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Optimizing Open Research: Data and Code Sharing at S-Lab

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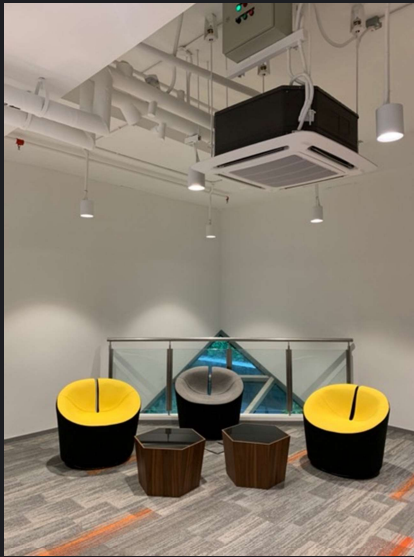
Nanyang Technological University (NTU)

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Optimizing Open Research: Data and Code Sharing at S-Lab

Loy Chen Change, College of Computing and Data Science (CCDS), Nanyang Technological University

Thanks to All Professors, Researchers, Students... And the Superb Open-Data Team!

Ms. Siew Moi Moi
Senior Project Manager

Mr. Ng Jin Boon
Research Engineer

Mr. Koh Chee Guan
Research Engineer

Dr. Poh Geong Sen
Senior Assistant Director

Prof. Loy Chen Change
President's Chair Professor



Basic and Translational Research at S-Lab

Visual Synthesis

Image Generation

Video Generation

Image-to-Video

3D Human Generation

3D Object Generation

3D Scene Generation

Motion Generation

3D-to-Video

Visual Editing

Dragging

In/out-painting

Harmonization

Attribute Editing

Style Transfer

Lip Syncing

Face Swapping

Morphing

Colorization

Visual Enhancement

Super-Resolution

Low-Light Enhancement

Denosing

Deblurring

Automatic White Balance

Color Grading

Color Correction

HDR

Flare Removal

Geometry Correction

Video Interpolation

Aesthetic Assessment

Graphics

Motion Capture

Retargeting

Relighting

Particle Systems and Fluid Dynamics

Lens Flare

High-Level Visual Processing

Detection

Segmentation

Tracking

Matting

Pose Estimation

Visual Language Model

Sharing Research on Open-source Platforms



A web-based platform that allows developers to store, share, and collaborate with others on code.



An algorithm system that integrates open source, academic research, business application and system development, aiming at becoming a worldwide leader in open source algorithm platform for computer vision and providing advanced R&D models and systems for the industry.



A one-stop service platform dedicated to AI researchers and developers in the field of AI, encompassing a Dataset Center, a Model Center, and an App Center.

Sharing Research on Open-source Platforms



DR-NTU (Data) curates, stores, preserves, makes available and enables the download of digital data generated by the NTU research community.

The repository develops and provides guidance for managing, sharing, and reusing research data to promote responsible data sharing in support of open science and research integrity.

A screenshot of the Dataverse website interface. The header includes the Dataverse logo, navigation links (Search, About, User Guide, Contact, Log In), and contact/share options. The main content area shows a search bar and a list of search results. The results are filtered by 'Dataverses (1)', 'Datasets (29)', and 'Files (13)'. The 'Dataverse Category' is 'Researcher (1)'. The 'Publication Year' is '2024 (30)'. The 'Author Name' section lists Loy, Chen Change (9), Liu, Ziwei (8), Chen, Chaofeng (5), Liao, Liang (3), and Lin, Weisi (3). The 'Subject' is 'Computer and Information Science (30)'. The 'Grant Information Grant Agency' section lists the Ministry of Education (MOE) (7) and Nanyang Technological University (6). The search results list three items: 1. 'VToonify' by Loy, Chen Change; Yang, Shuai, 2024, with a DOI link. 2. 'StructLDM: Structured Latent Diffusion for 3D Human Generation' by Hu, Tao; Hong, Fangzhou; Liu, Ziwei, 2024, with a DOI link. 3. 'Robust-Wide: Robust Watermarking against Instruction-driven Image Editing' by Hu, Runyi; Zhang, Jie; Xu, Ting; Li, Jiwei; Zhang, Tianwei, 2024, with a DOI link. Each result includes a thumbnail image, a title, a date, an author list, a DOI link, and a brief abstract.

CodeFormer: Robust Face Restoration and Enhancement Network



Official Gradio demo for [Towards Robust Blind Face Restoration with Codebook Lookup Transformer \(NeurIPS 2022\)](#)

🔥 CodeFormer is a robust face restoration algorithm for old photos or AI-generated faces.

👉 Try CodeFormer for improved stable-diffusion generation!

