Visual Search and Recognition at ViSenze

Guangda LI
CTO and Co-founder of ViSenze

NVIDIA AI CONFERENCE

ViSENZE

Agenda

- About ViSenze

- Deep learning behind ViSenze's Solution

- ViSenze's practices to accelerate the R&D efficiency using deep learning

NVIDIA AI CONFERENCE

ViSENZE™

About ViSenze

ViSENZE™

About Us

ViSenze is a global visual search provider, catering to the $1.67 trillion e-commerce and retail markets. Built for scale and performance, ViSenze processes over 100 million images every day and is used by some of the largest Internet companies like Rakuten, ASOS and UNIQLO.

ViSenze has been recognized amongst:

- Best AI Product in Retail by CognitionX London

- Top 5 deep learning companies by VentureBeat

- Top 20 artificial intelligence companies by DataMation

- Top 40 global Breakthrough Brands by InterBrand

link

FORTUNE   Forbes   Bloomberg   TNW THE NEXT WEB   FORRESTER®

recode   FAST COMPANY   VentureBeat   THE BUSINESS TIMES   THE STRAITS TIMES

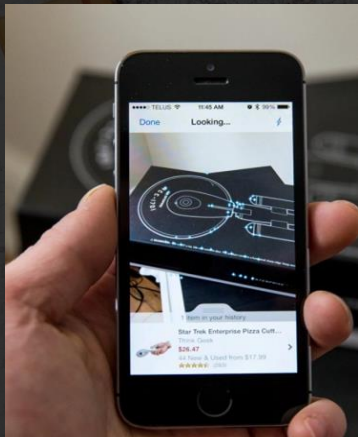Interbrand   TC TechCrunch   BUSINESS INSIDER   DNA Your Eye on the Tech Ecosystem   TA TECHINASIA
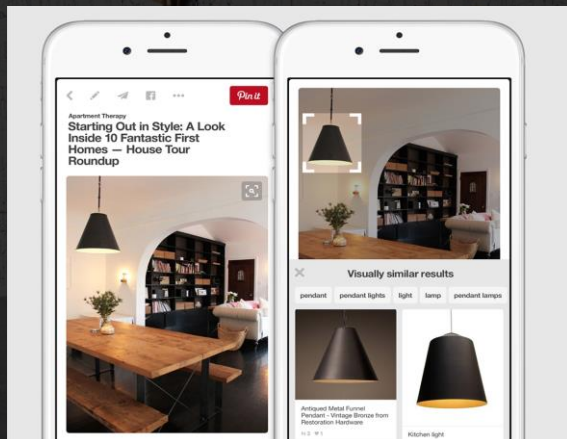
ViSENZE™

Growth of visual content and how major players are driving this shift

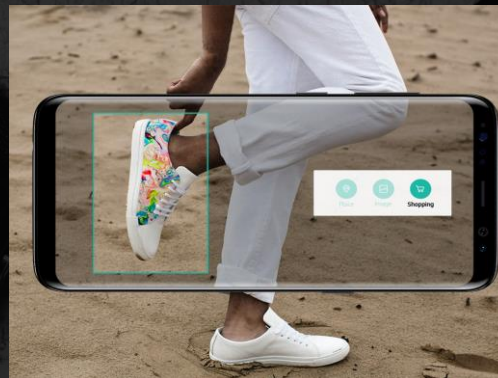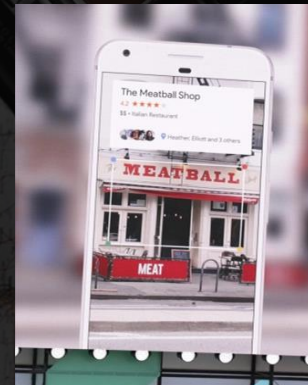**Amazon Visual Search**

Pinterest Lens

Samsung Bixby Vision

Google Lens

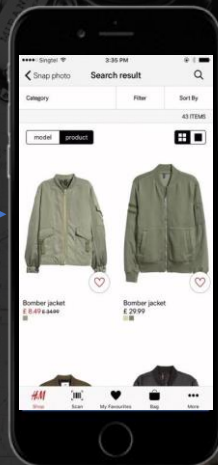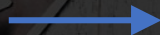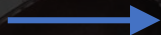3,000,000,000 *images uploaded online per day, 2015*

