

June 2021

# Computer Vision News

The Magazine of the Algorithm Community

Women in Science

IBM Watson Health

Automatic Gesture Recognition  
in Surgical Robotics

Challenge: Segmentation  
and Registration in Fetoscopy

Feel at CVPR!

Artificial Intelligence Spotlight News

Bay Vision Meetup

ConvNets using Julia





## Computer Vision News

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Dear reader,

We have many reasons to be excited this month! First, **CVPR 2021** is just around the corner! The entire community will virtually meet starting **June 19**. It will be a very special edition, and we know that all is being done by the organizers to make it an unforgettable one. **RSIP Vision** will partner with **CVPR** for the 6th consecutive year to publish the **CVPR Daily**, the official magazine of CVPR. Do you want to stay in the loop? [Subscribe here to receive the CVPR Daily every day in real time and feel just like you were there!](#)

The next **Bay Vision Meetup**, which we sponsor, will also be unforgettable: **Lena Maier-Hein** will honor us with her talk: **"Does machine learning require domain experts?"** [Register here to obtain your personal link to access the webinar.](#)

Don't miss the special section dedicated this month by **Computer Vision News** to a growing and exciting field: **Robot-Assisted Surgery**. We publish in this magazine some terrific (yet very different) articles, starting on page 14.

**Enjoy the reading!**

**Ralph Anzarouth**

Editor, **Computer Vision News**

Marketing Manager, **RSIP Vision**



**Happy 5th Anniversary!!!**

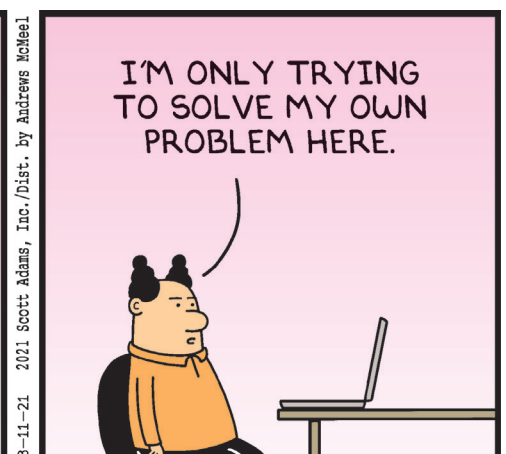


**"I am a big fan of Computer Vision News!"**

**Andreas Maier**

Head of the Pattern Recognition Lab

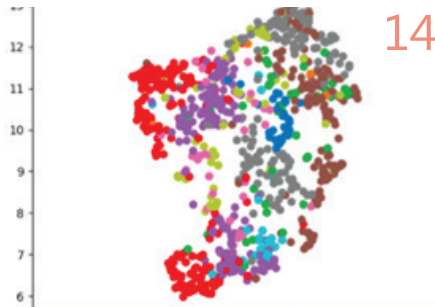
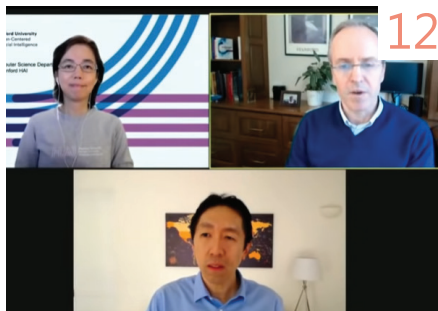
at the Friedrich-Alexander University Erlangen-Nürnberg





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using Flux, Flux.Data
using Flux: onehotbatch
using Base.Iterators: p
using Printf, BSON
using Parameters: @with
using CUDA
CUDA.allowscalar(false)
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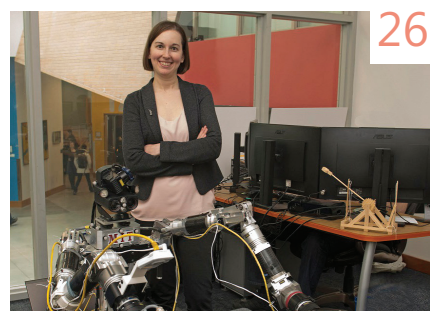
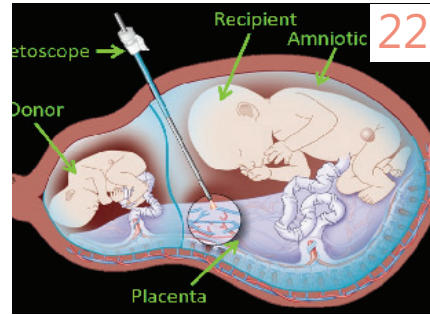
**Does machine learning-based bioanalysis require domain experts?** 19

