THE VALUE OF NOT KNOWING

An Interview with

Dr. Reinhard Ploss
CEO Infineon Technologies AG
FLI Global Thought Leader 2019

KEY TAKE AWAYS

- Machine intelligence should be used to help humans leveling-up the global standard of living without destroying the natural resource base.

- The human tendency for convenience can lead to an inadequate power for those companies that own the best data and algorithms.

- The purpose of leadership is to ensure and foster moral judgments how to develop, train, and use intelligent machines.

- Everybody should have basic knowledge about how intelligent machines think and process.

- Curiosity and an explorative approach become important individual capabilities.

- There is a value of "not knowing" that has to be intentionally appreciated.

THE VALUE OF NOT KNOWING

Thought Leader Interview with Infineon CEO Dr. Reinhard Ploss on Leadership and the Rise of Intelligent Machines

by Sebastian Morgner and Laura Bechthold

Dr. Reinhard Ploss is waiting for us in the bright and transparent lobby of the executive floor of Infineon's headquarter in Neubiberg close to Munich – with a relaxed smile and curiosity gleaming under his eyelids: "Welcome!" We, that are Laura Bechthold and Sebastian Morgner from the Future of Leadership Initiative, are curious about the thoughts the CEO of Europe's largest producer of semiconductors will share with us during the next hour. He is dressed in a light blue business shirt, a silver-grey jacket with a fashionable breast pocket handkerchief. He points into the direction of the meeting room: "Let´s go!" One can say that Infineon is right at the heart of the intelligent machine age! Its microchips already steer countless automated applications in cars. Its semiconductors play a key role when it comes to industrial power control, the energy management of electronic devices, running energy efficient server farms as well as in the area of digital security solutions.

Dr. Ploss has been in the microelectronics business for more than three decades. When he started his business career after having received his doctorate in process engineering in 1986, the internet was just taking-off. During his time

ABOUT
DR. REINHARD PLOSS

Reinhard Ploss has been a member of the Management Board of Infineon Technologies AG since 2007. He has been CEO since 1 October 2012.
Reinhard Ploss was born on 8 December 1955 in Bamberg. He studied process engineering at the Technical University of Munich and received his doctorate in 1986. He began his career at Infineon (Siemens AG until 1999) in the same year.

as an industry leader, technology has fundamentally changed economy and society at increasing speed.

After having cared that everybody got their favored refreshment, the leader of more than 40,000 employees worldwide takes his seat, puts his palms on the table and starts to reflect about leadership and the rise of intelligent machines.

He starts by reflecting on the historical development of recent technologies. Machine intelligence, he explains, has emerged as a self-accelerating system driven by the coexistence and fusion of a growing amount of data and ever-increasing computing power. Yet, this development has been going on for over 50 years and thus represents nothing new in particular. A crucial tipping point, however, was reached when machines started to learn by themselves and to train one another. By today, the triad of generated data, use-cases and algorithm capability creates an upwards spiral that humans can hardly predict.

THE FUTURE IMPACT OF MACHINE INTELLIGENCE

In the next part of the interview, we ask Dr. Ploss about his future vision regarding the impact of intelligent machines on our economy and global society.

As regards the economic implications, he takes the stance that intelligent machines will replace many repetitive and monotone tasks, but on the other hand, many new jobs and new intellectual tasks for humans will be created. We keep on talking about Industry 4.0, the internet of things and complex infrastructures. The technical path forward seems fairly clear: More and more hardware components will be mutually connected, software will interact, and unthinkable amounts of data will flow.

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"But is the progress of intelligent machines mainly a development for its own sake or is there an essential purpose behind," we are wondering. Reinhard Ploss makes a thoughtful pause. "There is one fundamental contradiction today", he states, "almost nine billion people live on our planet. Every one of them should have the chance to a decent standard of living. Only intelligent applications can help us achieve this without further destroying our natural resources. We have to achieve more out of less." In his eyes, it is a global responsibility to reduce waste, drive productivity and make lives easier, safer and greener. Even though data analytics and intelligent systems can help to use resources in a very efficient way, there is a big challenge: "Today's artificial intelligence systems like blockchain or Google's AlphaGo are energy burners. Currently, it would be impossible to globally scale such solutions", Ploss tells us. The same applies to areas where highly reliable cloud connections and huge processing capacities are needed like autonomous driving or the internet of things.

Did you know? Infineon is one of the forerunners in developing energy efficient semiconductor solutions that allow AI hardware-software architectures to perform on a much lower level of energy consumption.