250,000,000 *visual Searches per month, on Pinterest – May 2017*

360,000,000 *Visual Searches per month, on Taobao - Aug 2017*

ViSENZE™

Search Solutions and Use Cases

Visual Search
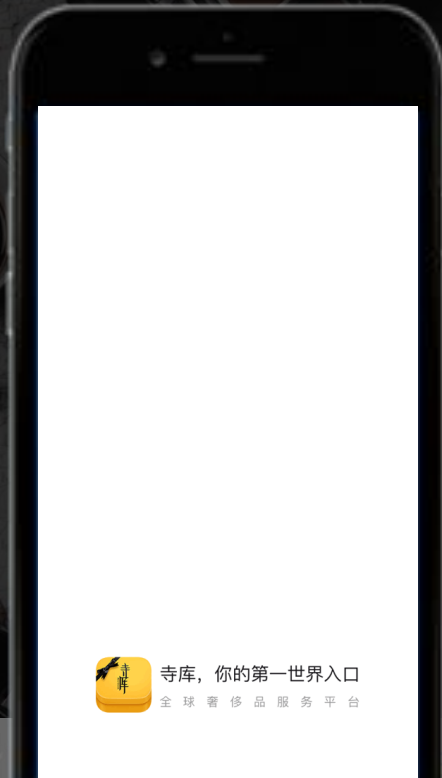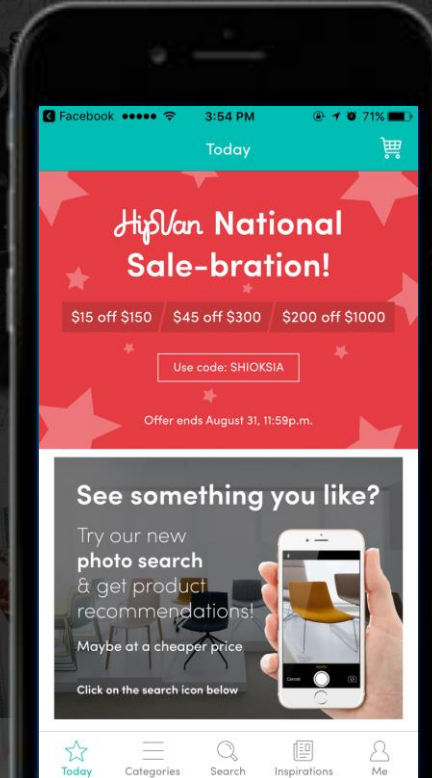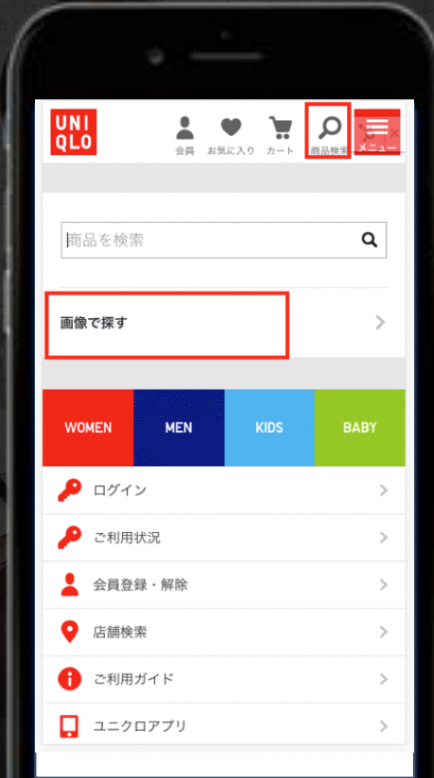
Enhance search and discovery

Search by Image

Enable shoppers to search using an image or screenshot

Search by Color

Color palettes allow users to broaden their experience to new product categories

Image Search is now a common feature on leading retailer apps

H&M, ASOS and UNIQLO Visual Search powered by ViSenze

Recommendation Solutions and Use Cases

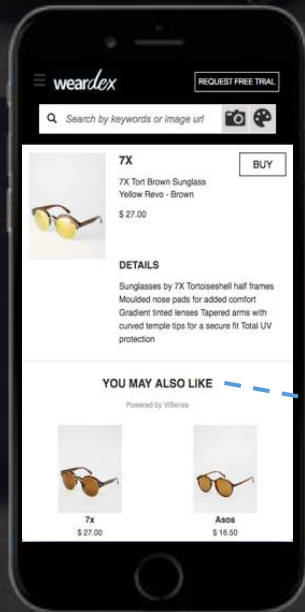## Visual Recommendation and Discovery

Improve discoverability and conversions

You May Also Like

Recommendations based on what shoppers are viewing

Out of Stock Alternatives

Suggest visually similar products when shopper is viewing an out of stock item

YOU MAY ALSO LIKE

VISUAL RECOGNITION POWERED RECOMMENDATIONS

ViSENZE™

How It Works : Product recommendation

Tagging Solutions and Use Cases

Automated Tagging

Improve discoverability and conversions

Color

Pattern

Fashion Attributes*

Custom Attributes**

Catalogue Management

Tag entire image libraries based on visual attributes for better search results

Image Filtering and Moderation

Tag entire image libraries based on visual attributes

ViSENZE™

How It Works: Tagging (Demo Video)

