

Alok Govil: AI Could Augment Our Intelligence

By Kanika Gupta - October 15, 2019

Alok Govil is a principal engineer at Amazon, focusing on artificial intelligence and computer vision. He is a full-stack technologist with breadth and depth in many computer science and electronics disciplines including hardware, software, and complete systems. He has authored eight technical publications including two book chapters and holds 42 US patents + 38 pending applications. Alok is the recipient of a gold medal for being amongst the top 25 students in India in the National Standard Examination in Physics, 1994, and is known for his ability to explain things with simplicity and is a sought-after mentor. See his [LinkedIn](#) profile for more.

What got you interested in Natural Language Processing and Deep Learning? Do you have any advice for the beginners who are hesitant to get started because of the idea that Deep Learning is an advanced field?

I had started programming at an early age of 11 years, in the year 1988 when personal computers were just making way into India, and have been self-learned from that point on. I saw the computer playing chess and almost managing to defeat one of the best players I have personally known, my grandfather. The latter soon shifted my own interest from playing chess into programming for chess, and into Artificial Intelligence.

As a middle-school child, noting how I could set any pixel's color on the screen started my wild imagination into making 3D animated movies entirely on the computer, though my first successful 3D animation did not come until a few years later due to the limitations of the hardware (a 4 MHz processor, with about 32 KB of available RAM and no non-volatile storage).

At around 14 years of age, I came across a program written in machine code, which seemed a hundred times faster than those written in interpreted BASIC language. Not knowing anything about compilers at that time and age, I learned machine code programming, reinvented a compiler, and built a prototype during early tenth grade. Again, as a child not knowing anything about computer science fundamentals or the theory of languages, I imagined compiling English to machine code, leading to the development of my interest in Natural Language Processing.

Deep Learning came much later into popularity, of course, and has seen very rapid adoption and developments. While it may seem an advanced field, a famous researcher, Andrew Ng, has called

Artificial Intelligence the new electricity. Electricity too would have been advanced at some point in time, yet most use it today even without a good understanding of what it really is. Assuming Andrew is right, Artificial Intelligence and Deep Learning too will keep on spreading, making a very deep impact on society, economics, and humankind.

Even if it is perceived by some as an advanced field now, the underlying concepts in any field are often very simple, in fact potentially easier for fresh students to understand. And starting earlier in your age brings unique advantages like in my examples above. While I am generally known today as an expert in the field, my own start with Machine Learning also came primarily through an online course I took in the year 2011.

Given the recent growth and global interest in research, how can one stay updated with the cutting edge?

The humankind is on an exponential technology growth curve. Staying updated with the recent developments involves catching up with the developments from countless researchers all over the world against the single you trying to keep pace. So first off, one should not be discouraged by not being able to follow everything happening in the field of interest. It takes years of maturing in any given field to be able to absorb the key learning from developments happening across the world.

What remains important is to have a solid understanding of the fundamentals, as the latter enables you to assimilate and utilize the newer developments faster and better. Early on, when learning a new domain, one should be asking a lot of questions, and not forget these questions even if they remain unanswered.

As the knowledge in any new field matures, books start appearing on the topics, not only naturally laying out the material clearly for a new audience, but also filtering out the most important concepts from a much larger set produced by the researchers. Many such good books are available today online for free in the field of Artificial Intelligence including Deep Learning, Natural Language Processing, and Computer Vision.

For catching up with recent developments in these fields, I frequently recommend <https://www.kdnuggets.com/> which publishes comprehensive articles for a wide audience. Hacker News (<https://news.ycombinator.com/>) is also an excellent resource for the very latest on many STEM topics, though the readers should watch out to not get overwhelmed and should also make sure to read a few selected articles published in-depth as opposed to reading a large number of them without. Wild ML (<https://www.getreuve.co/profile/wildml>) is also an excellent blog to read, though it is inactive currently.

Apart from technical expertise, what other skill sets played an essential role in shaping your career?

I have been an original thinker from childhood who used to have a lot of questions in my mind, though I used to be overly silent at school. Most of these questions remained unanswered, yet I would not let them go away by maintaining them in a personal diary. Through the teenage years, perhaps this along with a personal challenge led me to confusion and dilemma. I joined the British Council Library and used to park myself before randomly selected bookshelves, reading whatever books were in front of me. Even when I was barely able to take any of the books to the finish line, in retrospect, the latter still helped me develop a broader understanding of a variety of topics.

However, I still did not come out of my confusion till I self-discovered myself as a scientist, at which point I was freely able to overcome many scientifically incorrect beliefs and subsequently kept on discovering answers to all my questions. That curiosity, exemplary willingness to learn, has clearly played a role in shaping my career and professional relationships.

Whereas I used to be very silent during school days, over time, I learned the importance of good communication and slowly developed the skill. We work as a team and having good communication, the ability to explain things well, willingness to learn from others, having mutual respect and gratitude, and also expressing the same, all lead to one's own development as well as that of others. One should spread their knowledge freely and fearlessly; it totally rings true that the more you spread, the more you get. Even if everyone shares just 5% of their knowledge to all others, we can collectively amplify our knowledge several folds!

Likewise, do not be afraid of asking questions if you do not know the answers. You have a choice between looking dumb by asking a naïve question, and remaining weaker by not asking! And anyways, naïve-looking questions are often not actually naïve. While some may feel that their bosses or teachers do not know enough, I practically never look down upon them; chances are that they are working with a different frame of mind and you only have something to learn from them by putting yourself in their shoes.

Last but not the least; I have almost always seen problems we face on a day-to-day basis not as frustrations, but as opportunities. It's easy to say that this and that problem should be solved by the governments, etc.; it's harder to put yourself in their shoes and a still lot harder to understand the root causes of the problems well. Keep in mind though that not all problems are solvable.

You also double as a motivational speaker and a mentor. Is there a specific reason behind you reaching out to people with your experience and knowledge?

It's ultimately my small and big failures and recovery from those. A smaller but much more common example has been with trying to understand things better, whether related to education or beyond. I have often found that the concepts are simpler than they first seem, though the *path* to understanding the same and finding that simplicity in complexity is usually not simple.

It is said that you do not understand something well enough unless you are able to explain it well to others. I have correspondingly been passionate about teaching others what I have learned, along with a habit to keep on learning myself. I have been labeled "a powerhouse of talent", "idiot", "a very committed learner", "guru", "stupid guru", "walkipedia", et al, and I take pride in each one of those (laughs)!

Any expert insight on upcoming opportunities and probable career paths for students interested in/pursuing Deep Learning?

Artificial Intelligence and Deep Learning are rapidly evolving technologies with a lot of scope for further research and innovation. The experts are divided on how long it would take for AI to reach human-level intelligence (sometimes called AGI for Artificial General Intelligence), even though machines are already routinely outperforming humans on many tasks. Some of the needed breakthroughs may come from readers like you, and especially those who are mathematically-inclined.

While research at the forefront is not suited for everyone, the new technologies still present immense potential for innovation and solving a variety of prevalent problems. The said new electricity will over time change our society and economy in significant and often surprising ways. This will include healthcare, governance, and automation, improving the overall well-being of people, and reducing the digital divide. The fears of AI taking human jobs aside, AI could augment our intelligence in the same way in which cars and airplanes have enabled us to do things our bodies could not have. I look forward to the readers making contributions to the humankind by building upon or using the said technological developments.