



SVENSKA
SÄLLSKAPET
FÖR
AUTOMATISERAD
BILDANALYS

SWEDISH
SOCIETY
FOR
AUTOMATED
IMAGE ANALYSIS

MEMBER OF THE INTERNATIONAL SOCIETY OF PATTERN RECOGNITION

SSBAktuellit

»» nr 69 december 2023



www.ssba.org.se

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Title photo: Andrea Behanova

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SSBAktuellt är ett föreningsblad med
information av nationell karaktär.
Redaktionen kan nås på e-post
redaktionen@ssba.org.se

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December 2023

Ordförandes Ord



Amanda Berg

Kära medlemmar,

När jag skriver det här är det kolsvart ute och snöflingorna dansar utanför fönstret. Här i Linköping har vi för en gångs skull vinter och snö redan i december och jag vet att det ser likadant ut i stora delar av landet. Kanske vågar vi hoppas på en vit jul i år?

På tal om snö så ser jag mycket fram emot 2024 års SSBA och SSDL symposium som hålls i Luleå 11-13 mars. Det var hela 10 år sedan SSBA-symposiet anordnades i Luleå sist, 2014, och det var mitt allra första SSBA-symposium någonsin. Jag minns det som igår! Jag skulle presentera mitt examensarbete, slant med rullhjulet på musen och råkade, på något märkligt sätt, lägga till ca 1000 tomma slides i min powerpoint...

Jag hade som doktorand turen att ha handledare som värdesatte deltagande i symposiet och det är jag mycket tacksam för. Jag vill att symposiet ska ses som en självklarhet både för doktorander och handledare. Det är en viktig mötesplats och ett nätverk som vi ska vara måna om, både idag och i framtiden.

I slutet på oktober anordnade vi ett internat i Uppsala. Det blev ett lyckat arrangemang där deltagarna, som kom från både akademi och industri, enades om att den viktigaste frågan, alla kategorier, är rekrytering. Diskussionerna ledde fram till ett spännande projektförslag gällande kommunikationsmaterial som vi hoppas kunna driva igenom.

I detta nummer av SSBA-Aktuellt får vi läsa mer om Visual Sweden, InfraVis samt en av våra företagsmedlemmar, Image Systems, bland mycket annat. Har du något förslag på innehåll till nästa nummer? Tveka inte att höra av dig till redaktionen, de nås på redaktionen@ssba.org.se.

Slutligen vill jag önska er alla en riktigt fin och frisk jul inklusive lugna mellandagar med tid för återhämtning. Hoppas vi ses på symposiet!

December 2023, Sweden

A Word from the Editors

Call for SSBAktuellt Content

Dear SSBA Community,

As the year comes to an end, we are enjoying the lovely snowy scenes in Uppsala, just like in other parts of the country. Arrival of new year reminds us time is flying by and we want to say a big thank you to everyone who contributed to this and past newsletters.

Now, we would love for you to join in! Share your ideas and experiences with us—whether it is about conferences, internships, or anything exciting. We want to include your stories in the next SSBAktuellt. Just drop us a message at redaktionen@ssba.org.se.

Wishing you a joyful Christmas and a healthy, happy New Year. We are also looking forward to meeting you in Luleå for the SSBA and SSDL Symposium in 2024!

Best,
Deniz and Andrea



Deniz

Andrea

A Word from the Editors

Call for SSBAktuellt Cover Images

Do you have photos, images or graphics you would like to share with SSBA community that would fit the SSBA newsletter? Images connected to Sweden, your research, SSBA activities or graphics which relate to image analysis are all welcome! Please send your proposal to redaktionen@ssba.org.se.

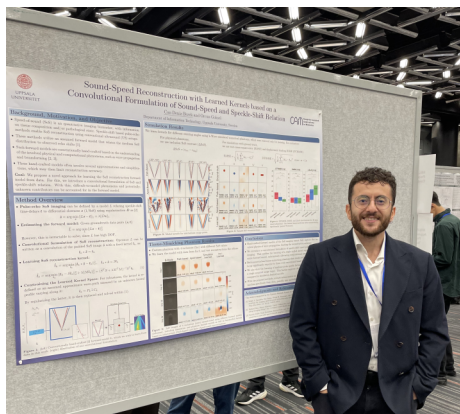


Conference Report

IUS 2023

Can Deniz Bezek reports on the IEEE International Ultrasonics Symposium took place at Montreal in September 2023.