Improving User Engagement Through Artificial Intelligence

30%
higher conversions on image search over text based search

50%
higher CTR of shoppers who click on visually similar products

5x
higher conversion rates for shoppers clicking on visually similar products

160%
increase in engagement for shoppers who used find similar

A.I. powered visual search and recognition solutions improve engagement and conversions

ViSENZE™

ViSenze Enterprise Ready Solutions

Scalable

Scales during traffic spikes without compromising user experience

Fast

Industry leading performance. Latency under 200ms

Accurate

Above 90% accuracy as per customer evaluations

Built-in failovers and professional services ensure high availability and support for troubleshooting

ViSENZE™

EGAMI makes the camera shoppable
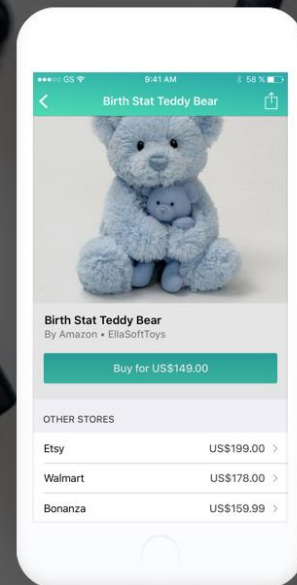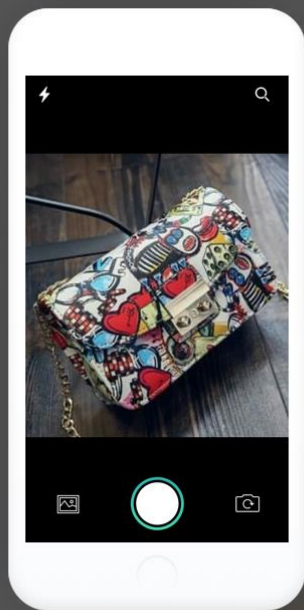
Download our Showcase app below :
https://itunes.apple.com/us/app/egami/id1241860111?ls=1&mt=8

ViSENZE™

Deep learning behind ViSenze's Cloud-based Visual Search and Recognition System

ViSENZE
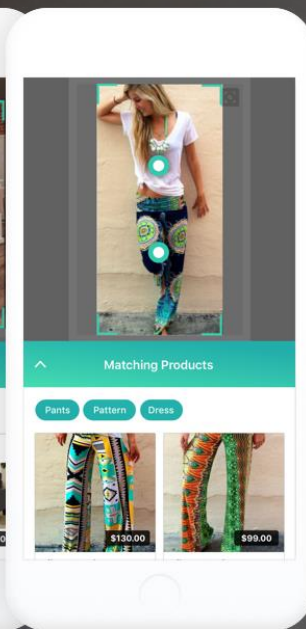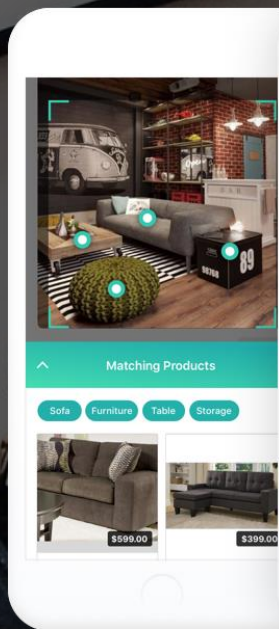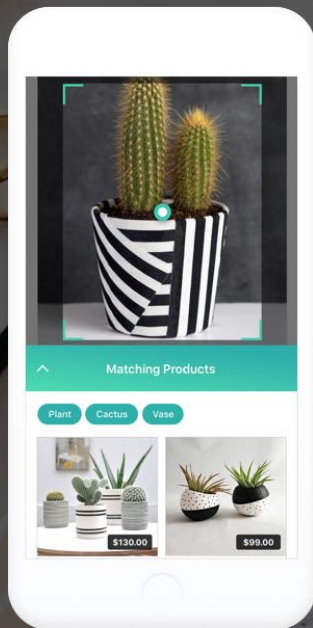
Visual Search 1-2-3

Query image

Features (AlexNet)

Similarity + kNN (Cosine similarity)

$v[1:4096]$

Image Database

v_1
v_2
…
v_N

Similarity 78.752%

Similarity 78.267%

Similarity 77.827%

Similarity 77.473%

Similarity 77.207%

Similarity 76.673%

ViSENZE™

Object Detection

What have we used?