Thursday | 10 am PT  
Jun 17<sup>th</sup> | 1 pm ET

Guest Speaker:  
Prof. Dr. Lena Maier-Hein  
Computer Assisted Medical Interventions  
Head of Department  
German Cancer Research Center (DKFZ)

Hosted By:  
Moshe Safran  
CEO, RSIP Vision USA

Rabeeth Fares, M.D.  
Head of Clinical  
Applications RSIP Vision



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# 34 IBM Watson Health

Dr. Mehran Anvari is Professor of Surgery and Chair in Surgical Innovation at McMaster University. He is also the Scientific Director and CEO of the Centre of Excellence in Canada for Commercialization of Medical Robotics. Dr. Maria Victoria Sainz de Cea is a Data Scientist at IBM Watson Health. They speak to us about a partnership that could revolutionize the world of surgical robotics.

Dr. Anvari's Centre develops precise robotic capabilities that can navigate in a variety of imaging modalities, including MRI. The technology can accurately navigate to the site of any abnormality, however small within the body, so long as the system detecting it can provide it with the correct coordinates.

His group have been working with a global team from **Merge Healthcare**, part of **IBM Watson Health** in Canada, to develop AI platforms that connect with the Centre's robotics to build a truly autonomous medical robot which can accurately detect, locate, and intervene.

*"Imaging analysis is very fast now,"* Dr. Anvari explains.

*"The systems we're building will significantly improve on current practices, reducing time even further*



Mehran Anvari



Maria Victoria Sainz de Cea

*between analysis and diagnosis. **AI can analyze images in a matter of seconds** and we're working on platforms that can **add histopathology in minutes**. They consider not only the usual diagnosis but look at patients' outcomes and the decision-making which led to that outcome."*

*Where surgeons make decisions based on personal experience of perhaps hundreds of previous patient interactions, these systems use machine learning to base decisions on analysis of millions of interactions from around the world. They are constantly evolving and enhance patient treatment by taking surgical intelligence to a higher level than what one surgeon or even a group of surgeons could achieve.*

The team are on the cusp of a huge breakthrough, building tools for **screening, diagnosis, and treatment of cancer at a much earlier stage**. Proof of principle testing was



completed a couple of years ago, supported by the **Canadian Space Agency (CSA)**, to ensure that the AI and robotics platforms can communicate seamlessly without human intervention.

*“We are even working with the CSA and NASA to potentially build an autonomous medical robot for the Mars mission,”* Dr. Anvari adds.

*“You can see that the same type of ideology behind this can not only improve care of patients on earth, but potentially on long space missions too. We are partnering with the main manufacturer of all the robotics for the space program - probably the most advanced robotic company in the world - to build a series of systems which will work with IBM Watson Health in various situations. But that’s*

*as much as I can tell you!”*

IBM Watson Health have a history of partnering with different stakeholders. Back in 2018, **John R. Smith** told us about its partnership with **MIT** on the **MIT-IBM Watson AI Lab**.

*“The way we push science forward is by partnering, hearing other opinions, and bringing other minds into play,”* Maria tells us.

Maria works in the imaging branch of IBM Watson Health, developing deep learning algorithms for detection, segmentation, and classification of medical images.