Image: Can Deniz Bezek



I am delighted to share an overview of my participation in the IEEE International Ultrasonics Symposium (IUS) 2023, held in Montreal from September 3 to 8.

The IUS is a cornerstone in the field of ultrasound research, bringing together professionals and researchers from around the world. I actively contributed to the event by giving an oral talk and presenting two posters. This provided a valuable platform to share my research, receive insightful feedback, and establish connections within the scholarly community.

The keynote speech delivered by Yoshua Bengio, a renowned figure in Artificial Intelligence, stood out as a significant highlight. His perspectives on the integration of AI and ultrasound technologies presented a compelling vision for the future development of these dynamic fields.

A valuable aspect was the chance to engage with fellow researchers in my specific field. The interactions were intellectually stimulating and opened doors for potential collaborations. Additionally, the

interdisciplinary nature of the conference facilitated enriching discussions with professionals from diverse research backgrounds, offering a comprehensive view of current trends in ultrasound research. I also met couple of professors and PhD students from Sweden.

In conclusion, I enjoyed participating in IUS 2023. It was a multifaceted experience that combined professional development and networking opportunities. I also found pleasure in exploring Montreal, including its historical sites and relishing the local cuisine, all of which enhanced my overall experience.

The Author

Can Deniz Bezek
PhD student
Uppsala Univeristy

Conference Report

IbPRIA 2023

Elisabeth Wetzer reports on The 11th Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA) took place at Alicante in June 2023.



Image: Elisabeth Wetzer



The 11th Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA) is organized by the Portuguese and Spanish chapters of IAPR, [APRP](#) and [AERFAI](#) respectively, and it is technically endorsed by the [IAPR](#). It took place in June 2023 in Alicante, Spain.

The conference hosted thematic sessions on document analysis, computer vision, medical imaging, and machine learning applications, as well as a full day dedicated to tutorials on unsupervised machine learning, machine learning for computational photography, and continual visual learning. It also featured a doctor's consortium in which a large number of PhD students had the opportunity to display their ongoing research work in a poster session in addition to the poster sessions at the main conference which presented the accepted, reviewed submissions of the conference. The interest in the posters among the participants was very big and led to many engaging discussions, making IbPRIA's poster sessions the best poster experience during my entire PhD studies.

international, with some traveling from as far as New Zealand to attend IbPRIA. Sweden was also represented in multiple presentations, including an oral talk by Raphaela Heil from Uppsala University on "A Study of Augmentation Methods for Handwritten Stenography Recognition".



The crowd of participants was very



Apart from an interesting scientific program and lovely, very engaged attendees, the conference was incredibly well organized and spoiled us participants with absolutely breathtaking views at the reception on top of the Santa Bárbara Castle from which we enjoyed a gorgeous sunset while getting to know each other over delicious Spanish food and drinks. Following the reception at the castle which is situated on [Mount Benacantil](#) in the center of the city, the conference attendants were granted permission to remain at the castle and watch the incredibly impressive fireworks that were displayed the week of the conference, following Fiesta de San Juan Hogueras. The show was amazing and not comparable to any fireworks I have ever seen before!



The conference also offered an excursion to the beautiful MARQ archaeological museum as a social activity, which introduces its visitors to field, urban and underwater archaeology in an interactive way. Finally, the conference dinner was held in Alicante's beautiful harbor at the fantastic Dársena Restaurant which concluded the conference in wonderful Alicante with tons of Spanish delicacies.