- FFLD (sliding windows)

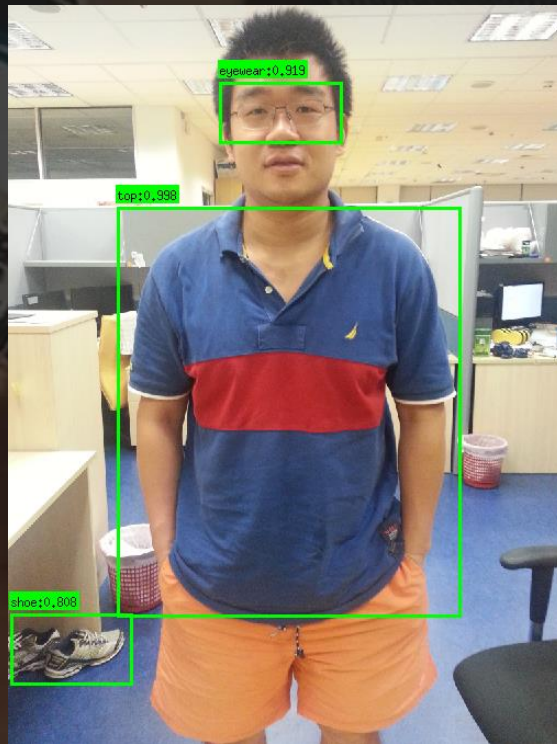- Deformable Part Models

- Fast-RCNN

- Faster-RCNN

- SSD

- DSOD

Visual Embedding

Similarity:
- Exact match (the exact same item)
- Different variations of the same product
- Same category
- Similar category
- …

Needs to combine multiple embeddings

Similarity 63.696% Similarity 63.237% Similarity 61.479% Similarity 59.424% Similarity 57.236% Similarity 57.116%

ViSENZE™

DL Problems ViSenze is working on

- CNN feature learning and indexing

- CNN Model compression

- Interpretation and visualization of CNN

- Robust fine-tuning and Incremental learning for various CV tasks

- Large-scale product category and attribute classification

- Automatic training/test data bias discovery

ViSENZE™

ViSenze's Practices to Accelerate the R&D Efficiency using Deep Learning

From Isolated GPU to Centralized Training Management

SYSTEM SPECIFICATIONS		
GPUs	8X Tesla V100	8X Tesla P100
TFLOPS (GPU FP16)	960	170
GPU Memory	128GB total system	
CPU	Dual 20-Core Intel Xeon ES-2698 v4 2.2 GHz	
NVIDIA CUDA® Cores	40,960	28,672
NVIDIA Tensor Cores (on V100 based systems)	5,120	N/A
Maximum Power Requirements	3,200 W	
System Memory	512 MB 2,133 MHz DDR4 LRDIMM	
Storage	4X 1.92 TB SSD RAID 0	
Network	Dual 10 GbE, Up to 4 IB EDR	
Software	Ubuntu Linux Host OS See Software Stack for Details	
System Weight	134 lbs	
System Dimensions	866 D x 444 W x 131 H (mm)	
Packing Dimensions	1,180 D x 730 W x 284 H (mm)	
Operating Temperature Range	10–35 °C	

Multi-GPU training (time taken)

Multi-GPU training (throughput)
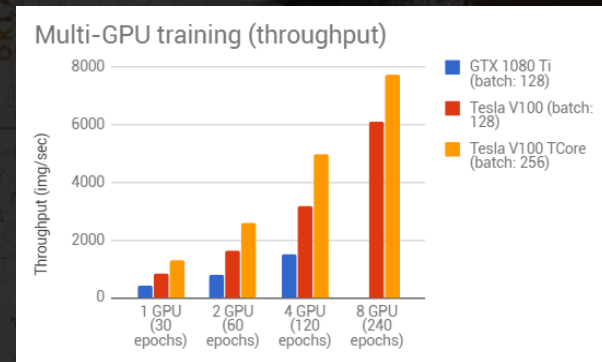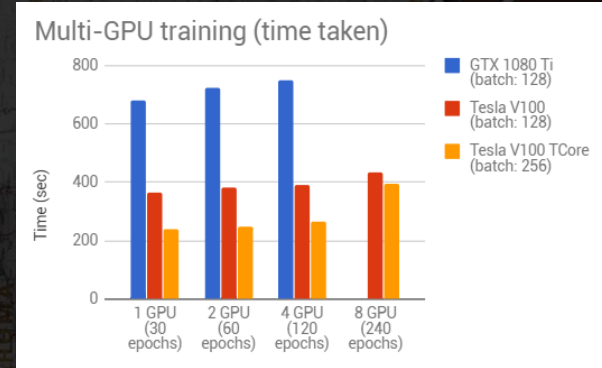
- Pascal TitanX and 1080Ti, DGX-1 with 8 V100
- Move from single server management to centralized training management

ViSENZE™

Visual Search and Recognition at ViSenze

Guangda LI
guangda@visenze.com
www.visenze.com

ViSENZE