*“We deal mostly with radiology images - right now, I’m working on prostate MRI, but we work on a wide variety of modalities. The best thing*



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*about working here is the fact you get to work with very smart people on cutting edge technologies. We have access to a huge amount of data, and that makes our algorithms highly effective.”*

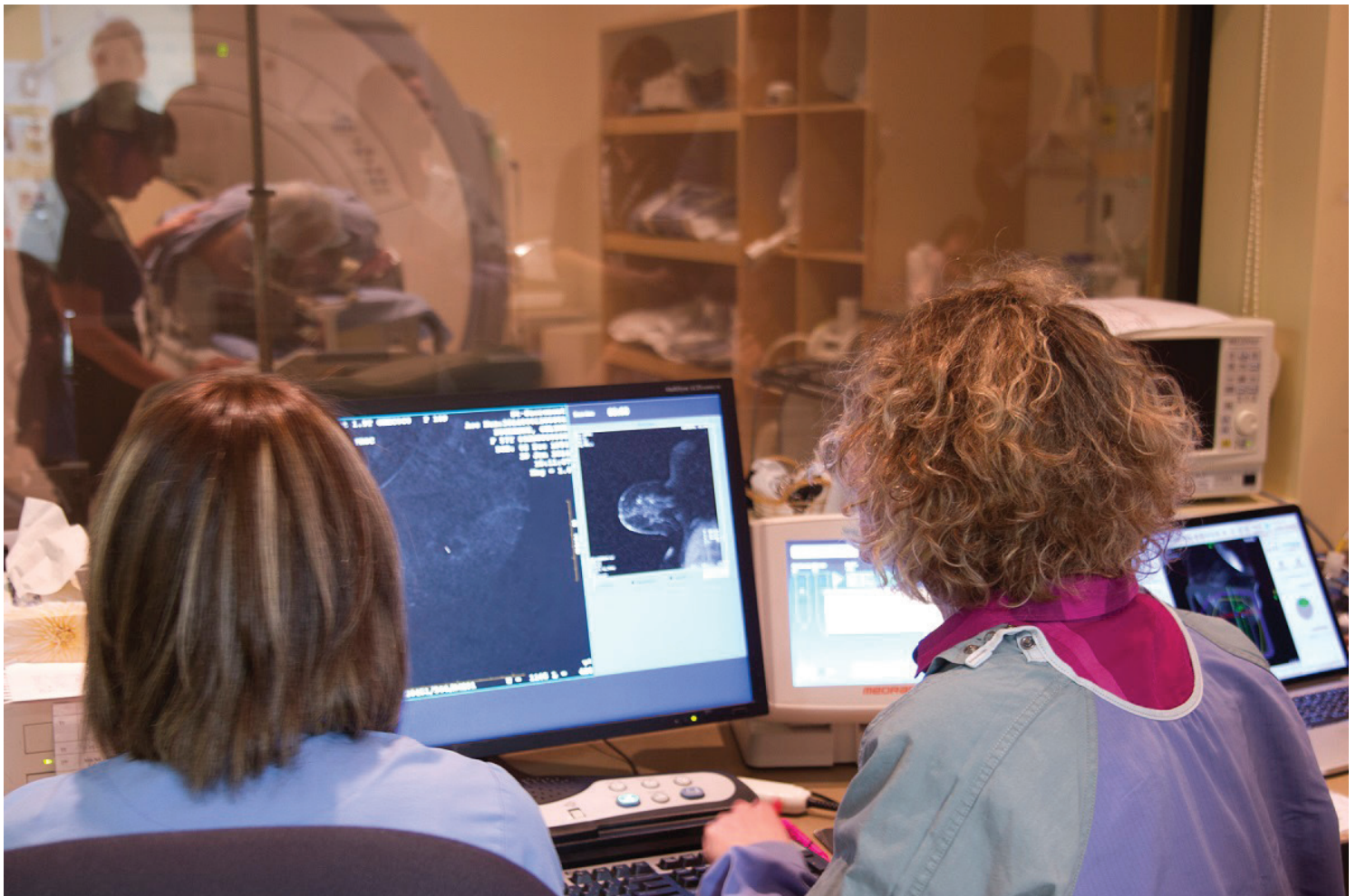
Dr. Anvari agrees:

*“Any organization is only as strong as the people it employs and the vision that motivates it. I’ve been working with a very collaborative group of engineers at IBM Watson Health under **Dr. Marwan Sati** who have really grasped our ideas. The motivation that I see in the group*

*of people I work with is not only to improve patient care, but to improve access to care also.”*

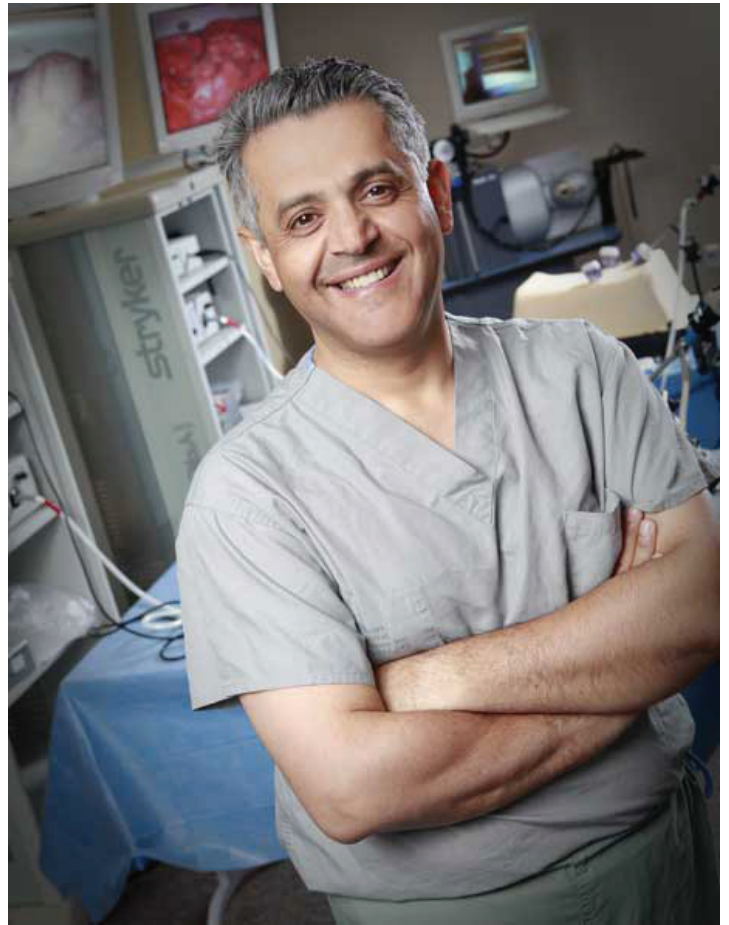
Remote access to care is another benefit that AI can bring, meaning any patient anywhere with a disease or who has had an accident or emergency can get **the same treatment as they would receive at the very best hospitals in the world.**

However, with some high profile ethical and societal issues related to the use of AI in the news recently, has this affected patient confidence at all?





**“Physicians, who are traditionally very conservative, have to accept the fact that for some tasks, AI can enhance their abilities to diagnose and treat; the public have to agree that it is the best thing for them; and hospitals have to understand that AI is going to save them money. I have no doubt that we will satisfy all three!”**



*“My experience with patients is that they’re very willing to accept technology,” Dr. Anvari reassures us.*

*“When they see that AI improves the care they receive, and that they can get the care closer to home, they are very happy. 17 years ago, I started a program operating on patients remotely. Everybody said, ‘Who would allow you to operate on them when they’ve never seen you?’ The first patient was obviously very brave, but once everybody had heard that it was a success, there was no shortage of people saying I’d rather have the surgery remotely than have to travel 400km!”*

AI and robotics have already been combined successfully in many industries, but in medicine, Dr. Anvari says it is **revolutionary**, although there is some work to do.

*“There are three groups that you need to satisfy,” he points out.*

*“Physicians, who are traditionally very conservative, have to accept the fact that for some tasks, AI can enhance their abilities to diagnose and treat; the public have to agree that it is the best thing for them; and hospitals have to understand that AI is going to save them money. I have no doubt that we will satisfy all three!”*