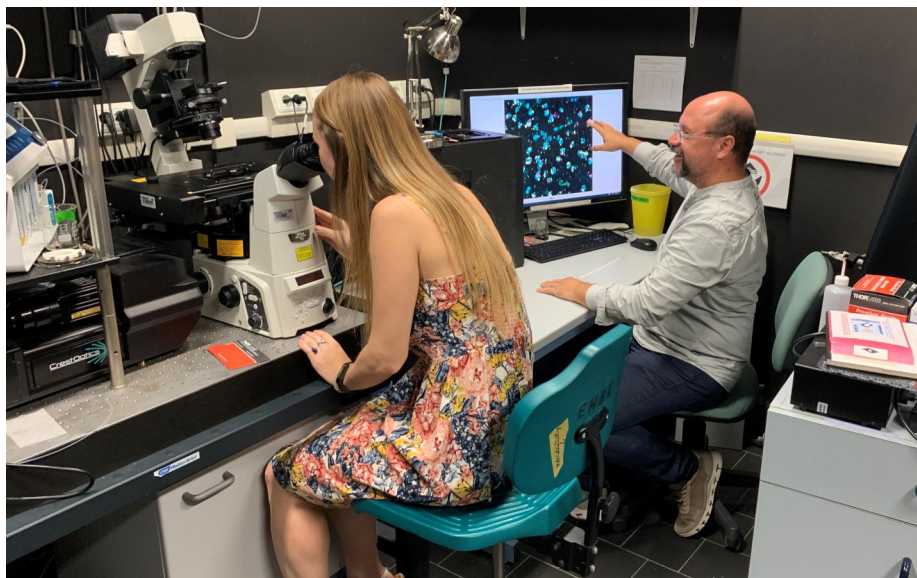


The Author

Elisabeth Wetzer
PhD Student
Uppsala University

Internship report

EMBL Rome



In September 2023, I participated in educational internship at the European Molecular Biology Laboratory (EMBL) in Rome. My primary project during the internship was under the supervision of Alvaro Crevenna in collaboration with the Boulard group. The aim was to implement a microscopy-based method and image analysis pipeline to profile the expression patterns of 200 murine olfactory receptor genes within slices of the nasal epithelium of wild-type and mutated mice. This work aimed to provide valuable insights into the olfactory system and its genetic regulation. Throughout the project, I worked closely with a team of skilled researchers who guided me in the processes of sample preparation and microscopy.

A part of my internship involved hands-on laboratory work related to in situ sequencing techniques. This cutting-edge method is used to visualize and analyze gene expression patterns within the tissue with high precision. Under the guidance of Alvaro Crevenna, I gained valuable experience in sample handling and sequencing, while I could contribute with my experience from working with image processing (such as image registration) and data interpretation.

My internship at EMBL Rome in September 2023 was a remarkable journey of learning, growth, and scientific exploration. I am grateful for the opportunity to contribute to research that has the potential to advance our understanding of olfactory receptor genes and their role in the mouse nasal epithelium. I look forward to applying the knowledge and skills gained during this internship to my future work in the field. I would like to extend my sincere gratitude to the entire EMBL Rome team for their guidance, support, and mentorship throughout this internship.

I'm also happy that the collaboration with EMBL Rome will continue after my internship with the Wählby lab at Uppsala University, and I have been given the opportunity to continue to contribute with my data analysis, interpretation and visualization skills.

The Author

Andrea Behanova
PhD student
Uppsala Univeristy

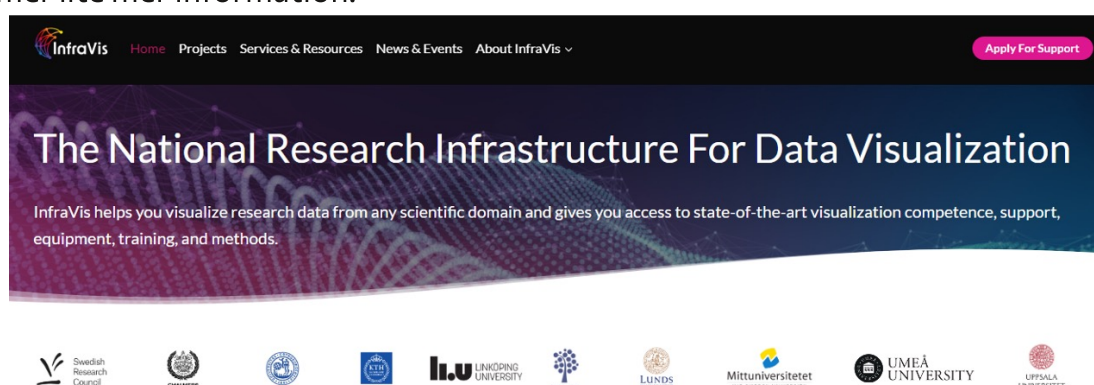
Infrastructure

InfraVis



VAD BETYDER INFRAVIS FÖR OSS SSBA-MEDLEMMAR?

