



IEEE CyberScitech/DASC/PICOM/CBDCOM 2021

IEEE CyberSciTech/PICOM/DASC 2021- A brief overview of the conference

After a long wait in difficult times, we are back. We had a fantastic IEEE CyberSciTech/DASC/PICOM/CBDCOM 2021! Virtually, but not less amazing. The conference used the **Whova** platform to get us all together in those daring times.

We had a 4 day conference (October 25- 28) with several keynotes, papers and a lot of fun. Several simultaneous sessions - it was difficult to choose what to take a look at!

Thanks to our hosts from Athabasca University for organizing all this amazing infrastructure. Athabasca University has undergone a huge effort in 2020 and 2021 to host the co-joint conferences (<http://cyber-science.org/2021/>).

The opening ceremony started on October 25 around 7:15 AM (Calgary time) and there was a speech from prof. Jianhua Ma. The speech was followed by messages from honorary chairs, general chairs and program chairs.

Some data about the event:

- 267 attendees
- 1 panel
- 2 special sessions
- 4 keynotes
- 47 sessions

Right after the Opening ceremony we started with the first Keynote.

We had several interesting and enticing talks. Each keynote was chosen by one of the conferences, so there was room for everyone to enjoy and learn.

DASC Keynote 1 - Understanding and supporting human through personal big data analysis- Jin Qun - Waseda University Japan



This keynote discussed the challenges of personal data analytics as well as the ethics behind it. Through several challenges the speaker showed a modeling approach to responsibly deal with individual data - ensuring data quality, sustainability and security. This individual model is well-suited to Cyber-physical spaces with applications in smart health as well - elderly monitoring specially. The keynote showed how a data pipeline can be used to achieve a higher accuracy in a given particular problem. A very deep presentation with a very important topic.

CyberSciTech Keynote 2 - Misbehavior Detections for Vehicular Communications Networks - Yi Qian, University of Nebraska-Lincoln, USA



This keynote showed that Vehicular communications are vulnerable to wireless network attacks. There are several requirements in Vehicular Networks. There are already several attacks that can cause severe damages - some already well-known. The systems are dynamic since cars move fast. Misbehaviour detection systems should be able to tell the difference between attacks and problems in the network - anomaly detection. Hybrid machine learning and reputation-based detectors can be used to increase detection accuracy as well to ensure the reliability of both node and data. In this particular presentation the speaker presented a technique that employed Dempster-Shafer theory (belief functions) and beta distribution for reputation update. Really amazing talk.

A Panel on Human Cognition and Hyper Intelligence

The panel was one of the peaks of the conference and with several members of the Hyper-Intelligence Workgroup. It helped to highlight the importance of the hyper-Intelligence field in the next few years. It discussed a broad aspect of topics from the concept of Intelligence itself to how to achieve Hyper-Intelligence. It was an enlightening discussion and at the end we just wanted to have more time with it.

Panel Co-Chairs:

D. Frank Hsu, Fordham University, United States
Jianhua Ma, Hosei University, Japan

Panel Speakers:

Shinsuke Shimojo, California Institute of Technology, United States
 ✧ *“Upper Limits” and How to Break Them - in Relation to Somatic and Social Characteristics of Implicit Cognitive Processes*
 Ryota Kanai, Araya Inc., Japan
 ✧ *Implementing Functions of Consciousness*
 Christina Schweikert, St. John’s University, United States
 ✧ *Model Fusion: Combining Multiple ML/AI Models with Cognitive Diversity*
 Michael David, National Intelligence University, United States

- ✧ *Hyper-Intelligent Supply Chain Developments and Risks*
Vincenzo Piuri, Università degli Studi di Milano, Italy
- ✧ *Ambient Intelligence: Convergence of Technologies for Smart Environments*

In a brief overview, the panel discussed the limitations of human intelligence, consciousness, and how AI can be used to mimic and-or improve and extend human limits, and how to use it to automate tasks that can be used to benefit society - such as supply chain (hyperautomation). AI can also be used to enhance our perception of a given environment. In this sense, AI can be seen as a tool for extending the intelligence and capabilities of every aspect of society (citizens and infrastructure) as well as to protect it. Regarding the infrastructure, sensors work as the underlying data collection infrastructure and must be used in new ways to achieve a smart ambient. Those ambients are complex and sometimes a single decision (fusion) model is not enough to give us the whole picture and we need to combine several decision mechanisms to improve performance. Through model fusion and AI decision mechanisms we can achieve hyper-intelligence. This panel was very broad and the problems were very interdisciplinary.

Keynote 3: Orchestration of Virtualized network services in edge computing environments - Paulo Pires - Fluminense Federal University, Brazil



This talk intends to present the concepts of edge computing and how SDN and NFV can be used to provide the flexible infrastructure to use the whole benefits of edge computing. Several challenges are presented such as the discussion of single X multiple VNFs per edge node or single X multiple objectives per VNF. It was also discussed the auto-scaling issues - such as proactive X reactive, the use of ML and Rule base approaches. In the keynote a solution was presented using an online ML approach to solve the auto-scaling problem. At the end the keynote showed a project done in Brazil taking the presented issues in consideration. The keynote also emphasized the importance of using a distributed architecture. A very interesting perspective on a very timely topic.

