



Third International Conference on Computing and Network Communications (CoCoNet'19)



ACN'19

International Conference on Applied Soft computing and Communication Networks (ACN'19)



Organised by

Indian Institute of Information Technology and Management-Kerala (IIITM-K)



Association for Computing Machinery
Trivandrum Chapter



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CONFERENCE PROGRAM

December 18-21, 2019, Trivandrum, India

Conference Venue

DEC 18-20: TECHNOCITY CAMPUS, PALLIPPURAM, TRIVANDRUM



DEC. 21, 2019: TECHNOPARK CAMPUS, KAZHAKOOTTAM, TRIVANDRUM



<http://coconet-conference.org/2019/>

<http://www.acn-conference.org/2019/>

Queries on Registration: conference.registration@iiitm.ac.in

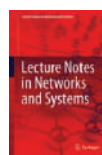
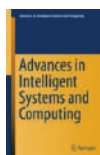
Queries on program: coconet.conference@gmail.com; acn.conference@gmail.com

Co-affiliated Symposiums @ CoCoNet'19



- Symposium on Signal Processing for Wireless and Multimedia Communications (SPWMC'19)
- Symposium on Internet of Things, Fog Computing and Wireless Location Technologies (SIFL'19)
- Symposium on Multimedia, Visualization and Human-Computer Interaction (SMVH'19)
- Symposium on VLSI Design and Embedded Computing (VDEC'19)
- Symposium on Recent Advances in Computational Social Science (SoRiCS'19)
- 6th Symposium on Computer Vision and the Internet (VisionNet'19)
- 4th Symposium on Advances in Applied Informatics (SAI'19)
- 8th Symposium on Natural Language Processing (NLP'19)
- 7th International Symposium on Women in Computing and Informatics (WCI'19)
- 3rd Symposium on Recent Advances in Communication Theory, Information Theory, Antennas and Propagation (CIAP'19)
- 7th Symposium on Control, Automation, Industrial Informatics and Smart Grid (ICAIS'19)
- Symposium on Emerging Topics in Computing and Communications (SETCAC'19)
- Workshop on Blockchain Technology organised by Kerala Blockchain Academy (KBA)

Co-located Symposiums @ ACN'19



- Seventh International Symposium on Security in Computing and Communications (SSCC'19)
- Symposium on Machine Learning and Metaheuristics Algorithms, and Applications (SoMMA'19)
- Fifth International Symposium on Signal Processing and Intelligent Recognition Systems (SIRS'19)
- Fifth International Symposium on Intelligent Systems Technologies and Applications (ISTA'19)



Authors by Country (Accepted Papers)

India, USA, Bangladesh, Canada, Italy, Saudi Arabia, Slovakia, United Kingdom, China, Lebanon, Vietnam, Russia, Indonesia, Greece, Egypt, Japan, Algeria, Nigeria, Australia, Brazil, Czech Republic, Poland, Ireland, Spain, United Arab Emirates, Taiwan, France, Malaysia, Germany, South Africa, Iran, Finland, Morocco, Norway, Jordan, Brunei Darussalam, Singapore, Tanzania and Cyprus.

Total number of submissions (CoCoNet & ACN): 949

Program at a Glance

December 18, 2019		Location
08.45 - 12.30	Conference Registration	Registration Desk, Ground Floor Entrance
09:00 - 09:45	Tea	Ground Floor, Lift Lobby Near Room No. 031
9.45-10.30	Conference Inauguration	
10.30-11.30	Keynote: Trends and Issues in Networking: What's In What's Out? Prof. Raj Jain, Barbara J. and Jerome R. Cox, Jr., Professor of Computer Science and Engineering, Washington University in St. Louis, USA	Gallery Hall, Ground Floor (Room 23)
11.30-12.30	Keynote: Shri. M. Sivasankar IAS, Secretary , Department of Electronics and Information Technology, Govt. of Kerala	Gallery Hall, Ground Floor (Room 23)
	Keynote: Dr. Guy Diedrich, Vice President and the Global Innovation Officer, Cisco Systems, USA	Gallery Hall, Ground Floor (Room 23)
12:30 - 13:30	Lunch Break	Dining Area (Hostel Block)
13:30 - 14:30	Keynote: Research in medical imaging, processing, and informatics: prospect and perspective Prof. Jayanta Mukhopadhyay, Professor, Department of Computer Science and Engineering, Indian Institute of Technology, Kharagpur, India	Gallery Hall, Ground Floor (Room 23)

Parallel Technical Sessions

14:40 - 18:00	CoCoNet-S0-A: Best Paper Session Chairs: Sherly Elizabeth (IIITM-K, Technopark, Trivandrum, India), Kalaivani Anbarasan (Saveetha Institute of Medical and Technical Sciences, India)	Gallery Hall, Ground Floor (Room 23)
	CoCoNet-S0-B: Best Paper Session Chairs: Varsha Hemant Patil (University of Pune & Matoshri College of Engineering & Research Center, Nashik, India), Sudarshan Kumarbabu Valluru (Delhi Technological University, India)	Gallery Hall, Ground Floor (Room 24)
	CoCoNet-S1: Symposium on Internet of Things, Fog Computing and Wireless Location Technologies (SIFL'19) Chairs: Madhusudhan Mishra (Indian Institute of Technology, Kharagpur & NERIST, India), Manu Vardhan (National Institute of Technology Raipur, India)	Ground Floor (Room 21)
	CoCoNet-S2: Sixth Symposium on Computer Vision and the Internet (VisionNet'19) Chairs: Shikha Tripathi (PES University & Bangalore South Campus, India), Gyanendra Verma (National Institute of Technology, Kurukshetra, India)	Ground Floor (Room 20)
	CoCoNet-S3: Symposium on VLSI Design and Embedded Computing (VDEC'19) - Regular and Short Papers Chairs: Kaushik Deva Sarma (CIT, Kokrajhar, India), Durgesh Nandan (Aditya Engineering College, India)	First Floor (Room 120)
	CoCoNet-S4: Main Track - Security and Privacy/Wireless Communications (Regular Papers) Chairs: Suneeta Budihal (Vishweshrayya Technological University, India), Usha Jain (Central University of Rajasthan, Ajmer, India)	First Floor (Room 105)
	CoCoNet-S5: Main Track - Computer Vision, Image Processing, Machine Learning and Pattern Recognition (Short Papers) Chair: Janardhanan PS (SunTec Business Solutions Pvt Ltd., India)	First Floor (Room 116)
	ACN-01: Communication Networks Chairs: Mritha Ramalingam (University Malaysia Pahang, Malaysia), K Somasundaram (Amrita Vishwa Vidyapeetham, India)	First Floor (Room 106)