Under mina år som SSBA:s ordförande 2002–2006 skrev jag i många nummer av SSBAktuellt och senare har jag även skrivit om IAPR. Nu är det dags att skriva igen, men på ett annat tema nämligen om den nationella forskningsinfrastrukturen InfraVis. Ni minns kanske att jag talade med er om visualisering vid InfraVis rollup på SSBA/SSDL-symposiet på Kolmården i mars i år? Här kommer lite mer information.



InfraVis – a national research infrastructure providing support for data visualization

InfraVis is a Swedish national research infrastructure for visualization of all kinds of research data. InfraVis provides academic researchers all around Sweden access to combined state-of-the-art visualization competence and knowledge. InfraVis is funded by the Swedish Research Council and its nine partner universities with Chalmers being the host organization. InfraVis has gathered expertise from Umeå in north to Lund in south. Thanks to this build-up, it is possible for InfraVis to quickly assemble expert teams to provide the best visualization support for a given research project.

With InfraVis, you become engaged in visual exploration of your scientific data. We offer the InfraVis users support such as coding of software, training of specific tools, and exploration of modern methods. In so doing, InfraVis enables scientific discovery through visualization as well as helps researchers

increase their research impact and communicate their scientific output in a clear and interactive manner.

InfraVis helps researchers make the invisible visible

We are fully aware of that many researchers with image data at hand already have great expertise in visualizing their data. Nevertheless, we from InfraVis reach out to the SSBA community. We believe that the support we offer can extend your knowledge and give you new ideas on how to present and interpret your data coming from many different application domains.

InfraVis is not a research infrastructure built on hardware and equipment as many other research infrastructures are. Instead, we are a people infrastructure, where you have access to visualization experts at nine partner universities. For information and contact, see <https://infravis.se/>.

InfraVis is an infrastructure for other research infrastructures. Many InfraVis users have research data stemming from other infrastructures, where one example is data coming from beamline experiments at MAX IV.

<https://infravis.se/>. Jag ser fram emot att träffa er på kommande SSBA/SSDL-symposier och tala om InfraVis med er.

Sammanfattningsvis

Oavsett om du är doktorand eller senior, så finns InfraVis för dig och din forskning. Anmäl dig till InfraVis nyhetsbrev, kontakta vår helpdesk, sök support för forskningsprojekt, delta i olika workshops, med mera. För information och kontakt, se

The Author

Ingela Nyström
Nodkoordinator InfraVis
Professor vid Centrum för bildanalys
Uppsala universitet



Infrastructure

Visual Sweden



The Visual Sweden initiative stimulates and supports visualization and image analysis innovation, based in a region with Sweden's highest density of competence in the field. Here is a short version of the story behind.

Image analysis as a field of computer science developed in the 1950s–1970s at academic institutions such as the MIT A.I. Lab, originally as a branch of artificial intelligence and robotics. In the early 1970s Per-Erik Danielsson was hired as a professor of electrical automation at Linköping Institute of Technology (now part of Linköping University). He had a background from KTH and at the Swedish Defence Research Agency (at the time FOA, now FOI), where he was working in a group led by Olof Carlstedt.

Some years earlier, in 1957, Olof was the lucky recipient of a scholarship funded by the Swedish-America Foundation, which enabled the opportunity to study for a time at MIT. There he was taught, among others, by mathematics professor Norbert Wiener, the creator of the Wiener filter, which can be used to filter out noise in an image. So, there we have some kind of connection from the pioneers at MIT to Linköping University. However, it was not fully clear that the group at FOA should focus on image analysis, but demands from the Swedish Defense led to substantial work on creating images from radar data.

It explains that Per-Erik Danielsson was interested in the field and hired Björn Kruse, who started the development of the special image processing computer PICAP. In the late 70s FOA also established in Linköping. Gösta Granlund subsequently also joined LiU, and an ever-increasing number of doctoral students became involved in the two image processing groups that were set up. When both these

groups spun off companies that were the first to be located in Mjärdevi science park, their activities put Linköping on the map and the region began attracting international attention. Today, image analysis research is led by professor Michael Felsberg at the same institution.