On the social side, the complexity of artificial intelligence brings about unprecedented challenges for our society as single human individuals will not be able to oversee the highly interwoven digital universe. Dr. Ploss reflects: "Today, the

majority of people have recognized that machine intelligence matters to them. They understand that things are changing, but it is nearly impossible to forecast in which way. There are many experts around sending very mixed messages. And there is no central authority the people can believe in." The fact that it is almost impossible for a normal user to anticipate the decision process of an intelligent algorithm in combination with the tempting convenience of these systems bears high potential for unconscious manipulation. Many users are not aware to what degree their online decision-making is driven by an AI. And even though they are generally concerned about data protection and security, the convenience provided by AI systems is just too tempting. Looking at platform economies like Amazon many users like and accept the purchase proposals generated by the algorithm, because it helps them to reduce complexity. "Why do people use Google? Because it delivers the best results. You have to ask yourself: Where do I pay by this convenience?" Reinhard Ploss reminds us. In the long run, this could bear the risk of an increasingly monochrome behavior based on dominant algorithms. "The world today is working because it is colorful. We have to avoid monochrome, overly optimized systems. Competition is key for sustainable success.", the CEO states.

Another aspect pointed out by Dr. Ploss is the issue of governance and control in the digital world as opposed to the physical world. To exemplify his thoughts, he compares the emergence of AI with the beginnings of environmental legislation. While harmful environmental impacts are bound to physical boundaries that form a natural basis for legislation, there are no such boundaries in the virtual world due to global connectedness. We cannot simply stop cross-country data flow by law. Hence, the area of control in the digital world is very different, which requires new solutions. Dr. Ploss doubts that the established governance structures of our society will be able to keep up with the speed of technological developments. What government, however, can do is to provide a level of orchestration and awareness: "It has to be a common journey. The relevant stakeholders need to ag-

ree: yes, we walk the road of AI together." But this would require more flexible and adaptive legislation as all the challenges and implications machine intelligence will bring about cannot be anticipated. "We have to walk this road with eyes wide open and to accept corrections even from the hindsight."
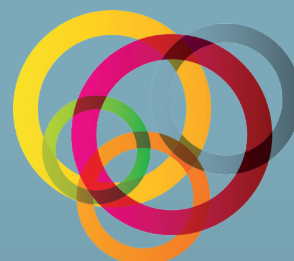
ABOUT THE PROJECT

The Future of Leadership Initiative (FLI) is a non-profit organization that brings together thought leaders, senior executives and highly talented students from leading universities. Each year, we select a Grand Challenge of Leadership – a pressing global and complex issue that requires an interdisciplinary understanding and a participatory approach to be tackled. In various co-creation sessions, we bring together a unique blend of people across industries, academic disciplines, and generations.

Our goal in 2019: To explore how the rise of technologies, such as artificial intelligence and robotics, will impact the future of our global society and economy, and to derive strategies how leadership can empower individuals, teams, and entire organizations to master the transition towards this new digital era.

An integral part of our activities is the dialogue with global thought leaders to learn from their experiences and insights. In the past, our projects were supported by more than 130 outstanding personalities, such as Wikipedia founder Jimmy Wales, Nobel Peace Prize Laureate Muhammad Yunus, cyberarchitect James Law, Siemens CEO Joe Kaeser, or cyborg artist Neil Harbisson.

LEADERSHIP AND MORAL JUDGEMENT

"Artificial Intelligence is just as good as it is trained", Reinhard Ploss states. "It is biased by the data you provide and by the mindset of the people that have programmed the algorithms." He reminds us of the movie I, Robot made already in 2004. In this story, Will Smith fights against robots that became able to interpret and break the rules programmed in their operating systems in their own way.

The implementation of machine intelligence demands a high level of consciousness and moral judgment regarding the possible consequences of relevant algorithms. Individuals, but also companies have to make conscious decisions on how much data they generate and provide to others. This is a vital leadership task. "Those who are receiving the data by the free will of users and own the data may gain an overly dominant position. Some companies will gain control by using AI." Thereby, technology itself is neither good nor bad. It is the intent behind that determines a moral value.

"We need a convergence of self-learning AI systems with a rule-based system that reflects important values." Leadership has to find clear answers about the do`s and don`ts. At Infineon for example, we make no compromises when it comes to products with doubtful consequences for the customer or AI that implies doubtful behavior.

For Reinhard Ploss, education and awareness-building of the pros and cons of intelligent machines are essential. "The next generation has to understand how intelligent machines think to make informed decisions," he predicts.

