

IEEE COMPUTE

Computer Vision & Machine Intelligence



LET'S INTERVIEW

Dr. Ajith Abraham

Director of Machine Intelligence Research Labs (MIR Labs)



Dr. Abraham is the Director of Machine Intelligence Research Labs (MIR Labs), a Not-for-Profit Scientific Network for Innovation and Research Excellence connecting Industry and Academia. Dr. Abraham works in a multi-disciplinary environment involving machine intelligence, cyber-physical systems, Internet of things, network security, sensor networks, Web intelligence, Web services, data mining and applied to various real-world problems. In these areas, he has authored / co-authored more than 1,400+ research publications out of which 100+ books are covering various aspects of Computer Science. Dr. Abraham received a Ph.D. degree in Computer Science from Monash University, Melbourne, Australia (2001) and a Master of Science Degree from Nanyang Technological University, Singapore (1998).

Currently, Dr. Abraham is the editor-in-chief of Engineering Applications of Artificial Intelligence (EAAI) and serves/served the editorial board of over 15 International Journals indexed by Thomson ISI.

You did your PhD./Masters in Computer Science. What made you so passionate about the domains in the Computer Science field? Do you think AI & Computer Science are the key to the future in terms of sustainability in technologies spanning various industries?

My Master's degree was in Control and Automation. In the mid 90's AI was not popular but at Nanyang Technological University, Singapore I got to study Fuzzy logic, Neural Networks, etc. Those few in-depth courses had a great influence on me to study more and develop my passion for artificial intelligence which eventually led me to do a Ph.D. at Monash University, Australia.

Definitely, AI is the key future technology. It helps us to solve our complex real-world problems, understand a variety of data, provide innovative products and services, leading to improved efficiency, productivity, etc. The sky is the limit with AI. All we need is to connect AI with the application/problem and we can find a way to innovate!

You have authored & co-authored over 1300 publications with an amazing h-index of 86 and have won best paper awards at various International Conferences. Where do you get all these ideas from? What inspires you?

My h-index is now 93 and I have close to 1400 publications. These figures don't mean anything as we still have to learn a lot of things. In front of science, we are like a just

born baby. It's my passion to acquire knowledge that keeps me going and I never get tired. I have worked on all the continents and my visits to different labs / interacting with other people etc. helped me to understand new problems/concepts etc. which later evolved to nice academic collaborations and learning new things. I also owe a lot to my students and collaborators.

I spend about 2-3 hours daily, for reading and this is the key to knowing the latest ongoing things. I edit a few journals and also organize a few scientific events every year. All these have helped me to get to know the latest developments in the field.

You have Industry and Academia experience of over 30 years! What can you tell us about the difference one might face whilst at a University and in the working world outside it - Corporate/Entrepreneur World?

University and Industry worlds are very different with a different focus. Universities are more to create knowledge and disseminate them while industries are meant to serve the public by providing innovative products and services. Having experience with both sectors is a bonus as you can then link theory with practice and utilize your expertise in the best possible way.

I got a campus interview job when I was in the 3rd year of my BTech. Those days campus interviews were rare and I had a deep passion for automobiles since I was a young boy and

my first job was with Ashok Leyland, one of the largest truck makers in India. So you can imagine the smile on my face when I was 20 years old. So those days I never thought of higher studies. It was after a few years, I figured out that I needed a technology upgrade and moved to Hyundai Engineering (South Korea) and Keppel Corporation (Singapore).

Has IEEE helped you along your way? How so?

I joined IEEE in 1995 and definitely, the Society has played a major role in shaping up my thoughts, vision, and serving the community. Since 2008, I Chair the Technical committee on soft computing of the IEEE Systems Man and Cybernetics Society. I was also a distinguished speaker for the IEEE Computer Society for 2 years serving IEEE Region 8. I am also involved in several IEEE Conferences. All these involvements helped me to interact with more Researchers and re-define different ways to serve humanity.