14:40 - 18:00

<p>ISTA-01: Best Paper Session</p> <p>Chair: Anirban Chowdhury (University of Petroleum and Energy Studies (UPES), India)</p>	<p>Gallery Hall , First Floor (Room 118)</p>
<p>ISTA-02: Intelligent Image Processing /Artificial Vision/Speech Processing</p> <p>Chairs: Rajib Ghosh (National Institute of Technology Patna India, India), Kasthuri Nehru (Kongu Engineering College, India)</p>	<p>First Floor (Room 103)</p>
<p>SIRS-01: Intelligent Recognition Techniques and Applications</p> <p>Malaya Kumar Nath (National Institute of Technology Puducherry & Karaikal, India), Joseph Paul (Indian Institute of Information Technology and Management, Kerala, India)</p>	<p>First Floor (Room 104)</p>
<p>SoMMA-01: Symposium on Machine Learning and Metaheuristics Algorithms, and Applications</p> <p>Chairs: K Satheesh Kumar (Kerala University, India), Rachana Patil (Mumbai University, India)</p>	<p>First Floor (Room 101)</p>
<p>SSCC-01: Security and Privacy in Networked Systems</p> <p>Chair: Anithakumari S (L. B. S Institute of Technology for Women, Trivandrum, India)</p>	<p>First Floor (Room 102)</p>
<p>14:45 - 16:15</p> <p>Tutorial: Fog Computing, Edge Computing and a return to privacy and personal autonomy</p> <p>Mr. Michael Losavio, University of Louisville, USA</p>	<p>Gallery Hall , First Floor (Room 115)</p>
<p>14:45 - 18:00</p> <p>Tutorial: Hands-on training on BigData Analytics and Machine Learning with PySpark</p> <p>Dr. T. K. Manojkumar, Professor, Indian Institute of Information Technology and Management - Kerala (IIITM-K)</p>	<p>Gallery Hall , First Floor (Room 119)</p>
<p>15:30 - 18:15</p> <p>Lightning Talks</p> <p>Chairs: Manjunath Aradhya (Sri Jayachamarajendra College of Engineering, India), Madhusudhan Mishra (Indian Institute of Technology, Kharagpur & NERIST, India)</p>	<p>Gallery Hall , First Floor (Room 117)</p>
<p>15:30 - 17:30</p> <p>CoCoNet-S6: Poster Paper Session-A</p> <p>Chairs: Arijit Karati (National Sun Yat-sen University, Taiwan), Manu DK (K. S. School of Engineering and Management, India)</p>	<p>Room: Ground Floor (Corridor)</p>
<p>16:00-17:00</p> <p>Birds of a Feather Sessions (BoFs)</p> <p>Topic: Role Model of Technical Education in Society</p> <p>Organiser: Dr. Joseph S Paul, Professor, IIITM-K</p>	<p>Ground Floor (Room 43)</p>
<p>16:00 - 17:00</p> <p>Tea Break</p>	<p>Ground Floor, Lift Lobby Near Room No. 031</p>

Cultural Program

by

Noopura Institute of Indian Classical Dance,
Trivandrum



December 19, 2019, 18.30
IIITM-K Technocity Campus



December 19, 2019**Location**

08.45 - 12.30	Conference Registration	Registration Desk, Ground Floor Entrance
9:30 - 10:40	Keynote: A Journey of Five Generations of Biomedical Signal Feature Extraction Prof. Sri Krishnan, Department of Electrical, Computer, and Biomedical Engineering, Ryerson University, Toronto, Ontario, Canada	Gallery Hall, Ground Floor (Room 23)
10:30 - 11:00	Student Research Symposium (SRS'19) - Poster Presentation	Room: Ground Floor (Corridor)
10:40 - 11:00	Tea Break	Ground Floor, Lift Lobby Near Room No. 031
11:00 - 12:00	Keynote: Cybersecurity Trends and Challenges Prof. Ravi Sandhu, Executive Director and Chief Scientist, Institute for Cyber Security (ICS), Professor of Computer Science, University of Texas at San Antonio, USA	Gallery Hall, Ground Floor (Room 23)
12:00 - 13:00	Keynote: Muscle Fatigue Detection using Infrared Thermography Dr. Dharma P. Agrawal, OBR Distinguished Professor, Director, Center for Distributed and Mobile Computing, Department of Electrical Engineering and Computer Science, University of Cincinnati, Cincinnati, USA	Gallery Hall, Ground Floor (Room 23)
13:00 - 13:40	Lunch Break	Dining Area (Hostel Block)
13:40 - 14:30	Keynote: Machine Learning and Visible Light Communications for Autonomous and Electric Vehicles Prof. Xavier Fernando, Director, Ryerson Communications Lab, Electrical and Computer Engineering, Ryerson University, Toronto, Canada	Gallery Hall, Ground Floor (Room 23)

