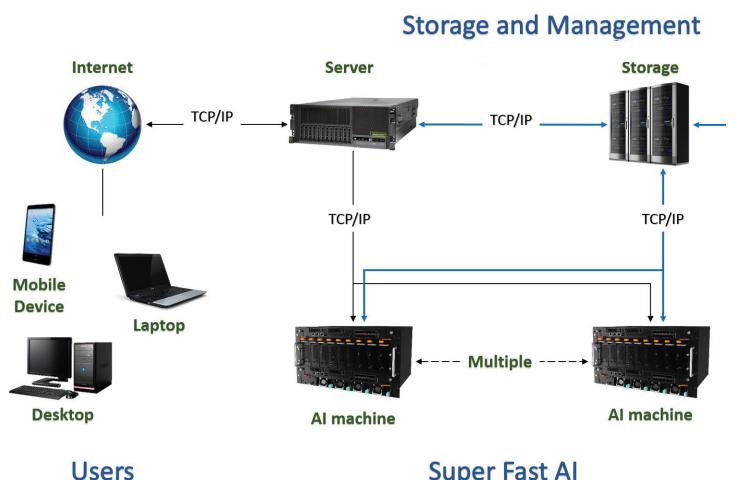
Super fast user-friendly AI platform



AI Explore is the world's leading terapixel platform (24x faster than Leica, 117x faster than Microsoft HDview) with super fast AI deep learning system (3,600 times faster than existing systems, which tends to cost at least half hour to process a gigapixel image), allowing real time analysis of terapixel images through internet on any portable device. In addition, customized AI models could be built fast and efficiently. AI models could be improved continuously by adaptive learning in mins (20,160 times faster than existing AI systems, which tend to cost two weeks to train an AI model on terapixel images). With special medical image AI training technology, AI models could be built based on limited amount of data. **Smart evolving AI is available!**

Super Fast AI HPC Platform

Super Fast AI HPC platform provides the AI infrastructure for smart healthcare, smart manufacturing, and smart city, enabling real-time analysis of gigabyte building customized AI model in a short time. In addition to our amazing speed, its accuracy is outstanding, defeats **435 teams worldwide** including **49 AI companies** as the **top 1.8%**, and outperforms the AI systems by world-leading AI teams in the United States, University of Maryland, Russia SKYCHAIN, London St. Mary's University and the other top European and American AI teams at the International AI Competition 2019 IEEE ISBI ACDC Automatic Cancer Detection and Classification in Whole-slide Lung Histopathology challenge.



Patents

- Gigapixel/Terapixel Interactive Real Time Visualization and Cloud System, Taiwan Invention Patent, I571762 , Wang, C.-W., Hung, C
- Gigapixel/Terapixel Interactive Real Time Visualization and Cloud System, USA Patent, 9,047,318 , Wang, C.-W., Hung, C
- Automatic Cephalometric Landmark Detection and Registration in Lateral Cephalograms, Taiwan Invention Patent , I499985, Wang, C.-W., Li C.
- Fetal Ultrasound Automatic Segmentation Method and System (IMAGE RECOGNITION METHOD AND IMAGE RECOGNITION SYSTEM), USA Invention Patent, 9,020,252, Wang, C.-W.
- Fetal Ultrasound Automatic Segmentation Method and System (IMAGE RECOGNITION METHOD AND IMAGE RECOGNITION SYSTEM), Taiwan Invention Patent, 1501754, Wang, C.-W.
- Image registration method, USA Patent, 9,208,560, Wang, C.-W.
- Wang C, Chen Y, Cross-staining and multi-biomarker method for assisting in cancer diagnosis, Taiwan, 107118500

