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Optical Flow Explained: The Key to Seamless Image Stitching

TECH MARCH 21, 2017 15 COMMENTS SHARE

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The Insta360 Pro ensures a seamless stitch using the science of optical flow.

360-degree cameras face a thorny problem: How do you take visual data captured by multiple lenses, facing multiple directions, and then produce a final image that blends all of this information into one seamless whole?

Add on the fact that the various subjects of these lenses may be moving unpredictably — crossing from the field of view of one lens to another and then back again, hovering about the zone where two lenses overlap, or shifting between the foreground and background of a scene at different rates— and the problem gets a whole lot thornier.

It's a little like trying to solve a jigsaw puzzle where the image on every piece is changing in real time. And it's the reason you've probably seen shots that turn out like this:



Toronto's CN tower has seen better days.

The **Insta360 Pro** solves this problem with a cutting-edge stitching technology that's based on the science of optical flow.

Optical flow is a subject worthy of an army of PhD's, but the basic idea is simple enough.

Instead of stitching together images according to a one-size-fits-all rule – essentially programming a computer to match dotted line A with dotted line B – the optical flow approach lets a computer keep track of the actual content of an image, down to the level of individual pixels.

Take the Insta360 Pro, with its six independent lenses, as an example. An optical-flow-based stitching algorithm allows for a granular comparison of the six images captured by the Pro's lenses, so that the images can be stitched together intelligently, according to their actual subjects.

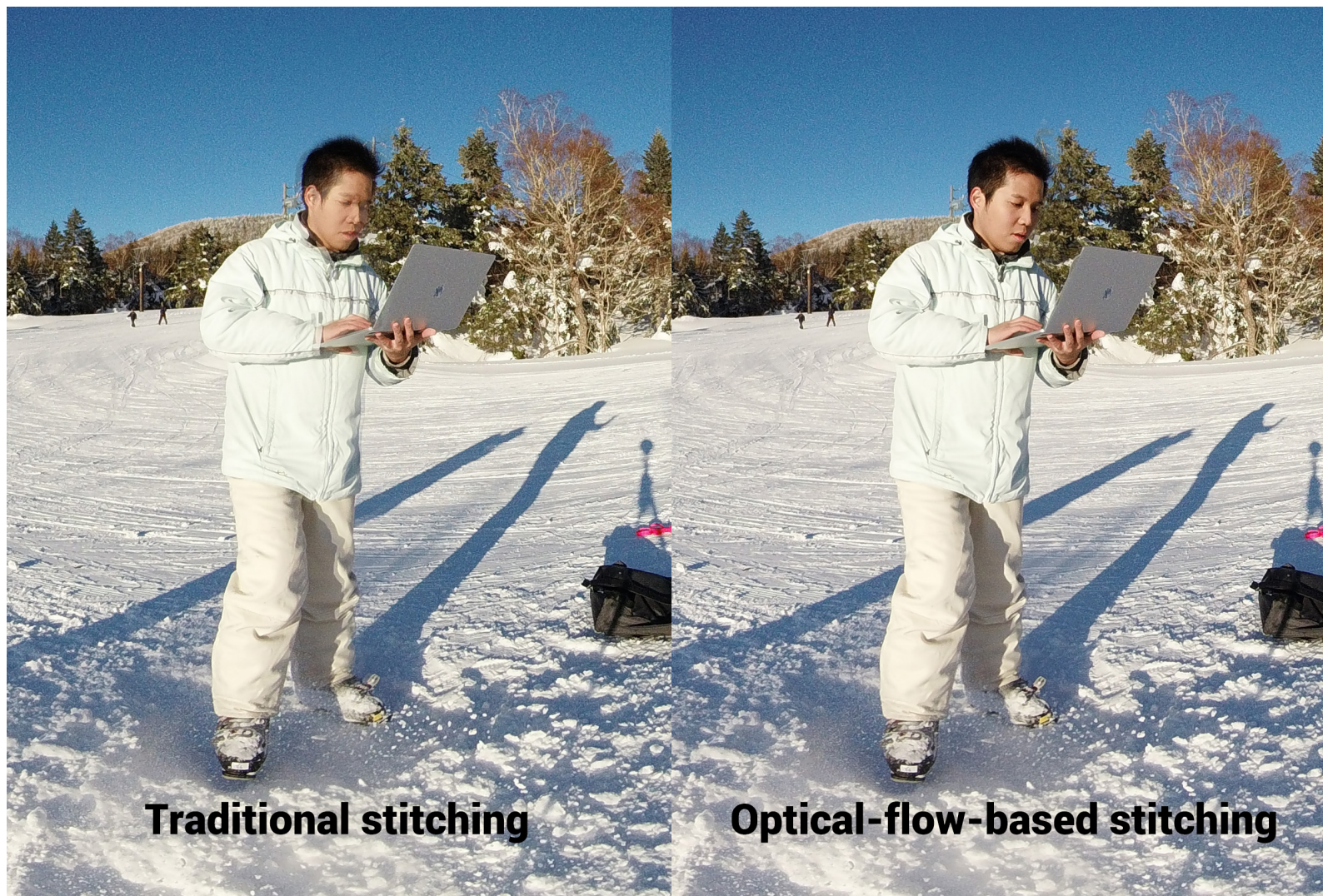
In practice, this means that the Insta360 Pro can avoid taking shots like the one of Toronto's CN tower above, where a key object has fallen victim to an indiscriminate stitching algorithm. Have another look:



The problem is obvious to any human, but how do you explain it to an algorithm? If the stitching algorithm had been able to notice the stark shift in the arrangement of pixels at the seam where the tower is cut in half – a sudden jump from gray concrete to blue sky – it wouldn't have made this mistake. By letting a computer actually “see” what's happening in an image, optical-flow-based stitching avoids this type of problem.

In the case of video capture, the Insta360 Pro's optical flow stitching algorithm works on an even more sophisticated principle. Not only does it compare the images captured by each of the Pro's six lenses for any given frame of a video, but it also compares an image captured by a single lens to images captured by that same lens in adjacent frames of the video.

The upshot: Seamless stitching that works *with* the content of your shoot instead of against it. Compare the two shots below to see how optical flow can save your subjects:



Optical-flow-based image stitching adjusts a stitch according to the actual content of a shot.

Optical flow stitching ensures that creators using the **Insta360 Pro** can transport their viewers into new worlds, worlds that look just like they should – seamless.

#360 photography #image stitching #Insta360 Pro #optical flow #stitching techniques #VR filmmaking

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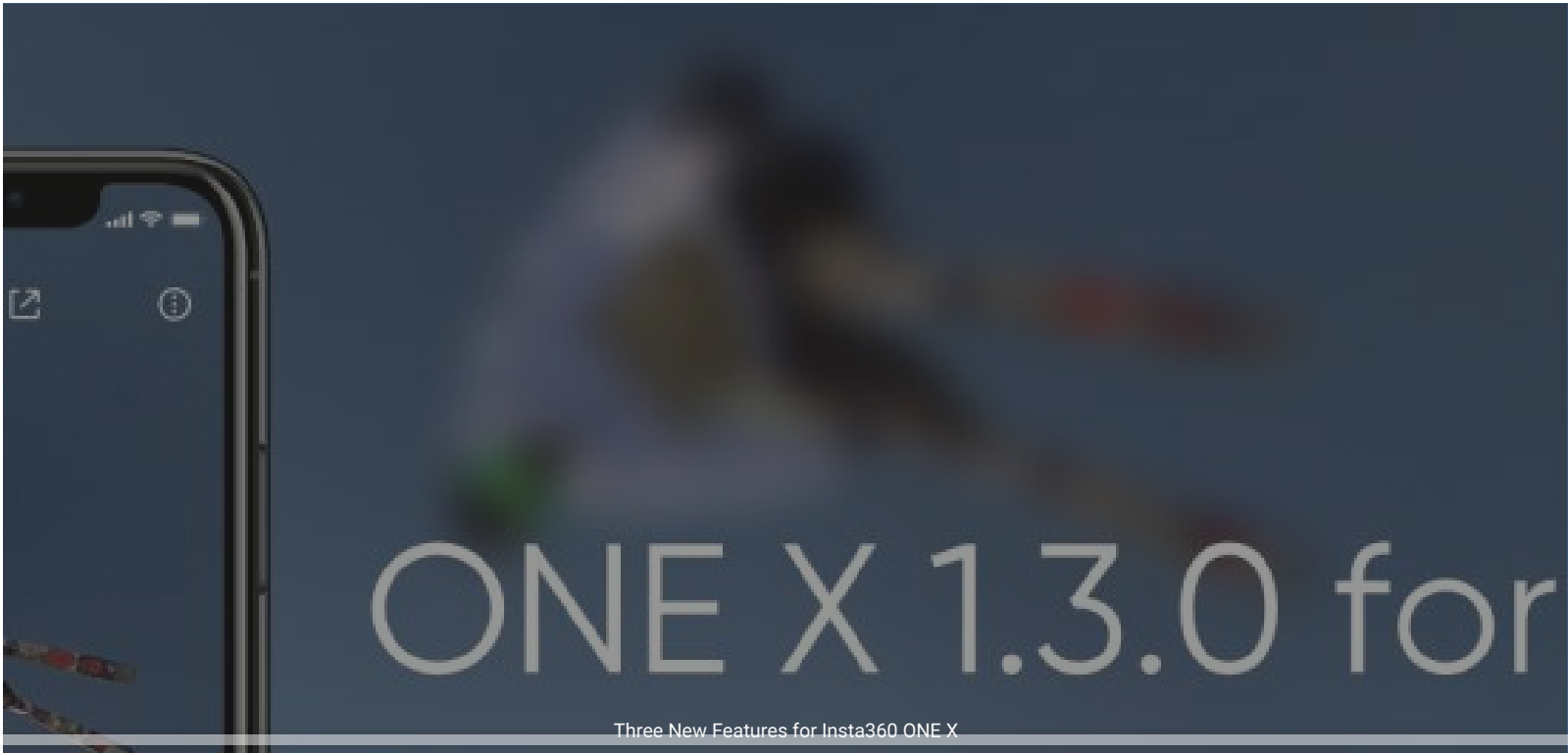
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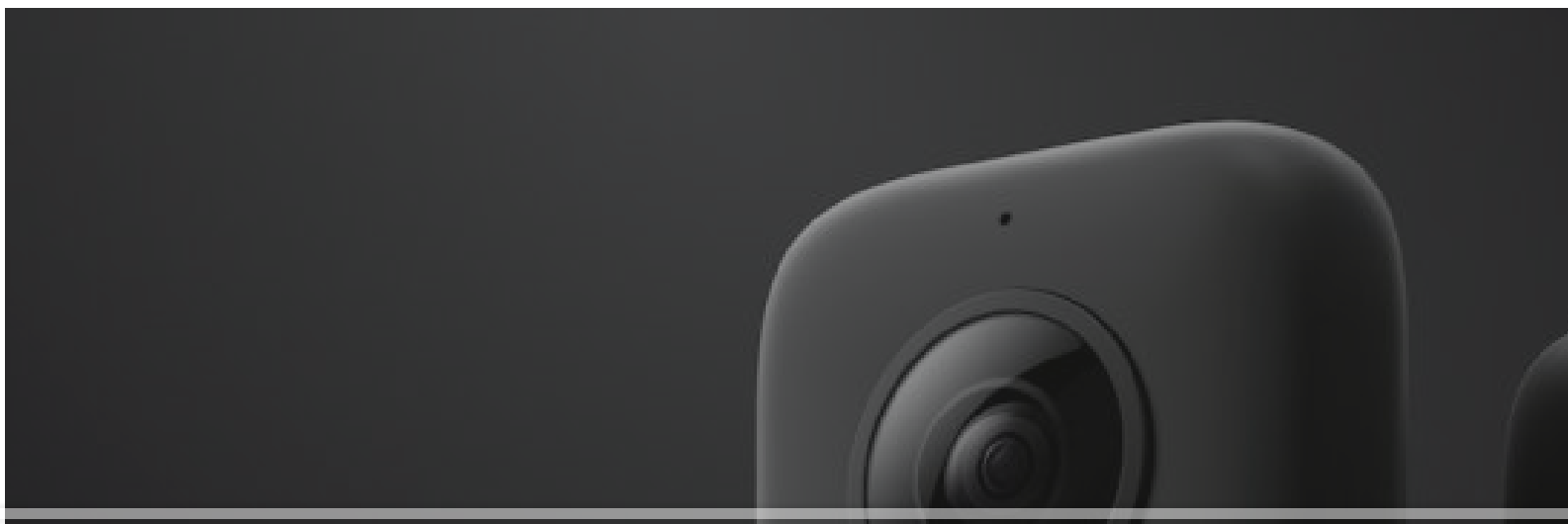
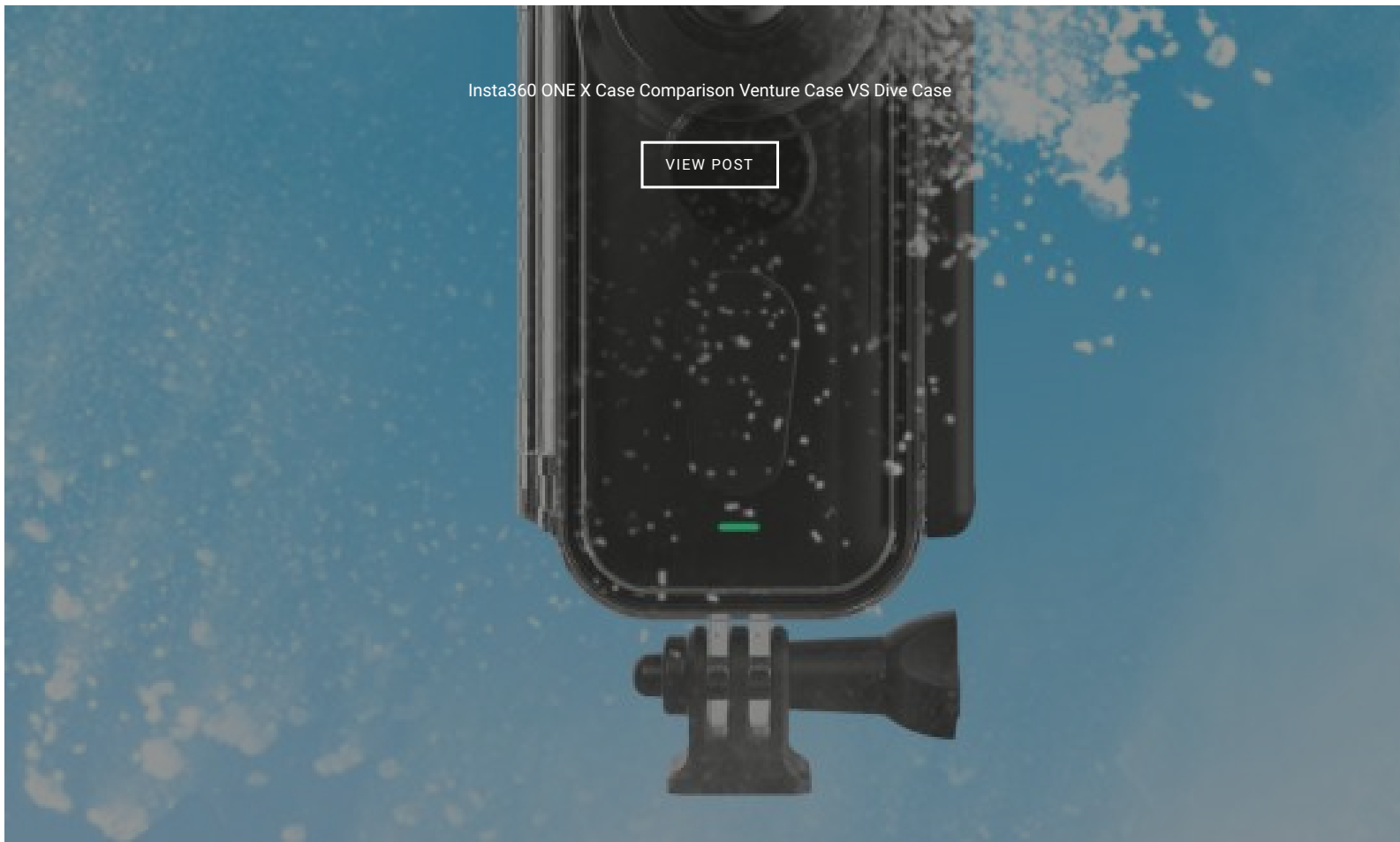
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15 COMMENTS