Parallel Technical Sessions

14:40 - 18:00	CoCoNet-S10: Main Track - Computer Vision, Image Processing, Machine Learning and Pattern Recognition (Regular Papers) Chairs: Shikha Tripathi (PES University & Bangalore South Campus, India), Gyanendra Verma (National Institute of Technology, Kurukshetra, India)	Gallery Hall , First Floor (Room 115)
	CoCoNet-S11: Eighth Symposium on Natural Language Processing (NLP'19)/ Data Engineering - Regular & Short Papers Chairs: Rinki Gupta (Amity University Noida, India), Sumana Maradithaya (M S Ramaiah Institute of Technology & Ramaiah Institute of Technology, India)	Ground Floor (Room 21)
	CoCoNet-S12: Doctoral Consortium Chair: Sudarshan Tsb (PES University, Bangalore, India)	Gallery Hall, Ground Floor (Room 24)
	CoCoNet-S7: Seventh Symposium on Control, Automation, Industrial Informatics and Smart Grid (ICAIS'19) - Regular & Short Papers Chairs: Sudarshan Kumarbabu Valluru (Delhi Technological University, India), Puviarasi Ramalingam (Saveetha University, India)	Ground Floor (Room 20)
	CoCoNet-S8: Third Symposium on Recent Advances in Communication Theory, Information Theory, Antennas and Propagation (CIAP'19) - Regular & Short Papers Chairs: Shashibhushan Sharma (NIT Durgapur, India), Sujatha Kesavan (M.G.R Educational & Research Institute, Chennai)	First Floor (Room 116)
	CoCoNet-S9: Main Track - Cloud/Edge/Fog Computing/Wireless Communications (Short Papers) Chairs: Janet Vijaya Light-Thompson (University of New Brunswick, Canada), Chintan Patel (PDPU, India)	First Floor (Room 120)
	ISTA-03: Intelligent Techniques for IoT/Sensor Networks/Distributed Computing/Security Chair: Malu G (Indian Institute of Information Technology and Management - Kerala, India)	First Floor (Room 101)

	ISTA-04: Intelligent Tools and Techniques and Applications Chairs: Alpana Alpana (Jawaharlal Nehru University, India), Ramesh Guntha (Amrita Center for Wireless Networks and Applications, Amrita Vishwa Vidyapeetham University, India)	First Floor (Room 102)
	SIRS-02: Intelligent Recognition Techniques and Applications Chairs: Manjunath K e (ISRO Bangalore, India), Drisya Alex Thumba (University of Kerala, India)	First Floor (Room 103)
	SSCC-02: System and Application Security/Cryptosystems, Algorithms Chair: Tony Thomas (Indian Institute of Information Technology and Management - Kerala, India)	First Floor (Room 104)
15:30 - 17:00	CoCoNet-S13: Poster Paper Session-B Chairs: Shilpi Birla (Manipal University, India), Dhanalakshmi Subramanian (Coimbatore Institute of Technology, India), O K Fasil (Central University of Kerala, India)	Room: Ground Floor (Corridor)
14:45 - 18:00	Tutorial: Social Engineering: Exploiting the Weakest Link Adarsh S V Nair, Head of Information Security UST Global Inc, Trivandrum, India	Gallery Hall , First Floor (Room 118)
14:45 - 17:45	Tutorial: Tutorial / Hands-on Workshop on Bayesian Optimization Dr. Sinnu Susan Thomas, Processing of Speech and Images, Department of Electrical Engineering, KU Leuven, Belgium	Gallery Hall , First Floor (Room 119)
16:00 - 18:00	Lightning Talks Chairs: Jasleen Kaur (IGDTUW & Indian Council of Medical Research, India), Harishkumar Kushtagi Shetra (Mangalore University, India)	GroundFloor (Room 117)
16:00 - 17:00	Tea Break	Ground Floor, Lift Lobby Near Room No. 031
18:30 - 20:30	Cultural Events followed by Banquet Dinner	Dining Area (Hostel Block)

December 20, 2019

Location

08.45 - 12.30	Conference Registration	Registration Desk, Ground Floor Entrance
9:30 - 10:40	Keynote: Artificial Intelligence and Machine Learning for 5G Wireless Networks Dr. Rajesh M. Hegde, Professor and Umang Gupta Chair, Department of Electrical Engineering, Indian Institute of Technology, Kanpur, India	Gallery Hall, Ground Floor (Room 23)
10:40 - 11:00	Tea Break	Ground Floor, Lift Lobby Near Room No. 031
11:00 - 12:00	Keynote: Four Decades of HPC: Architectures, Programming Environments, Systems, and Applications Dr. Vipin Chaudhary, SUNY Empire Innovation Professor, SUNY Buffalo, USA	Gallery Hall, Ground Floor (Room 23)
12:00 - 13:00	Keynote: Denial of Service Attacks on Software-Defined Networks Dr. Rajendra Boppana, Professor, Department of Computer Science, The University of Texas at San Antonio (UTSA), USA	Gallery Hall, Ground Floor (Room 23)
13:00 - 13:40	Lunch Break	Dining Area (Hostel Block)
13:40 - 14:30	WCI Keynote: Security of Quantum Cryptography Dr. Anindita Banerjee, Quantum security specialist, QuNu Labs Pvt Ltd, India	Gallery Hall, Ground Floor (Room 23)
14:00 - 17:00	Tutorial: CAN Network Development Program Venkatesh Mane, Professor at KLE Technological University, Hubballi, Karnataka, India	Gallery Hall , First Floor (Room 118)

14:00 - 17:00	Tutorial: Complex Networks: A Networking Perspective Dr. B. S. Manoj, Indian Institute of Space Science and Technology Trivandrum (IIST) and Dr. Abhishek Chakraborty, Indian Institute of Technology Madras	Gallery Hall , First Floor (Room 119)
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Parallel Technical Sessions