Patents in Application

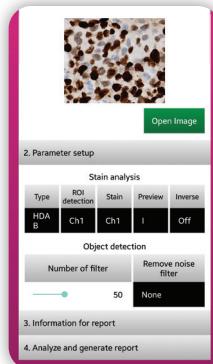
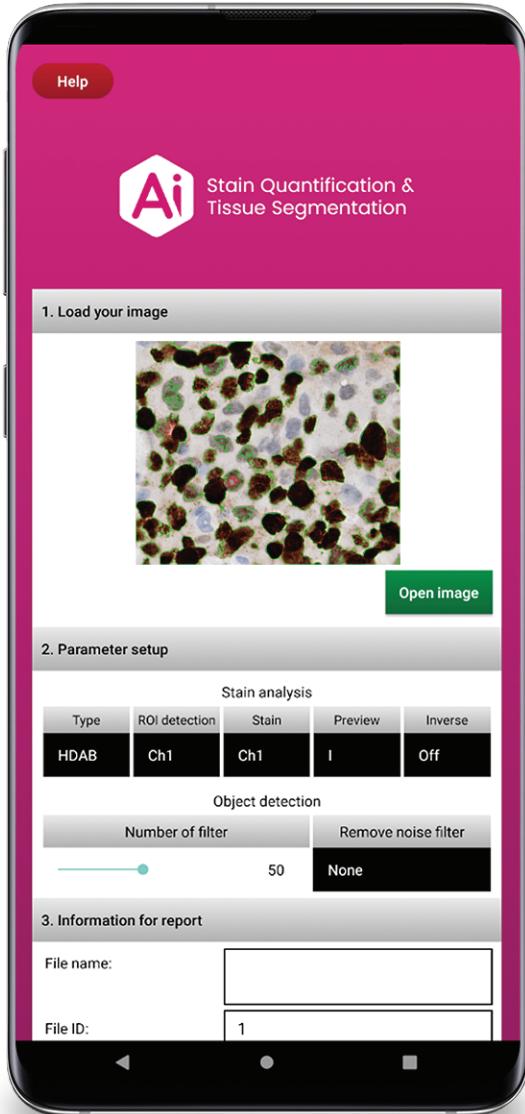
- Wang C, Chen Y, Cross-staining and multi-biomarker method for assisting in cancer diagnosis-USA, 1070013USO
- Wang C, Chen Y, Cross-staining and multi-biomarker method for assisting in cancer diagnosis-China, 1070013CNO
- Wang C, Chen Y, Cross-staining and multi-biomarker method for assisting in cancer diagnosis-Japan, 1070013JPO
- Wang C, Ko H, SPLINE IMAGE REGISTRATION METHOD, Taiwan, 107121575
- Wang C, Ko H, SPLINE IMAGE REGISTRATION METHOD, USA, 1070025USO
- Wang C, Ko H, SPLINE IMAGE REGISTRATION METHOD, China, 1070025CNO
- Wang C, Ko H, SPLINE IMAGE REGISTRATION METHOD, Japan, 1070025JPO
- Wang C, MEDICAL IMAGE ANALYSIS METHOD APPLYING MACHINE LEARNING AND SYSTEM THEREOF, Taiwan, 107124061
- Wang C, MEDICAL IMAGE ANALYSIS METHOD APPLYING MACHINE LEARNING AND SYSTEM THEREOF, USA, 1070021USO
- Wang C, MEDICAL IMAGE ANALYSIS METHOD APPLYING MACHINE LEARNING AND SYSTEM THEREOF, German, 1070021DE0
- Wang C, MEDICAL IMAGE ANALYSIS METHOD APPLYING MACHINE LEARNING AND SYSTEM THEREOF, Japan, 1070021JPO

Awards

- International Award Winning AI platform, 2019 IEEE ISBI ACDC Automatic Cancer Detection and Classification in Whole-slide Lung Histopathology challenge, 2019 Italy Venice)
- Innovative Invention Award - Super Fast Gigapixel Server , 2018 Taiwan Innotech Expo
- Innovative Invention Award - Super Fast 3D Radiology Server, 2018 Taiwan Innotech Expo
- Excellence in Research Award, National Taiwan University of Science and Technology, 2018.2-2020.1
- The Outstanding Research and Creativity Award, National Taiwan University of Science and Technology, 2016.2-2018.1
- Innovation Award, the 16th China International Industry Fair, Shanghai, China, 2014.11.3-7
- 1st Prize, the 4th Annual Creative Entrepreneurship Competition - New Business Development Group, National Taiwan University of Science and Technology, 2013.5
- Young Scholar Award, National Taiwan University of Science and Technology, 2013.1-2015.12
- Excellence in Research Award, National Taiwan University of Science and Technology, 2013.2-2016.1
- Second place, Right Ventricle Segmentation Challenge in 4D Cardiac MRI, 2012 Rouen, sponsored by Toshiba, PIE Medical Imaging and Medis
- First Prize, Fetal Femur Challenge, Organized by Oxford University, 2012
- Distinguished Young Scholar 3-Years Research Fund, by National Science Council of Taiwan
- Set for Britain, Selected to present the research in the House of Commons, London, March 8th 2010

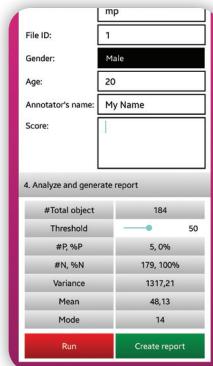
A Dedicated Smartphone Application

Stain quantification and tissue segmentation simplified



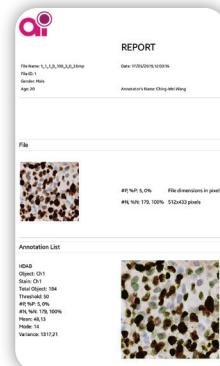
Stain Analysis Preferences

Perform stain analysis with various preferences available.



Patient Information

Add additional information of a patient in a simple step.



Perform Stain Analysis

Process a biomedical image for stain quantification and tissue segmentation.