Input

Drop Image Here
- or -
Click to Upload

📁 📷 📄

Pre_Face_Align

Background_Enhance

Face_Upsample

Rescaling_Factor (up to 4)

2

Codeformer_Fidelity (0 for better quality, 1 for better identity)

0.5

Clear Submit

Output

Midjourney Output



Enhanced by CodeFormer



Shangchen Zhou et al. Towards Robust Blind Face Restoration with Codebook Lookup Transformer, NeurIPS 2022

Midjourney Output



Enhanced by CodeFormer



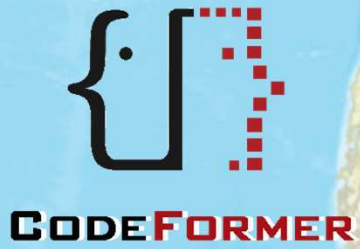
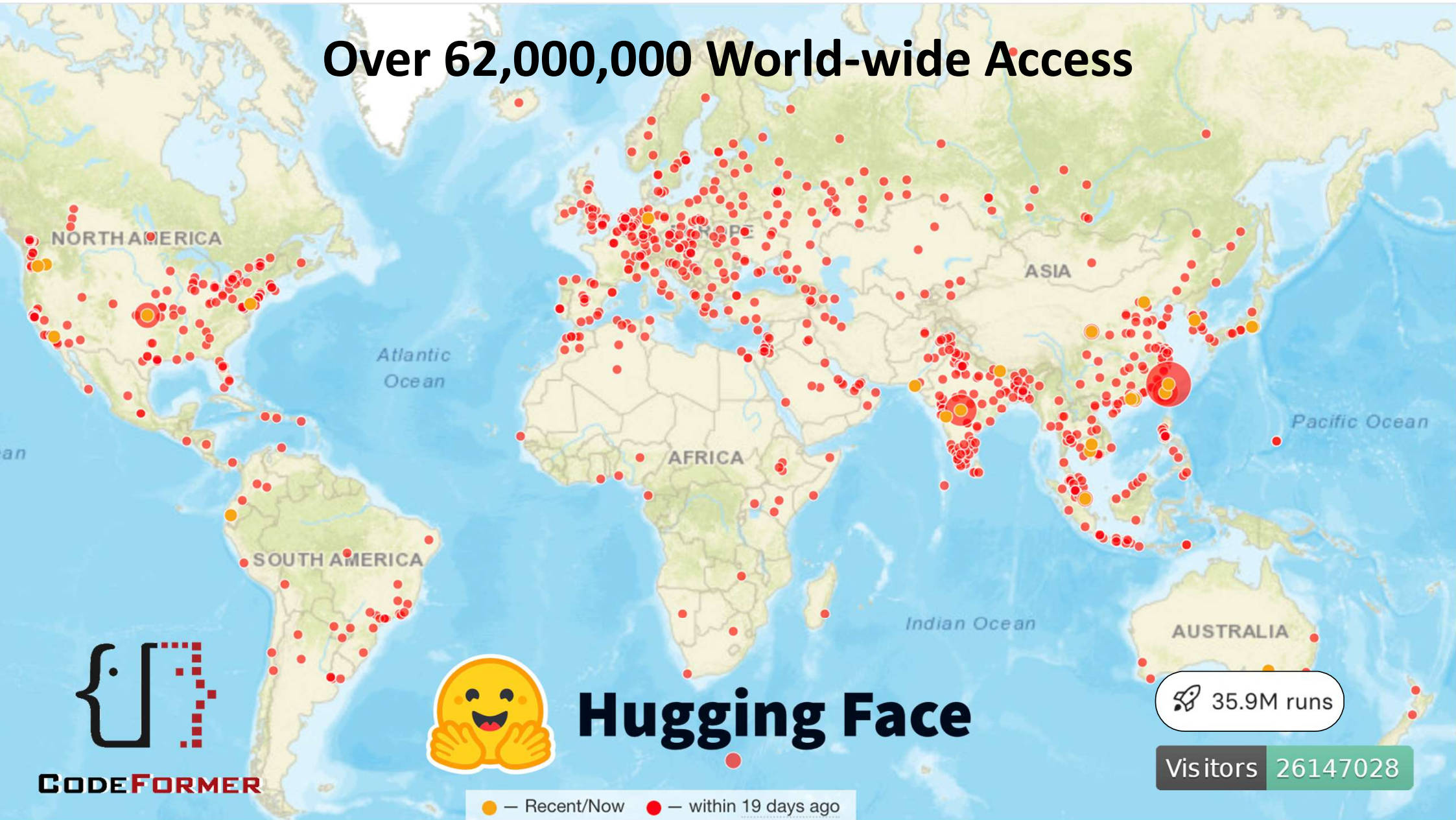
Midjourney Output



Enhanced by CodeFormer



Over 62,000,000 World-wide Access




Hugging Face

🚀 35.9M runs

Visitors 26147028


LLaVA-OneVision

 **LLaVA OneVision**
Code | Checkpoints | Data | LLaVA-NeXT Series Blog | OneVision-72B Demo

Note: `AnyResMax9` strategy is only applied for single image-text interactions (best for high-resolution images). Multi-image and multi-turn image-text conversations will use default tokenization (729 tokens per image).

llava-onevision-qwen2-7b-ov Parameters

Chatbot



Why this image funny?