14:40 - 18:30	CoCoNet-S14: Symposium on Multimedia, Visualization and Human-Computer Interaction (SMVH'19) - Regular & Short Papers Chairs: Madhusudhan Mishra (Indian Institute of Technology, Kharagpur & NERIST, India), P. Kalavathi (The Gandhigram Rural Institute - Deemed to be University, India)	Ground Floor (Room 20)
	CoCoNet-S15: Fourth Symposium on Advances in Applied Informatics (SAI'19)- Regular & Short Papers Chairs: Deepalakshmi Perumalsamy (Kalasalingam Academy of Research and Education, India), Mohammad Samar Ansari (Athlone Institute of Technology, Ireland & Aligarh Muslim University, India)	Ground Floor (Room 21)
	CoCoNet-S16: Seventh International Symposium on Women in Computing and Informatics (WCI'19) Chairs: Janet Vijaya Light-Thompson (University of New Brunswick, Canada), Dhanalakshmi Subramanian (Coimbatore Institute of Technology, India)	Gallery Hall, Ground Floor (Room 23)
	CoCoNet-S17: Symposium on Emerging Topics in Computing and Communications (SETCAC'19)- Regular & Short Papers Chairs: R Rajesh (Central University of Kerala, India), Sudhanshu S. Gonge (Vishwakarma Institute of Technology Pune & Savitribai Phule Pune University, India)	First Floor (Room 120)
	CoCoNet-S18: Main Track - Image and Signal Processing, Machine Learning and Pattern Recognition - Regular & Short Papers Chairs: Soumya T (College of Engineering Trivandrum, India), Philomina Simon (Department of Computer Science University of Kerala & University of Kerala, India)	Gallery Hall , First Floor (Room 115)
	CoCoNet-S19A: Symposium on Signal Processing for Wireless and Multimedia Communications (SPWMC'19) Chairs: Sudarshan Tsb (PES University, Bangalore, INDIA, India), O K Fasil (Central University of Kerala, India)	First Floor (Room 116)
	CoCoNet-S19B: Symposium on Signal Processing for Wireless and Multimedia Communications (SPWMC'19) Chairs: Geeta C Mara (UVCE, India), Anu Thomas (National Institute of Technology, Tiruchirappalli, India)	Ground Floor (Room 117)
	ISTA-05: Intelligent Image Processing /Artificial Vision/Speech Processing/Pattern Recognition (Regular and Short Papers) Chair: Karthik P (VTU & K. S. School of Engineering and Management, India)	First Floor (Room 101)
	ISTA-06: Intelligent Techniques, Tools and Applications (Regular and Short Papers) Chairs: Bhavnesh Kumar (Netaji Subhas Institute of Technology, New Delhi, India), Philomina Simon (Department of Computer Science University of Kerala, India)	First Floor (Room 102)
	SIRS-03: Signal Processing Chairs: Shasanka Sekhar Rout (GIET University, Gunupur, Odisha, India), Divya S Vidyadharan (AugSense Lab, India)	First Floor (Room 103)
	SoMMA-02: Symposium on Machine Learning and Metaheuristics Algorithms, and Applications Chairs: Tony Thomas (Indian Institute of Information Technology and Mangement - Kerala, India), Manjunath R Kounte (REVA University, Bengaluru` , India)	First Floor (Room 104)
	SSSC-03: System and Application Security/Cryptosystems, Algorithms Chair: G. p. Sajeev (Amrita Vishwa Vidyapeetham & Govt Engineering College, India)	First Floor (Room 105)

15:30 - 17:00	CoCoNet-S20: Poster Paper Session-C Chairs: Rinki Gupta (Amity University Noida, India), Diana Josephine (CIT, India)	Room: Ground Floor (Corridor)
15:15 - 16:15	Birds of a Feather Sessions (BoFs) Title: New Social Paradigms from New Technologies - How to Build Novel Models of Transdisciplinary Security, Integrity and Authenticity in the Messy Human World of the Information Polity. Organizer(s): Michael Losavio, University of Louisville, USA; Svetlana Polyakova, Perm State University, Russian Federation; Pavel Pastukov, Perm State University, Russian Federation and Alec Yasinsac, Professor and Dean, University of South Alabama, USA	Ground Floor (Room 43)
15:30 - 18:00	Hot Off the Press Chairs: Madhusudhan Mishra (Indian Institute of Technology, Kharagpur & NERIST, India), Joseph Paul (Indian Institute of Information Technology and Management, Kerala, India)	Gallery Hall, Ground Floor (Room 24)
16:00 - 17:00	Tea Break	Ground Floor, Lift Lobby Near Room No. 031
18:00 - 18:45	WCI Panel Discussion: Challenges faced by female researchers and how to empower women professionals in Research and Academia?	Gallery Hall, Ground Floor (Room 23)
18:45 - 19:00	Valedictory Function	Gallery Hall, Ground Floor (Room 24)
19:00 - 19:30	High Tea	Ground Floor, Lift Lobby Near Room No. 031

Saturday, December 21, 9:00 - 16:30

Location: CCF, IIITM-K, Technopark Campus, Kazhakoottam, Trivandrum

Workshop on Blockchain Technology:

A Peek into the Future: Blockchain Myths and Facts

<http://coconet-conference.org/2019/?q=node/49>



10:00 - 11:30 - Strategy and an Innovation Talk : How to make your Organisation Blockchain and Emerging Tech First, Mr. Sudin Baraokar

11:30 - 11.45 - Tea Break

11:45 - 1:30 - Blockchain: Research Aspects

1:30 - 2:30 - Lunch Break

2:30 - 4:00 - Ethereum Lab Practical: Solidity smart contracts, Remix IDE and Metamask

4:00 - 4:15 - Tea Break

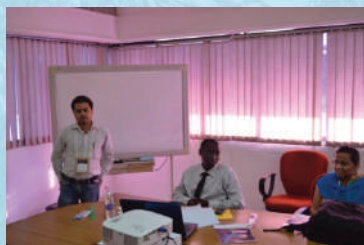
Instructors: Mr. Sudin Baraokar, Mr. Adarsh S, Mr. Praveen, Mr. Aseem and Ms. Husna N. M

IMPORTANT NOTES

- All delegates should bring the printout of the Order received from Explara (refer to the email received from Explara during registration) and photocopy of valid ID Cards. The QR Code will be scanned to issue the registration kit.
- Most Presentations are scheduled for a maximum time of 15-20 minutes, including Q&A.
- Presentations can only be in electronic Power Point formats/PDF.
- There will be a laptop and a projector available for all presenters in the conference rooms.
- Presenters are requested to be present in the room at least 10 minutes before the start of their session and introduce themselves to the session chair. Sign the register to show that you have presented your paper.
- Speaker rehearsal room will be available for presenters who wish to rehearse their presentations.
- The printed posters can be collected from the Registration Desk on the day of presentation.