Guy Vaillancourt

MARCH 21, 2017 AT 3:48 PM

Génial, quand sera-t-elle disponible à l'achat au Canada ?
Guy du Québec

REPLY ↓

**Aaron Nanto**

MARCH 21, 2017 AT 4:07 PM

So does this also eliminate a minimum distance with the Pro? For example, if I'm standing really close to the camera (say 1-2 feet) and move around the camera, will there be any stitch lines anywhere in the foreground and/or background?

REPLY ↓

**Dan**

MAY 28, 2018 AT 3:12 PM

A great question! I also want to know this as I plan to use this in confined spaces. Did you ever get an answer? Thanks.

REPLY ↓

**Michael**

MARCH 21, 2017 AT 11:53 PM

Can this be done live?

REPLY ↓

**朱春龍**

MARCH 22, 2017 AT 12:15 AM

請問INSTA360 PRO 它在拍攝時的最近距離(完美縫合)是幾公分
我目前使用RICOH THETA S拍攝全景照片,製作房屋銷售網頁,它在狹小空間(浴室)也能完美縫合影像
但是在太場景時影像畫質就差了

REPLY ↓

**Joseph Cathey**

MARCH 22, 2017 AT 7:18 PM

Amazing! Is the optical flow stitching available in-camera only, or is there software that enables it on a desktop as well?

We've been using the Omni, and while its auto-stitch is better than nothing, it still leaves a lot to be desired.

REPLY ↓

**Massimiliano Colombo**

MARCH 23, 2017 AT 9:03 AM

I would love to try this jewelry !!

REPLY ↓

**Mimosa**

APRIL 23, 2017 AT 4:58 AM

Great post with lots of imnoatrpt stuff.

REPLY ↓

**education online courses**

APRIL 30, 2017 AT 7:04 AM

This is really interesting, You are a very skilled blogger. I've joined your rss feed and look forward to seeking more of your fantastic post. Also, I've shared your website in my social networks!

<http://studypoints.eu>

REPLY ↓

**cartier bracelet copie**

MAY 3, 2017 AT 10:01 AM

As an example, a businessman in america and another entrepreneur in britain need some quantity of Pounds and some Bucks, respectively.

cartier bracelet copie <http://www.clovejs.ru/fr/screwdriver-replica-cartier-love-bracelet-pink-gold-with-paved-diamonds-n6036916-p721/>

REPLY ↓

**financial advisor help**

MAY 4, 2017 AT 5:05 AM

Keep this going please, great job!

REPLY ↓

**job postings websites**

MAY 5, 2017 AT 10:18 AM

Good response in return of this question with genuine arguments and telling the whole thing regarding that.

REPLY ↓

**how can i buy gold bars**

MAY 5, 2017 AT 4:23 PM

Hi, i think that i noticed you visited my weblog thus i came to return the desire?.I am attempting to find things to enhance my site!! I suppose its ok to use a few of your ideas!!

REPLY ↓

**sales jobs**

MAY 5, 2017 AT 9:58 PM

I am really grateful to the holder of this web page who has shared this enormous article at at this place.

REPLY ↓

at home jobs



MAY 6, 2017 AT 12:31 PM

Does your site have a contact page? I'm having problems locating it but, I'd like to send you an email. I've got some suggestions for your blog you might be interested in hearing. Either way, great blog and I look forward to seeing it grow over time.

REPLY ↓

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