The leader of an adjacent group in the 70s, Robert Forchheimer, saw a need to be able to send images, both moving and still, over the telecommunications network. The applications were available in medicine, but also the newspaper industry was interested in being able quickly to receive footage from dispatched reporters. For example, Swedish newspaper editors were among the first in the world to receive images in electronic form via a device developed by Hasselblad AB together with the SECTRA spin-off from LiU. Robert was one of the founders of SECTRA and also founded some other companies like IVP, now SICK IVP.

A major milestone for Linköping university in the field was the establishment of Campus Norrköping in 1997, which quickly became the home of Swedish visualization research, driven by professor Anders Ynnerman, who also was instrumental for the creation of The Center for Medical Image Science and Visualization (CMIV), 2003, and the recruitment of professor Anders Persson. Both these environments combine visualization and image analysis in an integrated way, and increasingly by utilizing advanced AI, as in research on generation of fully synthetic environments appearing as real, led by

professor Jonas Unger.

Many years later, in 2016, the innovation initiative Visual Sweden was established, uniting the immense competence in both visualization and image analysis, at the university as well as in numerous companies.

The objective of Visual Sweden is to promote innovation and growth. It has a wide network of contacts, and the companies I support benefit greatly from this. Furthermore, Visual Sweden helps put focus on our region when it comes to visualization and image processing, which continues to strengthen our brand in this field, says Robert Forchheimer.

For researchers and developers who settle here there are great opportunities for

burgeoning careers, independently of which of the cities you initially decide to establish in. Welcome to Visual Sweden!

References:

-Interview with Per-Erik Danielsson, by Sofia Lundgren, 2008, in the project "Från matematikmaskin till IT", Funded by Riksbankens Jubileumsfond.

-Interview with Olof Carlstedt, by Johan Gribbe, 2008, in the project "Från matematikmaskin till IT", Funded by Riksbankens Jubileumsfond.

-Interview with Robert Forchheimer, by Dag Ankersen, PS Sverige, 2022.



A company successfully combining image analysis and visualization is Maxar International Sweden AB, which spun off from SAAB in Linköping as Vricon and later acquired by Maxar. The photo is a raw satellite image of Linköping captured by a satellite at 620 km altitude.

Infrastructure

Image Systems

När Mjärdevi Science Park tog fart 1984 var Innovativ Vision ett av företagen som etablerades, som en avknoppning från Linköpings Universitet. Innovativ Vision tog fram flera produkter, däribland TrackEye, med lösningar för rörelseanalys, främst för applikationer där rörelse filmades med analoga höghastighetskameror.

Även om tiden har gått, och mycket av den analoga tekniken blivit digital, så är TrackEye fortfarande marknadsledande inom flera branscher och har även kompletterats med den något förenklade mjukvaran TEMA. Dessa produkter säljs över hela världen, och utvecklas numera inom företaget Image Systems Motion Analysis för en serie test- och mätillämpningar, där noggrannhet och precision står i första rummet. Grundprodukterna kan även paketeras med viss hårdvara för belysning och datainsamling. Företaget har sitt huvudkontor i Linköping City, i ljusa och fräscha lokaler med gott om enskilda kontor, där även all mjukvaruutveckling sker. Ett utvecklingsteam på närmare 20 personer, står bland annat för vidmakthållande och utveckling av befintliga produkter. Men då vi även är i en utvecklingsfas lägger vi samtidigt stora resurser på nyutveckling av en moderniserad framtida teknikplattform som kommer att ge nya förutsättningar att utveckla produkterna