2015 International Conference on Computing and Network Communications (CoCoNet)

December 16-19, 2015
Park Centre, Technopark, Trivandrum



Kantor Pelayanan Zakat Mizan Amanah Surabaya Dukuh Kupang

Berbagi untuk Anak Yatim

Mizan Amanah adalah Lembaga Amil Zakat Nasional berdasarkan SK No 764 th 2018 Kemenag RI

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Procedia Computer Science

<p>COUNTRY</p> <p>Netherlands</p> <div> Universities and research institutions in Netherlands </div> <div> Media Ranking in Netherlands </div>	<p>SUBJECT AREA AND CATEGORY</p> <p>Computer Science Computer Science (miscellaneous)</p>	<p>PUBLISHER</p> <p>Elsevier BV</p>	<p>H-INDEX</p> <p>109</p>
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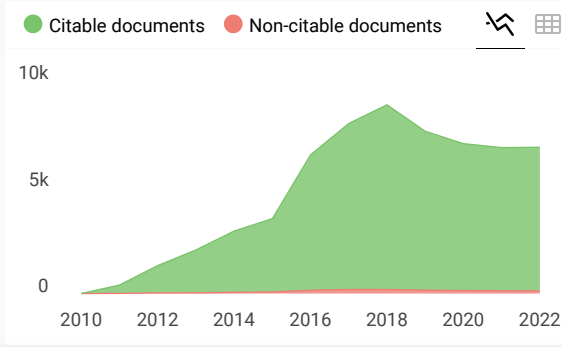
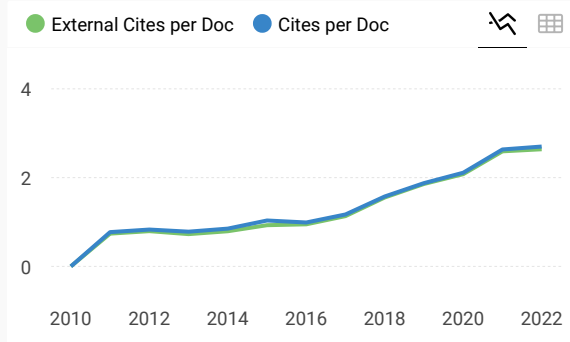
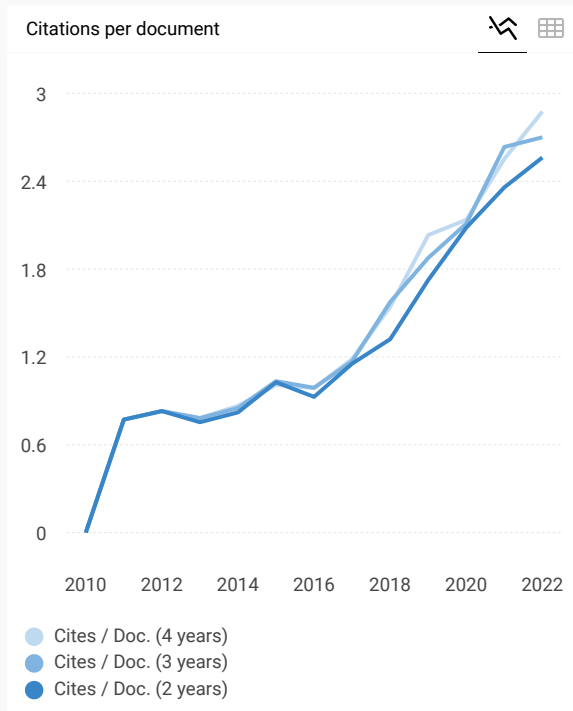
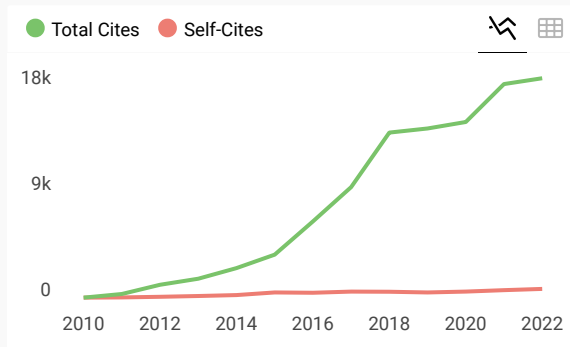
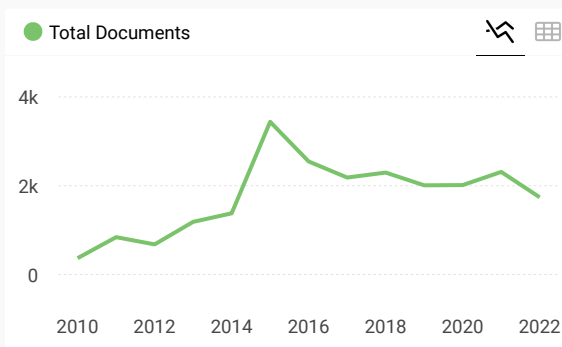
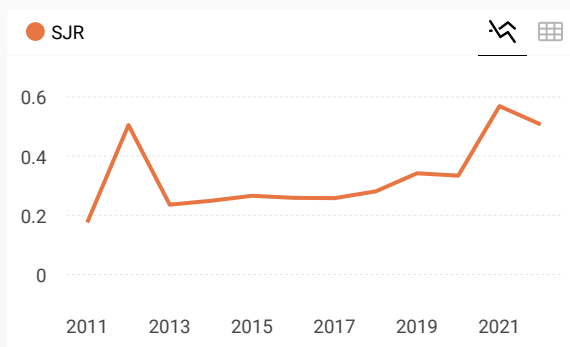
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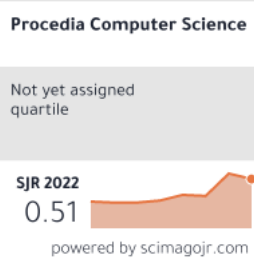
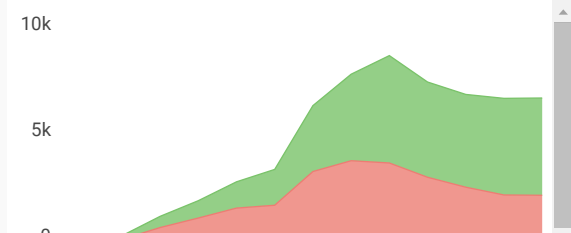
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Metrics based on Scopus® data as of April 2023