Keynote 4: Scheduling real-time Applications and in the Fog - Ellen Karatza, Aristotle University of Thessaloniki, Greece



The last keynote of the conference discussed how computationally intensive applications could use big data analytics for producing meaningful results in real time. In this scenario scheduling becomes important - selection, allocation and monitoring of jobs in a distributed manner. The talk also presented different types of scheduling, types of clouds and papers that implemented those algorithms. After a very complete overview of the scheduling scenario. At the end of the presentation, it was discussed where to deploy the computation effort with its pros and cons given the constraints of a given application. It was a very complete overview of the field and an incredible resource for anyone that wants to start researching it.

Closing Ceremony

Unfortunately things cannot last forever and so our meeting had to come to an end. After 4 days of discussion, presentations and overall fun - we had to close to prepare for a new cycle. But not before celebrating those who exceeded our expectations. We had several amazing papers this year and it was hard to choose the best. This year we awarded not only the best papers of each conference but also some outstanding works that called a lot of attention and praise.

Also we could not forget the work of all the amazing people that helped the conference on a daily basis - a special thanks was reserved for all the session chairs, workshop chairs, program chairs and the organization in general.

Outstanding Paper Awards Announcements

- **CBDCOM** - Disk Failure Prediction for Software-Defined Data Centre (SDDC) - Yongqing Zhu
- **CyberSciTech** - A Deep Learning Model for PM2.5 Concentration Prediction - Zhendong Zhang, Xiang Ma and Ke Yan
- **CyberSciTech** - MSBiNN: Multi-scale Bipartite Graph Neural Network for Recommender System - Yifan Chang, Xin Shen, Jing Gong and Zhixin Sun
- **CyberSciTech** - Inflow Forecasting Based on Principal Component Analysis and Long Short Term Memory - Xiaomei Cheng, Hossein Farahmand and Hao Wang
- **Workshop Paper** - *Workshop on the impact of Internet of Things on Daily Life (IoT-Life)* - Analysis on Falling Risk of Elderly Workers when Mowing on a Slope via Motion Capture - Bo Wu, Yuan Wu, Shoji Nishimura and Qun Jin

Best Paper Awards Announcements

- **PICOM** - Data-driven Adaptive Network Management with Deep Reinforcement Learning - Ameer Ivoghlian, Kevin I-Kai Wang and Zoran Salcic

- **DASC** - Chaos Engineering For Understanding Consensus Algorithms Performance in Permissioned Blockchains - Sherif saad, Issa Traore, Shiv Sondhi, Kevin Shi and Mohammad Mamun
- **CDBCCom** - RAYGO: rserve as You GO - Stefano Galantino, Marco Iorio, Fulvio Risso and Antonio Manzalini
- **CyberSciTech** - An Information Extraction Method for Sedimentology Literature with Semantic Rules - Zhicehn Hu, Xiangben Hu, Xiaolong Xu, Lianyong Qi and Shengjun Xue

As one cycle ends another begins, so we start to plan next year's conference. In 2022, we are going to Italy - specifically to the south of Italy, to the beautiful Calabria hosted by the University of Calabria with prof. Giancarlo Fortino as General Chair.

Some details to prepare you for what is coming next year:

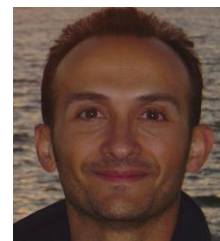
IEEE CyberSciTech/DASC/PICom/CBDCom 2022- Calabria, Italy

The conference theme: **Towards Internet of Everything**

General Chair: **Giancarlo Fortino, University of Calabria, Italy**

Short Bio: Giancarlo Fortino (Fellow, IEEE) is Full Professor

of Computer Engineering at the Dept of Informatics, Modeling, Electronics, and Systems of the University of Calabria (Unical), Italy. He received a PhD in Computer Engineering from Unical in 2000. He is also distinguished professor at Wuhan University of Technology and Huazhong Agricultural University (China), high-end expert at HUST (China), senior research fellow at the Italian ICAR-CNR Institute, CAS PIFI visiting scientist at SIAT C Shenzhen, and Distinguished Lecturer for IEEE Sensors Council. He is the chair of the PhD School in ICT, the director of the Postgraduate Master course in INTER-IoT, and the director of the SPEME lab at Unical. He is Highly Cited Researcher 2002 and 2021 in Computer Science by Clarivate. His research interests include wearable computing systems, e-Health, Internet of Things, and agent-based computing. He is author of 550+ papers in intl journals, conferences and books. He is cofounder and CEO of SenSysCal S.r.l., a Unical spinoff focused on innovative IoT systems. Fortino is currently member of the IEEE SMCS BoG and of the IEEE Press BoG, and chair of the IEEE SMCS Italian Chapter.



Planning:

- 3/4 Keynote speakers
- 1 Full-day Workshop or 2 Half-day Workshops
- 2 Tutorials (two tutorials on hot topics on the conference theme)
- 2-5 Special Sessions
- 1 Panel on Industry/Research hot issues
- Demo sessions during coffee breaks
- Special Issue in ISI-impacted Journals
-

Conference Venue: Very famous Touristic (and historical) towns near the conference venue are Tropea (named the Pearl of the Tyrrhenian sea) and Pizzo Calabro (where there is the Murat's Castle and famous for the Black Truffle Ice Cream). From the port of

Vibo Valentia, it is possible to take a boat to the Eolie islands, where it is possible to visit the active Stromboli Volcano Island.

So as this year's conference came to an end, we would like to take a moment to remember and appreciate all the amazing people that took part. Without the efforts of a huge group of dedicated researchers and attendees this conference - actually any conference - would be possible. So, we - the IEEE Hyper-Intelligence workgroup - would like to wish you Happy Holidays and we hope to see you next year.

