

Remark Holdings

Remark AI's Research and Development Team Led by Dr. Xiaoyun Yang Wins Three Champion Awards at ECCV 2020

September 1, 2020

LAS VEGAS, Sept. 1, 2020 /PRNewswire/ -- Remark Holdings, Inc. (NASDAQ: MARK), a diversified global technology company with leading artificial intelligence ("AI") solutions and digital media properties, today announced that Remark AI's engineering team won three out of five Championships in the Visual Object Tracking category at the 16th European Conference on Computer Vision ("ECCV 2020").

Remark AI won the championship in the Long-term tracking challenge (VOT-LT2020), the Short-term real-time tracking challenge (VOT-RT2020) and the Color and Depth long-term tracking challenge (VOT-RGBD2020). "We are proud of what we accomplished at ECCV as it reinforces that our AI products and services are based on some of the highest-quality AI software available," said Kai-Shing Tao, the Chairman and Chief Executive Officer of Remark Holdings, Inc.

The biennial ECCV is the European continent's top event in the image-analysis field. The 2020 edition, the 16th, took place online due to the COVID-19 pandemic. The Visual Object Tracking (VOT) challenges represented the eighth annual tracker benchmarking activity organized by the VOT initiative and held in conjunction with the ECCV. Co-founded by the University of Birmingham, the University of Ljubljana (the Czech Technical University in Prague) and the Austrian Institute of Technology, the VOT challenges are the most authoritative evaluation platform in the field of visual target tracking.

The VOT challenges evaluate the performance of each participant's algorithm for short-term tracking of single targets in complex scenarios. Evaluations include the standard VOT and other popular methodologies for short-term tracking analysis and a "real-time" experiment simulating a situation where a tracker processes images as if provided by a continuously running sensor. The long-term tracking sub-challenge focuses on long-term tracking properties, namely coping with target disappearance and reappearance. Since the evaluation sequence is updated every year, and the accuracy of the annotation is improved year by year, the VOT competition is also regarded as the most difficult competition in the field of visual tracking, far surpassing other data sets.

In recent years, the competition has become extremely competitive, with many of the largest technology companies, including Microsoft Research Asia and Tencent AI lab, internationally renowned institutions and universities such as Oxford University and ETH Zurich, competing for victory. After the intensive competition, the Remark team won the championship in all three sub-challenges, demonstrating Remark's growing AI technology capabilities to the world.



VOT
visual object tracking challenge

VOT-ST2020 Winners:

RPT by: Haitao Zhang, Linyuan Wang, Ziang Ma, Wei Lu, Jun Yin and Miao Cheng

"Learning Point Set Representation for Siamese Visual Tracking"



VOT
visual object tracking challenge

VOT-RT2020 Winners:

AlphaRef by: Bin Yan, Dong Wang, Huchuan Lu and Xiaoyun Yang

"Alpha-Refine"



VOT
visual object tracking challenge

VOT-LT2020 Winners:

LTMUB by: Kenan Dai, Dong Wang, Jianhua Li, Huchuan Lu and Xiaoyun Yang

"A Baseline Long-Term Tracker with Meta-Updater"

VOT-RGBD 2020 Awards

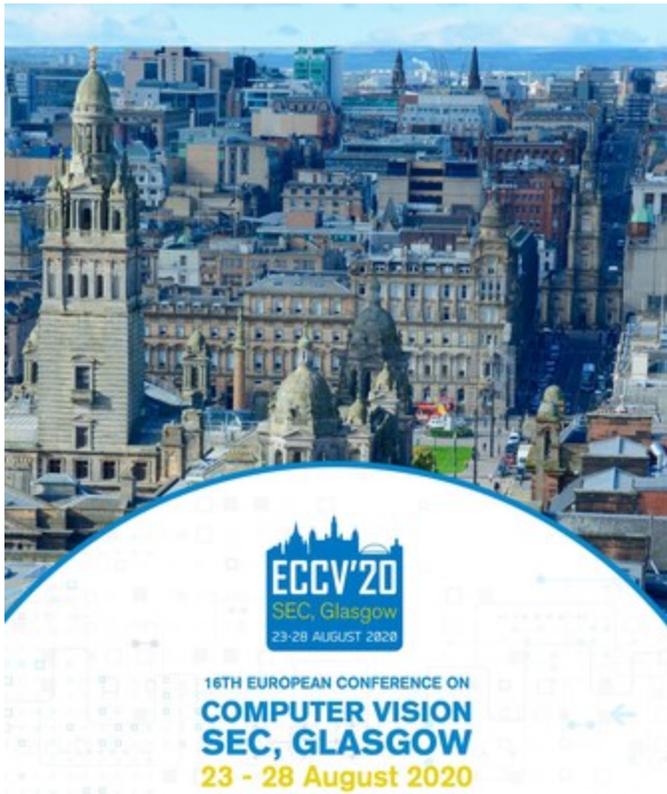
Winner of the VOT-RGBD 2020 challenge:

ATCAIS by Y. Wang, L. Wang, D. Wang, H. Lu and X. Yang

Tracker	P ₁₀	P ₅₀	F-Score	VT	RGB	RGBD
ATCAIS	0.7692	0.6061	0.7621	LT	RGBD	
CSMP	0.7052	0.6092	0.6962	ST	RGBD	
LORL	0.7252	0.6041	0.6922	LT	RGBD	
Standard	0.6177	0.6052	0.6011	LT	RGBD	
LTSEd	0.6174	0.6031	0.6016	LT	RGBD	
LTCSMP	0.6225	0.6221	0.6226	LT	RGBD	
LTMUB	0.6080	0.5611	0.6206	LT	RGBD	
logtrack	0.6094	0.5551	0.6111	LT	RGBD	
RPT	0.6011	0.5461	0.5721	ST	RGBD	
van_LTD	0.6226	0.6011	0.5416	LT	RGBD	
PersonalPlan	0.5271	0.5021	0.5227	ST	RGBD	
AlphaRef	0.6011	0.5421	0.5216	ST	RGBD	

Table 6. List of trackers that participated in the VOT-RGBD2020 challenge along with their performance score (P₁₀, P₅₀, F-score) and configurations (VT, LT, RGB, RGBD). 2020 submissions are ATCAIS, CSMP, LORL, D and Standard. 2019 submissions (Standard) was the winner. RGB trackers are the three top performers of VOT-ST2020 and VOT-LT2020.