sanoj kumar 3 months ago

hi

← reply



Melanie Ortiz 3 months ago

SCImago Team

Dear Sanoj, welcome and thanks for your participation! Best Regards, SCImago Team



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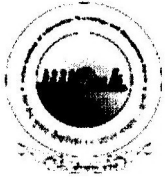
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Third International Conference on Computing and Network Communications (CoCoNet'19)

COCO (Creating Common Object in Context) Dataset for Chemistry Apparatus

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Abstract

In order to create machine learning, we need to build a model. The model is created from a process called training. The goal of training is to develop an accurate model that answers some questions and in order to train a model, we need to collect a dataset. The quality and quantity of the data gathered will determine how good the predictive model can be. Helping the model to understand datasets like humans do is one of the important processes of machine learning. Datasets need to be constructed and transformed correctly. In this research, we compare the difference between creating a COCO dataset manually and creating a synthetic COCO dataset. Creating datasets for chemistry apparatus is not as difficult as creating a human object. The apparatus has a specific shape and form, thus the dataset had to have a limited number. As a result, we create both a dataset both manually and synthetically. The synthetic dataset helps to gain more datasets by combining some objects with different backgrounds.

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Keywords: COCO dataset; synthetic dataset, annotate, chemistry apparatus

1. Introduction

One important process of machine learning is helping the model to understand a dataset like humans do. Dataset are required to be constructed and transform correctly. However, some problems arise when dealing with data. First, one limitation to developing a good model is limited data [1]. Second, an imbalanced dataset presents difficulties for learning models to achieve high performances [2]. Third, some privacy issues occur when dealing with information about the individual [3] [4]. To balance the dataset, we need to collect data equally. Various techniques can be used

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to collect datasets such as manually, using API, doing web scraping, using a dataset platform or generating synthetic dataset.

To generate a synthetic dataset, many algorithms are used depending on the data type. For an online social network dataset, graph topology can be used [3]. If it comes with images, some methods include UCSD Anomaly Detection [1] [5], procedural randomization and manual modelling [6] or image masking and vertices [7].

In this research, we are going to create COCO dataset of chemistry apparatus, which COCO has not provided it yet. The chemistry apparatus has a certain forms, thus most of them have a transparent form. In order to enrich the dataset, we also create synthetics dataset. We are going to make a comparison between creating the COCO dataset manually and creating the synthetic COCO dataset.

2. Literature

2.1. Common Objects in Context (COCO) dataset

COCO is a large-scale object detection, segmentation and captioning dataset [8]. They use several sources to collect object categories, which are grouped into three types, namely iconic-object images, iconic-scene images and non-iconic images. Iconic-object images have a single large object that appeals to the image. Iconic-scene images are recognized as a scene without any object being obvious. A non-iconic image is an image with some objects. It showed that datasets with more non-iconic images are better to use for generalizing. Three stages are used to annotate the image collections. First, category labelling is used to determine which object categories are present in each image. Second, instance spotting is used to label each instance of a specific category found in the previous stage. The final stage is segmenting each object instance.

COCO is a common dataset format used by Microsoft, Google, and Facebook. It is used as a benchmark to measure machine learning algorithm performance. The other common datasets are PASCAL VOC and ImageNet.

2.2. Synthetic dataset

Synthetic data generation is an alternative method for creating a large number of datasets. There are two techniques to create synthetic dataset [9]. First, we create fully synthetic data by making data synthetically. Second, we can combine the synthetic dataset with real data, by replacing some sensitive attribute values. Beside the privacy issue, synthetic dataset is also effective to evaluate algorithms and their usefulness. Mayer found points that need to be considered in order to create a synthetic dataset, namely (1) diversity is important, (2) realism is overrated, (3) learning schedules matters and (4) camera knowledge helps [6].

2.3. Chemistry apparatus

For our collections, we are creating datasets for chemistry apparatus such as a beaker, Erlenmeyer flask, Florence flask, graduated cylinder and petri dish. Each contains 200-300 datasets. We gathered the data from taking pictures at chemistry laboratories located at Sepuluh Nopember Institute of Technology, Surabaya. We are focusing on chemistry laboratories for first to second-year students, because they often use basic chemistry apparatus. We were visiting four laboratories from three faculties, which are Department of Chemistry, Department of Chemical Engineering and Department of Industrial Chemical Engineering. The example of images can be seen in Fig. 1.

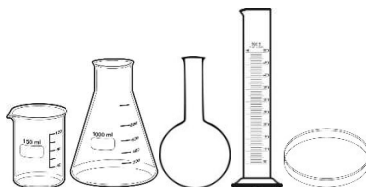


Fig. 1. Beaker, erlenmeyer flask, florence flask, graduated cylinder and petri dish

The beaker, erlenmeyer flask, florence flask, graduated cylinder and petri dish are some examples of the chemistry apparatus. The beaker can be made of plastic or glass. We only gathered data from a beaker glass, which can be heated. The common sizes are 50 mL, 100 mL, 250 mL and 400 mL. The erlenmeyer flask is made of glass, which can be heated and used in titration. The common sizes are 100 mL or 250 mL. The florence flask is made of glass, which can be heated and used in making or storing solution. The common sizes are 125 mL, 250 mL and 500 mL. A graduated cylinder can be made of glass or plastic, which is used to measure approximate values; however, it must not be heated. The common sizes are 10 mL, 50 mL and 100 mL used to measure approximate volumes, must not be heated.