image

SYSTEMS

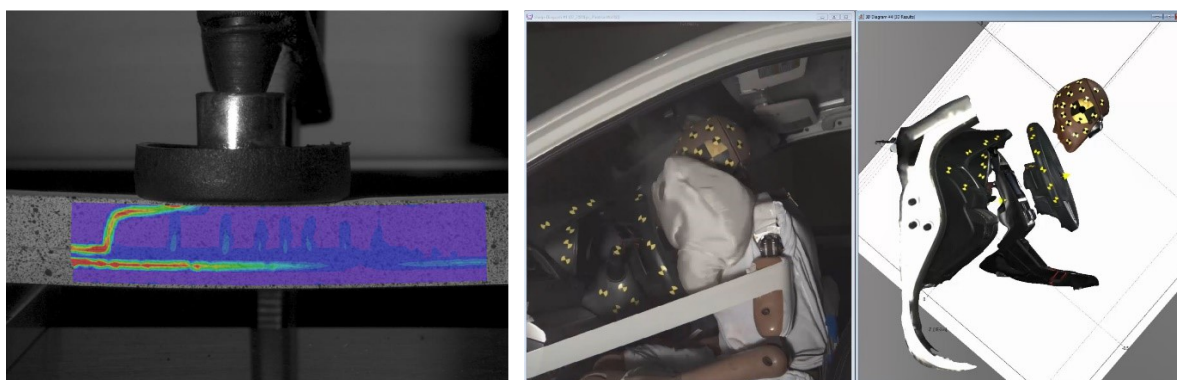
MOTION ANALYSIS

även långsiktigt. Rekrytering har pågått under senaste åren för att skala upp denna utveckling. Därtill utvecklas även en molnbaserad kundportal där kunderna bland annat ska kunna köpa och ladda ner våra produkter, hantera sina licenser, samt få produktsupport.



Företagets produkter utvecklas mestadels av en skara ingenjörer och matematiker, där kunskapsbasen spänner över bildanalys, matematik och mjukvaruutveckling. På senare år har även användaren hamnat alltmer i fokus och numera används både UX designer och ett dedicerat UI/UX team för att säkerställa användarvänligheten i produkterna.

Då våra produkter fortsatt är populära hos våra kunder, så ser vi mycket ljust på framtiden. Med vårt huvudkontor i en bildanalys- och visualiseringsinriktad region ser vi också stora möjligheter att fortsätta kunna rekrytera kompetenta medarbetare, och växa vår utvecklingsavdelning i takt med marknadens behov.



Två produktexempel. Till vänster en DIC-analys av ett deformationstest. Till höger en 6D-analys vid ett airbagtest.

Outlook 2023

Upcoming Conferences



JANUARY

Winter Conference on Applications of Computer Vision WACV

<https://wacv2024.thecvf.com/>

January 4-8, 2024 - Waikoloa, Hawaii

Northern Lights Deep Learning Conference (NLDL)

<https://www.nldl.org/>

January 9-11, 2024 - Tromsø, Norway

FEBRUARY

13th International Conference on Pattern Recognition Applications and Methods (ICPRAM)

<https://icpram.scitevents.org/>

February 24-26, 2024 - Rome, Italy

4th International Conference on Robotics, Computer Vision and Intelligent Systems

<https://robovis.scitevents.org/>

February 25-27, 2024 - Rome, Italy

19th International Conference on Computer Vision Theory and Applications (VISAPP)

<https://visapp.scitevents.org/>

February 27-29, 2024 - Rome, Italy

APRIL

12th International Workshop on Biometrics and Forensics - IWBF2024

<https://www.utwente.nl/en/eemcs/iwbf2024/>

April 11-12, 2024 - Enschede, Netherlands

IEEE International Conference on Acoustics, Speech and Signal Processing

<https://2024.ieeeicassp.org/>

April 14-19, 2024 - Seoul, Korea

Third International Conference on Discrete Geometry and Mathematical Morphology (DGMM)

<https://dgmm2024.dimai.unifi.it/>

April 15-18, 2024 - Florence, Italy

International symposium on image and signal processing (ISPA)

<https://www.univ-biskra.dz/ispaconf/>

April 21-27, 2024 - Biskra, Algeria

MAY

12th International Conference on Learning Representations (ICLR)

<https://iclr.cc/>

May 7-11, 2024 - Vienna, Austria

21st IEEE International Symposium on Biomedical Imaging (ISBI)

<https://biomedicalimaging.org/2024/>

May 27-30, 2024 - Athens, Greece

SIAM Conference on Imaging Science

<https://www.siam.org/conferences/cm/conference/is24>

May 28-31, 2024 - Atlanta, U.S.



JUNE

4th International Conference on Intelligent Systems and Pattern Recognition (ISPR 2024)
<https://ispr2024.sciencesconf.org/>
June 12-41, 2024 - Istanbul, Turkey

IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)
<https://cvpr.thecvf.com/>
June 17-21, 2024 - Seattle, U.S.