The image is a humorous meme that plays on the contrast between the physical abilities and lifestyle of humans in the past and the modern era. On the left, it shows a muscular, prehistoric human with the text "Humans 100,000 years ago" and "me hungry me hunt mammoth," suggesting that ancient humans were physically strong and had to hunt for their food. On the right, it shows a less muscular, modern human with the text "Humans today" and "why food delivery slow," implying that contemporary humans are less physically active and reliant on food delivery services, which can sometimes be slow. The humor comes from the exaggerated portrayal of the difference between the two time periods and the relatable frustration of waiting for food delivery in the present day.

Translate into Chinese

In single-image, multi-image and video benchmarks, LLaVA-OneVision is **the first open-sourced (code, data and weights) multimodal models** that captures the performance of GPT4V and reaching GPT4o level.

<https://llava-onevision.lmms-lab.com/>

CutCha

- Our interactive segmentation algorithm is extremely fast - approximately 40x faster than Meta's SAM
- Over 30 FPS on iPhone 14
- Flexible integration with other systems
- Zero-shot generalization to unfamiliar objects and images without requiring additional training



CutCha Photo

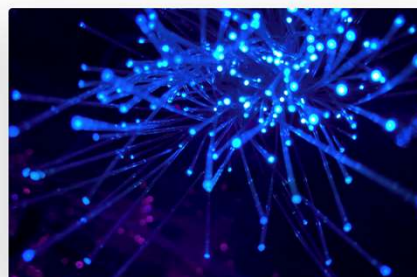


Local and International Research Workshops

ORGANIZED Workshops | Tutorials



Mobile Intelligent Photography & Imaging Workshop, 2022-2023



Tutorial on Prompting in Vision, 2023



Pre-CVPR@NTU 2023



Workshop on Sensing, Understanding and Synthesizing Humans, 2019-2022



OpenMMLab Workshop 2021



WIDER Challenge 2018, 2019

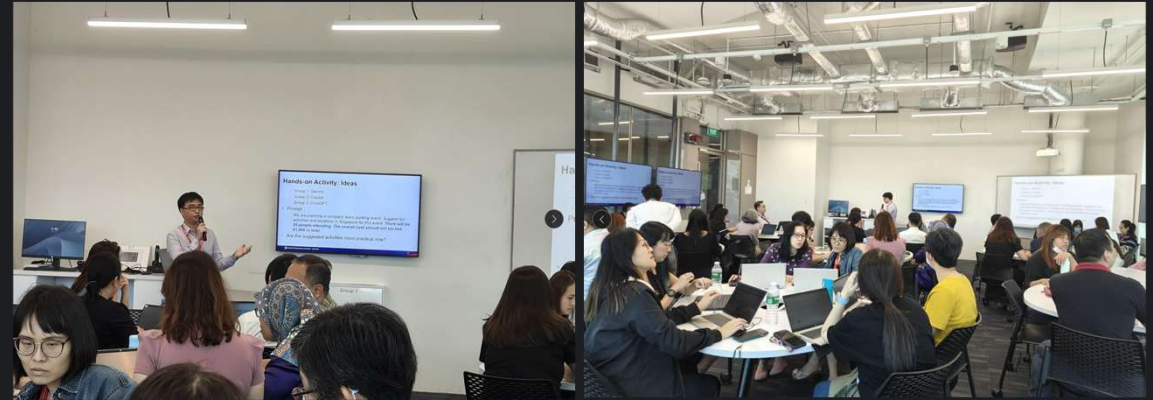
Local and International AI Education Workshops



Local and International AI Education Workshops

AI-Enhanced Productivity Series: Managing Information

Unleash the Power of Generative AI and Chatbots – Your Assistants for Day-to-day Task Efficiency



You Will Learn How To:

- Utilize ChatGPT and other chatbots
- Leverage AI to streamline your day-to-day tasks (e.g., emails, summaries, excel)



NTU Campus



4 JULY 2024



2:00 PM – 5:00 PM



No programming experience needed!

You Will Learn From:

- Representatives from NTU S-Lab for Advanced Intelligence

You Will Need:

- Your laptop
- Google and Microsoft accounts (Account creation instructions will be provided during the workshop as well)

Light refreshments will be provided!



Balancing IP Protection and Open Research

Our software is open source

- Trend in AI and building an ecosystem
- Attracting considerable number of licensing requests
- Detecting infringement of intellectual property (IP) in software is challenging due to complexity, closed source code, obfuscation, dynamic nature of software
- Solutions:
 - S-Lab license that only allows for non-commercial usages
 - Liaise with industry partner and NTUitive to engage external parties and to protect IPs
 - Work closely with partners to provide unique solutions

Conclusion and Future Directions

- We conduct cutting-edge research at S-Lab
- We share our research outcome with the wider research community through open-source platform like Github and NTU Dataverse
- We transfer our technology to industry partner for commercialization and license our technologies to third parties
- We proactively reach out to the general public with no AI background to introduce AI to them and to promote the use of AI in enhancing their learning experience in school and productivity at work



Thank you

<https://www.ntu.edu.sg/s-lab>

S - L A B

INSERT YOUR TITLE