3. Methodology

3.1. Creating COCO dataset manually

In order to create the COCO dataset manually (Fig. 2), first we specify the chemistry apparatus labels. As mentioned previously, labels would be Erlenmeyer flask, Florence flask, graduated cylinder and petri dish.

Second, we collect the images from laboratories at Sepuluh Nopember Institute of Technology, Surabaya. For each category, there are approximately 200-300 images. The images are taken with the original background. Some of the objects had an overlap position. We also scraped the Google Image Search [10], using a python helper software. Herewith the script:

```
googleimagesdownload --keywords " beaker, erlenmeyer flask, florence flask, graduated cylinder, petri dish"
```

Last, we annotate the images as COCO format. We are using an open-source annotation software, which can automatically produce a COCO formatted data [11]. This step is the most time-consuming.

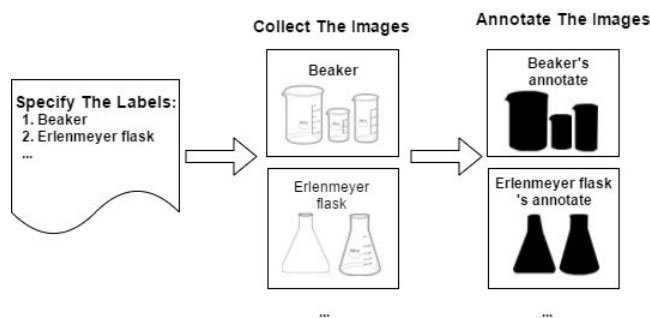


Fig. 2. Methodology of creating COCO dataset manually

3.2. Creating synthetic COCO dataset

In order to create a synthetic COCO dataset (Fig. 3), first we specify the chemistry apparatus labels. As mentioned earlier, labels would be erlenmeyer flask, florence flask, graduated cylinder and petri dish. Second, we choose the foreground and background image, and then we combine with the chemistry apparatus which had already been annotated.

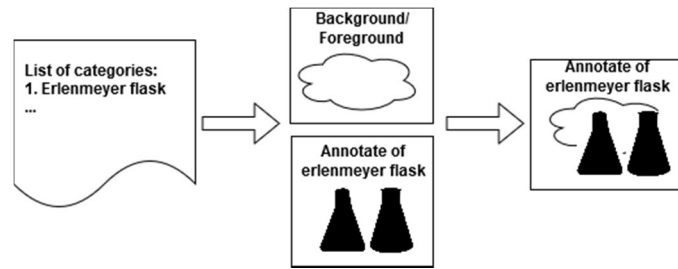


Fig. 3. Methodology of creating synthetic COCO dataset

4. Implementation

4.1. Creating COCO dataset manually

COCO is a standard dataset format for annotating the image collection, which is used to for data preparation in machine learning. Annotate means to create metadata for an image. From Fig. 2, we know there is an image named beaker and we know the position (x and y coordinate, width, length, and polygon area).

The labels from Fig. 2 will be the category of the COCO dataset (Fig. 4). The number described in each category is the number of objects already annotated.

<p>funnel ⋮</p> <p>66 objects have been made with this category.</p> <p><small>Created by admin</small></p>	<p>beaker_glass ⋮</p> <p>64 objects have been made with this category.</p> <p><small>Created by admin</small></p>
<p>erlenmeyer_flask ⋮</p> <p>280 objects have been made with this category.</p> <p><small>Created by admin</small></p>	<p>florence_flask ⋮</p> <p>186 objects have been made with this category.</p> <p><small>Created by admin</small></p>

Fig. 4. Category of the dataset



Fig. 5. The images of chemistry apparatus



Fig. 6. The objects with their annotates

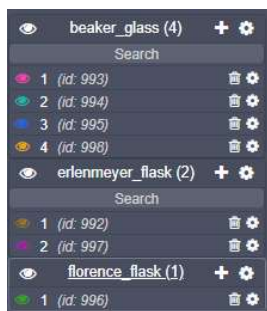


Fig. 7. The categories and their objects

Fig. 5 contains many chemistry apparatus objects, where more than 10 objects are displayed. For this example, we are only annotating seven objects with three categories (Fig. 6). The categories are the beaker glass, Erlenmeyer flask and Florence flask (Fig. 7). For the beaker glass, there are four objects that represent with yellow color. For the Erlenmeyer flask, there are two objects that represent with the magenta color, For the Florence flask, there is one object that represents with cyan color.

After creating the COCO dataset by using the tools from Justin Brooks, we download the json. The json structure contains images, categories and annotations. The images contain an id (auto increment), dataset_id (the folder id), file name, width, height, and file location (Fig. 8).

Categories are the information of the labels and the color (Fig. 9). Annotations contain segmentation, bounding box and color (Fig. 10). Segmentation contains the position of each vertex from the annotation. The bounding box is the maximum x and y of the image. The result from this manually annotate the objects can be seen in Fig. 11. We had a set of datasets that annotate manually. Average time to manually annotate per objects is three and a half minutes.