THE HYPOTHESIS OF A CHAOTIC SYSTEM

In our opinion, one thought of Dr. Ploss stood out in particular. It is his hypothesis that the rise of intelligent machines might trigger a tr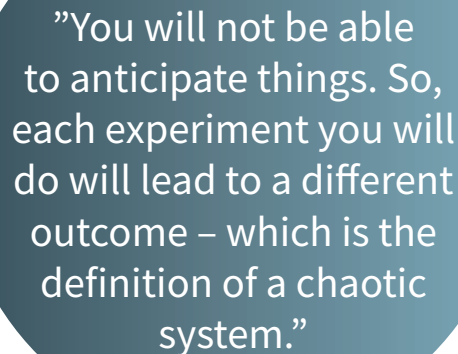ansition towards a chaotic system. Let's reflect a bit on that. Today, terms like complexity and uncertainty are all over the place. Our society is increasingly connected and intertwined. The constant interactions and feedback loops make all kinds of decision-making complex as you always have to take a plethora of factors into consideration. However, if you manage to take all these factors into account, your decisions will become reasonably predictable. Hence, in complex systems, it is still possible to learn from and build upon past experiences. A chaotic system, however, generates seemingly random behavior with each iteration. Outcomes are not predictable anymore.

> "You will not be able to anticipate things. So, each experiment you will do will lead to a different outcome – which is the definition of a chaotic system."

As intelligent algorithms will be further developed and exceed human understanding, the "thought process" of intelligent machines will successively turn into a black box. At the same time, people will keep on interacting with the machines and thus influence their behavior, as well. Consequently, it will become impossible for single entities to understand or even estimate all influencing factors in the system. Dr. Ploss explains: "You will not be able to anticipate things. So, each experiment you will do will lead to a different outcome – which is the definition of a chaotic system."

We found this hypothesis of a chaotic system an intriguing thought as it might fundamentally disrupt the guiding paradigms of our, especially economic, actions today: (1) collect huge amounts of data, (2) analyze, (3) predict, (4) act based on data-driven predictions. In a chaotic system, this current gold standard of decision making will work as much as random choice. So, this might be a fundamental challenge for leadership: What will be the new gold standard of strategic decision making?

THE VALUE OF NOT KNOWING

In the last part of the interview, we are interested in the role of leadership to master the transition towards the new digital era. How can

leadership prepare everyone for working with intelligent machines? What are the most promising use cases? What data do we need? What algorithms will help us to achieve the intended outcome?

Dr. Ploss demands a "fusion thinking between technology and business." The opportunities and challenges of machine intelligence require a high level of interdisciplinary understanding, collaboration and mutual learning. Anybody in the business who requires a digital solution should be able to understand the logic behind AI and the possible ethical consequences, use cases, and algorithms. Therefore, corporate leadership should stimulate curiosity and fascination for the topic, open and honest debates as well as best practice sharing. His pledge to young talents entering the business arena is to stay curious and foster a mindset of exploratory thinking as innovation and software development cycles will further accelerate.

At Infineon, for example, employees are invited to bimonthly Digitalks. This is a globally orchestrated platform to share insights and ideas in a safe space. According to Dr. Ploss, the key ingredient for the success of such initiatives is the permission to 'not knowing': "Curiosity always dies if people who 'know everything' enter the room", Ploss says with a smile, mentioning that Germans tend a bit to be know-it-alls. As we live in a knowledge society, people are conditioned to be smart. For Reinhard Ploss, exploratory thinking starts with open-mindedness. It means entering a process with curiosity and feeling encouraged to speak out what they do not know (yet). Then searching for answers together. Be willing to take a step back. Experiment and reflect. Use moral judgment. Create knowledge as you learn. And with this knowledge start the process again. This iterative approach can help to master things for the better.

The ability to cope with the unknown will become more and more important. Today, many people, especially in leadership positions, perceive "not knowing" as a threat. But it always has been the unknown that provided the potential for innovation and improvement. To intentionally appreciate the unknown unleashes curiosity and creativity. "There is a fundamental insight in valuing the 'not knowing'," Ploss summarizes at the end of our meeting.

QUESTIONS FOR YOUR PERSONAL LEADERSHIP REFLECTION

- Which aspect of your private and professional life is most likely to be disrupted by intelligent machines?

- Thinking about the first question: What is your biggest knowledge gap in regard to artificial intelligence that might become relevant for you? What could be concrete ways to close this knowledge gap?

- What is your perception of Dr. Ploss' hypothesis that we are moving towards a chaotic system? Do you agree?

- Is your organization/ company already fostering "fusion thinking"? If not – what could be concrete ways to do that?

- How can you as a leader establish a culture of controlled experiments? What are the basic conditions you need for fostering that – both in terms of mindset and general organizational frameworks?

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