Advancing AI technology Research & Development for wider applications

Remark AI is an innovative enterprise dedicated to the implementation of advanced artificial intelligence technology. The company has established laboratories jointly with well-known foreign universities such as Oxford University and the University of Liverpool, and has applied dozens of top AI technologies to intelligent solutions such as safety and safety supervision, farming, and manufacturing.

Remark AI continues to break new ground in the research and development of cutting-edge technologies. In recent years, it has successively won leading rankings in multiple international competitions in the field of video tracking and segmentation, marking Remark AI's industry leading position in key video intelligent analysis technologies such as video target detection, tracking and segmentation technologies. At the same time, these technologies will be widely used in the 5G+AR video business of Remark AI's smart retail, smart campus, smart construction, smart city, internet of vehicles, medical and other fields.

Getting the world back to work sooner and safer

During the ongoing COVID-19 pandemic, Remark's AI thermal imaging systems provide solutions to identify individuals with higher than normal skin temperatures, and to protect other individuals from possible infections. According to CDC, fever is the earliest symptoms of COVID-19. Remark Thermal products are industrial grade and developed to efficiently and accurately detect raised body temperatures of individuals being scanned, providing a first layer of security.

The use of thermal scanning can mitigate the risk of spreading any type of contagious illness, but also include a multitude of other benefits such as:

- Improve the safety of staff, and cut down operational costs from not having a trained staff member to individually scan each person entering with an outdated temperature gun;
- Have the ability to view alerts in real time both on display and can also be sent as an email or text to authorized administrators;
- Create a discreet and non-intrusive experience for your customers and staff;
- Integrate with employee check-ins and contactless gate and door access;
- Provide contact tracing questions after a temperature scan.

In addition to video tracking and thermal imaging, Remark AI has also made new progress in facial analysis. In response to the current situation where people generally wear masks, mask wearing detection, face recognition under masks, and attribute analysis models have been developed. In addition, infrared thermal imaging technology has been integrated to form an independent "Remark Brain" integrated platform to help society solve all kinds of new face problems under the new epidemic prevention situation.

With the resumption of work and schools, epidemic prevention for people in public places such as office buildings, hotels, hospitals and schools become even more challenging. The movement of people has brought economic activity and greater health risks. Remark AI's series of mask-wearing face models provide complete solutions for all sectors of society in a timely manner. Its functions include mask detection for employees, non-contact temperature measurement, and daily face-scanning access control for check-in and check-out.

In addition to individual settings, according to a test done on 100,000 actual pictures, the model can quickly identify and label faces wearing masks and those without masks while detecting mass faces in densely crowded public scenes. The face detection accuracy rate reaches 98.6%, and the mask

judgment accuracy rate reaches 96.8%. The test is done within 10ms, the industry's leading level. Behind such a high accuracy rate is the ingenious model design and the result of training with a large amount of data. On one hand, the new model uses multiple data sets, training data of more than 100,000 images, and reconfirms clearly to ensure that the sample size is large enough and the annotations are correct and effective. On the other hand, the face detection model is based on a new algorithm independently developed by Remark AI. The entire R&D process is based on the "Remark Brain" deep learning platform, which enables efficient and convenient model development, training, and deployment. For the lighting, mask obstruction, expressional changes, angle changes, scale changes and other issues in the actual implementation, the model is robust and can be detected in real time on a variety of different end, edge, and cloud devices.

Related Links

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About Remark Holdings, Inc.

Remark Holdings, Inc. (NASDAQ: [MARK](#)) delivers an integrated suite of AI solutions that enable businesses and organizations to solve problems, reduce risk and deliver positive outcomes. The company's easy-to-install AI products are being rolled out in a wide range of applications within the retail, financial, public safety and workplace arenas. The company also owns and operates digital media properties that deliver relevant, dynamic content and e-commerce solutions. The company is headquartered in Las Vegas, Nevada, with additional operations in Los Angeles, California and in Beijing, Shanghai, Chengdu and Hangzhou, China. For more information, please visit the company's website at <http://www.remarkholdings.com/>.

Forward-Looking Statements

This press release may contain forward-looking statements, including information relating to future events, future financial performance, strategies, expectations, competitive environment and regulation. Words such as "may," "should," "could," "would," "predicts," "potential," "continue," "expects," "anticipates," "future," "intends," "plans," "believes," "estimates," and similar expressions, as well as statements in future tense, identify forward-looking statements. These statements involve known and unknown risks, uncertainties and other factors, including those discussed in Part I, Item 1A. Risk Factors in Remark Holdings' Annual Report on Form 10-K and Remark Holdings' other filings with the SEC. Any forward-looking statements reflect Remark Holdings' current views with respect to future events, are based on assumptions and are subject to risks and uncertainties. Given such uncertainties, you should not place undue reliance on any forward-looking statements, which represent Remark Holdings' estimates and assumptions only as of the date hereof. Except as required by law, Remark Holdings undertakes no obligation to update or revise publicly any forward-looking statements after the date hereof, whether as a result of new information, future events or otherwise.

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