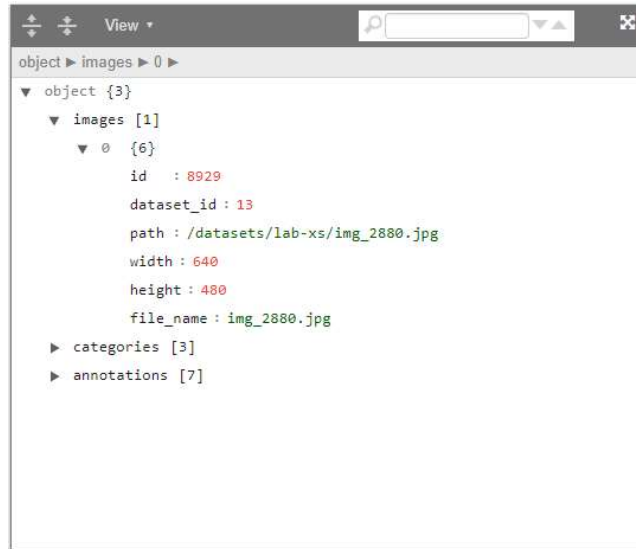


Fig. 8. The structure of json (1)

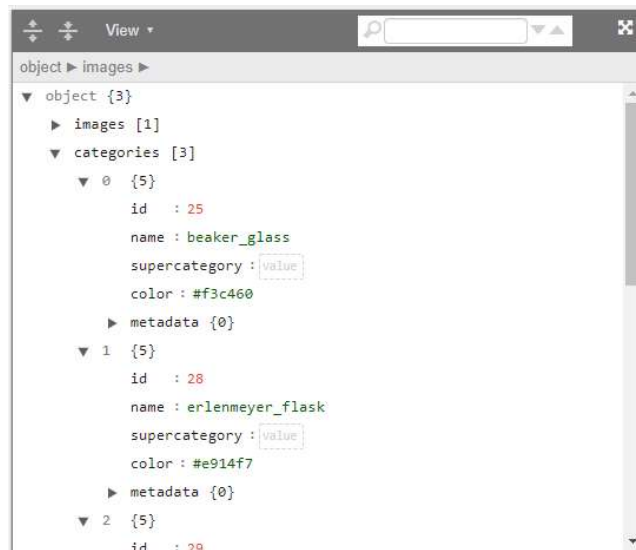


Fig. 9. The structure of json (2)

4.2. Creating Synthetic COCO dataset

Creating a synthetic dataset is challenging; we need to combine many backgrounds and objects. The background for synthetic dataset would be the laboratory itself. We choose ten backgrounds for five objects and we generate 500 annotations for each objects. The json format will be same as Fig. 7 – Fig. 11. We also used the tools from Brooks [11]. The result from the synthetic dataset can be seen in Fig. 12. With the same background, we put the funnel, beaker, Erlenmeyer flask and Florence flask in a different place. The average time to create a synthetic dataset per object is 0.05 minute.

```
object ▶ images ▶ 0 ▶ file_name  
  height : 400  
  file_name : img_0519.jpg  
  ▶ categories [1]  
  ▼ annotations [1]  
    ▼ 0 {10}  
      id : 991  
      image_id : 8928  
      category_id : 28  
      ▶ segmentation [1]  
        area : 29660  
      ▶ bbox [4]  
        iscrowd : false  
        color : #213acf  
      ▼ keypoints [0]  
        (empty array)  
      ▼ metadata {0}  
        (empty object)
```

Fig. 10. The structure of json (3)



Fig. 11. The result of manual annotate



Fig. 12. Synthetic dataset with laboratory background

5. Conclusion

Chemistry apparatus has a specific shape and form; therefore, the dataset had a limited number. In order to enrich the dataset, we need to collect images with many backgrounds or foregrounds. A synthetic dataset helps to collect more datasets by combining background and object. We placed some overlap objects in one background to get different viewpoints. For further research, the COCO dataset will be used for recognize chemistry apparatus using machine learning.

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References

- [1] Ekbatani, Hadi Keivan, Oriol Pujol, and Santi Segui. (2017). “Synthetic data generation for deep learning in counting pedestrians.” *Proceedings of the 6th International Conference on Pattern Recognition Applications and Methods (ICPRAM)*.
- [2] Der-Chiang, Li, Hu Susan C., Lin Liang-Sian, and Yeh Chun-Wu. (2017). “Detecting representative data and generating synthetic samples to improve learning accuracy with imbalanced data sets.” *PLoS One* **12** (8): e0181853.
- [3] Nettleton, David. (2016). “A synthetic data generator for online social network graphs.” *Social Network Analysis and Mining* **6**, 44.
- [4] H, Surendra and Mohan H. S. (2017). “A review of synthetic data generation methods for privacy preserving data publishing.” *International Journal of Scientific & Technology Research* **6** (3): 95–101.
- [5] Li, Weixin, Vijay Mahadevan, and Nuno Vasconcelos. (2014). “Anomaly Detection and Localization in Crowded Scenes.” *IEEE Transactions on Pattern Analysis and Machine Intelligence* **36** (1): 18–32.
- [6] Mayer, Nikolaus, Eddy Ilg, Philipp Fischer, Caner Hazirbas, Daniel Cremers, Alexey Dosovitskiy, and Thomas Brox. (2018). “What makes good synthetic training data for learning disparity and optical flow estimation?” *International Journal of Computer Vision* **126** (9): 942–960.
- [7] Remez, Tal, Jonathan Huang, and Matthew Brown. (2018) “Learning to segment via cut-and-paste.” *Computer Vision – ECCV 2018* **11211**: 39-54.
- [8] Lin, Tsung-Yi, Michael Maire, Serge Belongie, James Hays, Pietro Perona, Deva Ramanan, Piotr Dollár, C. Lawrence Zitnick. (2014) “Microsoft COCO: common objects in context.” *Computer Vision – ECCV 2014. ECCV 2014. Lecture Notes in Computer Science* **8693**: 740-755.
- [9] Dandekar, Ashish, Remmy A. M. Zen, and Stéphane Bressan. (2018) “A comparative study of synthetic dataset generation techniques.” *Database and Expert Systems Applications. DEXA 2018. Lecture Notes in Computer Science* **11030**: 387-395.
- [10] Vasa, Hardik. (2019) “Google images download.” *Online*: <https://github.com/hardikvasa/google-images-download>.
- [11] Brooks, Justin. (2019) “COCO Annotator.” *Online*: <https://github.com/jsbroks/coco-annotator/>.