JULY

Medical Imaging with Deep Learning (MIDL)
<https://2024.midl.io/>
July 3-5, 2024 - Paris, France

4th International Conference on Pattern Recognition and Artificial Intelligence (ICPRAI)
<http://icprai2024.org/>
July 3-6, 2024 - Jeju Island, South Korea

5th International Conference on Deep Learning Theory and Applications
<https://delta.scitevents.org/>
July 10-11, 2024 - Dijon, France

9th International Conference on Image, Vision and Computing (ICIVC)
<http://www.icivc.org/>
July 15-17, 2024 - Suzhou, China

14th International Conference on Pattern Recognition Systems
<http://www.icprs.org>
July 15-18, 2024 - London, UK

International Conference on Machine Learning (ICML)
<https://icml.cc/>
July 21-27, 2024 - Vienna, Austria

AUGUST

18th International Conference on Document Analysis and Recognition
<https://icdar2024.net/>
August 30-September 4, 2024 - Athens, Greece

OCTOBER

2th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)
<https://conferences.miccai.org/2024/en/>
October 6-10, 2024 - Marrakesh, Morocco

IEEE International Conference on Image Processing (ICIP)
<https://2024.ieeeicip.org/>
October 27-30, 2024 - Abu Dhabi, UAE

NOVEMBER

26th Iberoamerican Congress on Pattern Recognition (CIARP)
<http://ciarp24.org/>
November 26-29, 2024 - Talca, Chile

DECEMBER

27th International Conference on Pattern Recognition (ICPR)
<http://icpr2024.org/>
December 1-5, 2024 - Kolkatta, India

Conference Announcement

SSBA 2024



We celebrate the 41st anniversary of the Swedish Symposium on Image Analysis (SSBA) this year. It is co-located with the 7th Swedish Symposium on Deep Learning (SSDL). The event takes place at Luleå University of Technology, Luleå, Sweden, which is home to the spectacular Northern Lights.

The SSBA symposium is the premier Swedish event where researchers, industrial professionals and students gather to learn about the recent developments in the areas of image processing, computer vision, pattern recognition and related fields. SSBA 2024 will feature keynote speakers, and oral presentations and posters of submitted papers.

Registration for SSBA 2024, March 11-13 in Luleå is open.

Highlights:

- Four keynote speakers have already confirmed, including Seiichi Uchida from Japan
- Preliminary schedule is online
- We will have a social event in the underground mine of our robotics lab and Teknikens hus – great food for thoughts and stomach

Looking forward to see you in March (which is the best time for the northern lights in Luleå)

For more information visit:

<https://ssba.org.se/ssba2024/index.html>

Conference Announcement

NLDL 2024



Deep learning is an emerging subfield in machine learning that has in recent years achieved state-of-the-art performance in image classification, object detection, segmentation, time series prediction and speech recognition to name a few.

This conference will gather researchers both on a national and international level to exchange ideas, encourage collaborations and present cutting-edge research.

Please join for the 7th Northern Lights Deep Learning Conference (NLDL) on 9-11 January 2024 in Tromsø, Norway, organized by Visual Intelligence and the UiT Machine Learning Group.

The program reflects highly relevant and recent topics in Deep Learning.

We are proud to host high profile international researchers as our keynote speakers, such as, Mark Girolami, Narges Razavian, Gitta Kutyniok and Aasa Feragen.

We look forward to gathering the deep learning community again in the cool arctic air for a physical conference.

More info on <https://www.nldl.org/home>

Announcement

Aktuella Avhandlingar

Här presenteras de avhandlingar som publicerats sedan senaste numret av SSBAktuellt och kommit redaktionen till känna. Meddela redaktionen om aktuella avhandlingar



Doktorsavhandlingar

Raphaela Heil

Uppsala Universitet

[Document Image Processing for Handwritten Text Recognition: Deep Learning-based Transliteration of Astrid Lindgren's Stenographic Manuscripts](#)

Milda Pocevičiūtė

Linköping Universitet

[Generalisation and reliability of deep learning for digital pathology in a clinical setting](#)

Maria Priisalu

Lund Universitet

[Modelling Pedestrians in Autonomous Vehicle Testing](#)

David Gillsjö

Lund Universitet

[Applications in Monocular Computer Vision using Geometry and Learning: Map Merging, 3D Reconstruction and Detection of Geometric Primitives](#)

Gustav Grund Pihlgren

Luleå Tekniska Universitet

[Deep Perceptual Loss and Similarity](#)

Ankit Gupta

Uppsala Universitet

[Adapting Deep Learning for Microscopy: Interaction, Application, and Validation](#)