Having been involved in teaching students at your University, you must have come across a lot of students. What was the most common problem faced by them towards research and development? What was your advice for them?

To do scientific research one needs a passion to learn new things and think out-of-the-box. One should not do a Ph.D. for the sake of a job or a degree. Ph.D. is just a “paper” certificate and it will not have any value unless we gain the experience to do

independent research. For excelling in research, one should have that drive and a long-term vision – strategy in life! Staying competitive in a tough academic environment is not so easy as there would be lots of challenges. With hard work and commitment, we will get there

Computer Vision and Machine Intelligence are gaining a strong foothold in various industries across the world, in terms of impact and productivity. What may be the downsides of the cutting technology used in important sectors like Farming, Healthcare, and Transport?

By processing the appropriate low-high level features, computer vision helps us to understand the environment visually enabling us to make intelligent decisions. Imagine what a robot could do if she could see as good as human eyes?

By employing technology in key areas like farming, health care, etc. It can only improve efficiency and productivity. For example, in farming, with computer vision, we can closely monitor diseases in plants, decide harvest time, etc. Imagine if we have such automated 24/7 monitoring for patients. For terminally ill patients, this could reduce the workload for health care staff. Driverless vehicles are on the way and it could reduce the workload for us if we look at a positive side. Adoption of technology could create more technology-oriented jobs and in certain cases, could lead to unemployment and there is a need to re-train those directly involved to upgrade their skills

or setting up alternate jobs.

in your opinion, should never be automated or AI applied to it? Do you believe that letting everything be autonomous or artificially intelligent is actually beneficial in the long run?

As the saying goes, too much of anything is bad for the system. Technology should be used to assist and improve our daily life. Technology should never be used to replace humans. Technology should be used to provide innovative services, improve productivity/efficiency, and decrease the burden on physical work done by humans. We should use a robot to carry a log of wood but not for transferring a patient from a ward to an ICU

Definitely, AI is going to play a significant role in the so-called fourth industrial revolution, which we are enjoying now!.

What are the technical difficulties or problems faced by researchers who are working on these fields Computer Vision, Neural Networks, and Machine Intelligence?

In any field, doing good quality research is simply not easy. The young generation in the scientific community is often pressurized by the employers/funding agencies to produce more. In the process, some of them get carried away by the need for “numbers and over time they also forget quality aspects. So, there is a certain need to focus on quality versus quantity. A scientific publication has no value if it cannot get at least a few external citations

during the first few years of its publication. The Younger generation often faces the problem of getting good guidance/mentors besides lack of funds to purchase resources etc.

You are the Director of Machine Intelligence Research Labs(MIR Labs) which is a scientific network for Innovation and Research having members across 100+ countries, how exciting it is to overlook some of the exciting cutting-edge research developments happening in the world

Yes, it is indeed fascinating to work in an environment where we operate almost 24/7 and we don't have days–nights and weekends. When someone is ready to close the day, there will be someone ready to start the day at some other part of the globe. This is also our strength! We can do a lot of work within a short period. Collaboration through scientific networking is our guiding principle and we have done this a lot better than any other research labs with minimal costs. Recently we organized a Webinar series. We had 27 speakers from 14 countries and close to 1450 attendees from 55 countries. So all our events are very International.

How important is it to be multi-disciplinary in terms of learning and experience to develop groundbreaking projects having the potential of impacting over millions of stakeholders

In any discipline, initially, we are focused on a single discipline (Intra-disciplinary), and in areas like computer science we always try

to view from the perspective of another discipline (Cross-disciplinarity). Nowadays, in machine intelligence we see researchers from different disciplines (Multi-disciplinary) working together and it's a common phenomenon. The field of machine intelligence is growing and it's too difficult to predict what is in store for us after 10 years. Our real-world problems in an Industry 4.0 environment would only get more complex and challenging. There is a certain need for us to evolve our skill sets to work in a Trans-disciplinary environment where there is a need to integrate knowledge from different disciplines beyond the disciplinary perspectives.

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