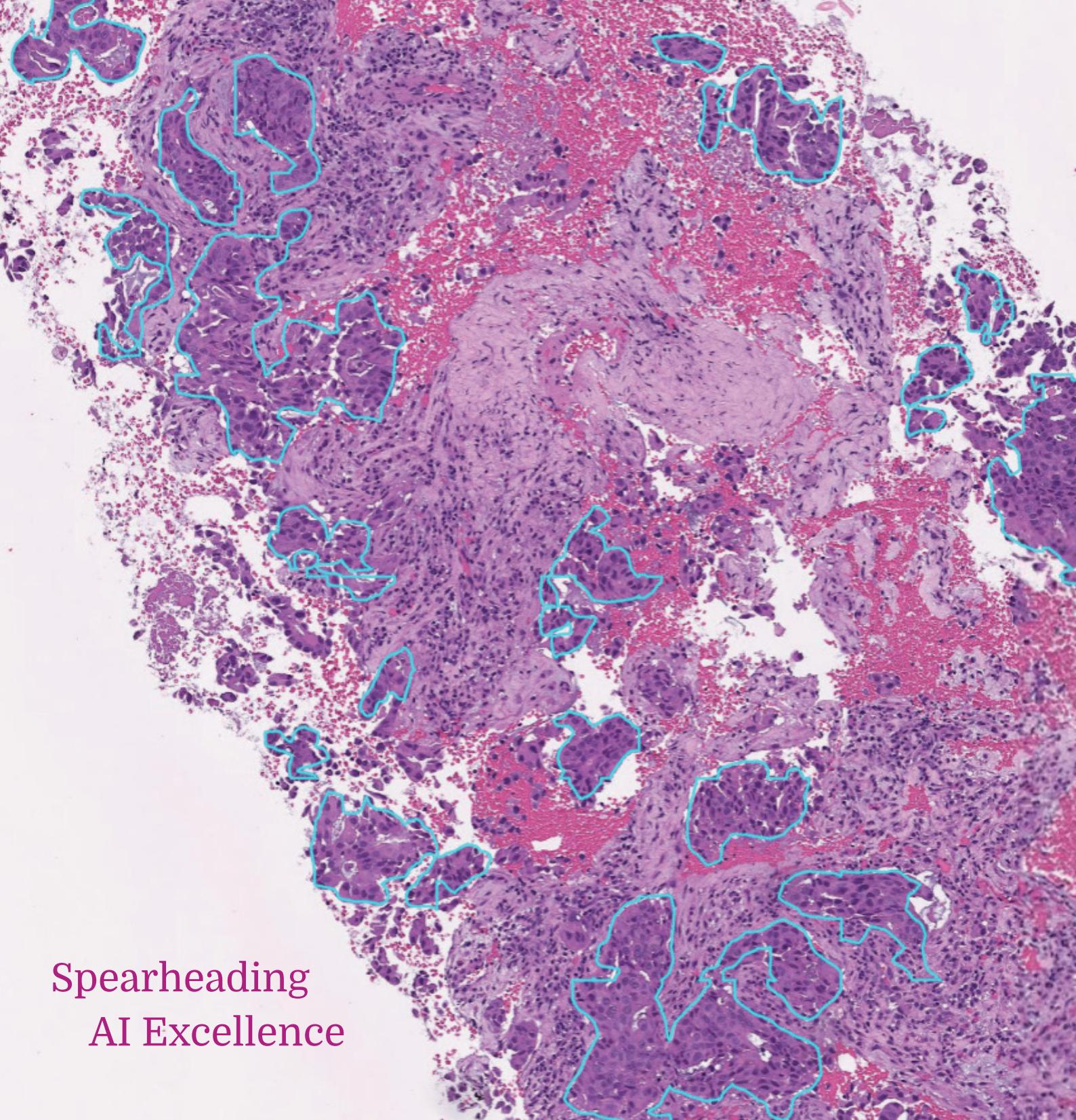
Many options for stain types to choose from:

- Haematoxylin and Eosin x2
- Haematoxylin and DAB
- Feulgen Light Green
- Giemsa
- Fast Red, Fast Blue and DAB
- Methyl green and DAB
- Haematoxylin, Eosin, and DAB
- Haematoxylin and AEC
- Azan-Mallory
- Masson Trichrome
- Alcian blue and Haematoxylin
- Haematoxylin and Periodic Acid-Schiff
- RGB subtractive
- CMY subtractive



Download our app:
<http://tiny.cc/eke56y>





Spearheading AI Excellence



Find out more at
aiexplore.ntust.edu.tw 

Founder

cweiwang@mail.ntust.edu.tw
cwwang1979@gmail.com

E-mail

aiexplore.tw@gmail.com

Address

AAEON Building TR913, No. 43, Sec. 4,
Keelung Rd., Taipei, 106, Taiwan



AI Explore TW