##### [00:00:01.470] - Introduction

Welcome to EU Code Week podcasts, we bring coding, computational thinking, robotics and innovation closer to you, your community and your school.

##### [00:00:24.750] - Eugenia

Hello, everyone, and welcome this are your hosts speaking Eugenia Casariego and Arjana Blazic.

##### [00:00:30.450] - Arjana

With this series of podcasts. We'd like to contribute to changing the education in Europe and adapting it to a society that is getting more and more digitalized.

##### [00:00:40.110] - Eugenia

And also, we are part of the EU Code Week team and are passionate about digital technologies teaching, and education.

##### [00:00:46.260] - Arjana

In this episode, we are going to talk about the risk of artificial intelligence. We have already talked about AI in schools in another episode of our podcast series. A.I. refers to computer systems that apply intelligent behavior in order to solve problems. But I'm sure you all know that A.I. is everywhere in our daily lives. Just think about opening your phone with Face ID. Think about smart homes or think about recommendations you'll get on the internet. A.I. is used in our everyday lives.

##### [00:01:32.830] - Arjana

However, there are a lot of benefits, but also challenges of A.I.. So today we are going to look at some risks and we will discuss some possibilities to prevent or minimize those risks.

##### [00:01:45.970] - Eugenia

Indeed, but we actually wanted to discuss this topic with actually an expert. It's one of our Code Week ambassadors from Albania, Marjana Prifti Skenduli. Marjana, a very good morning, and I hope you're doing well. How are you this morning?

##### [00:01:58.550] - Marjana Prifti Skenduli

A very quickly something about myself. My name is Marjana Prifti Skenduli. I'm an assistant professor in computer science at the University of New York, Tirana in Albania. My research interests lie primarily in the artificial intelligence and machine learning domain, spanning natural language processing, pattern recognition and data mining. My recent research work is tightly connected with the opinion mining and sentiment analysis of microblogging texts, and this is something I have naturalised through extensive publications, but I feel myself very much connected to the research conducted at the intersection between AI and social and behavioral sciences.

##### [00:02:43.210] - Marjana Prifti Skenduli

In my free time, I volunteer as a EU Code Week ambassador for Albania. This is actually a mission I'm very, very proud of. I joined EU Code Week back in 2018, and since then it has become really a mission and part of my everyday life. I always take a chance to introduce AI to other communities which are not necessarily present in universities or schools to every age, to every single gender, to every person that has, let's say, a passion or has the need to know more about technology.

##### [00:03:22.570] - Marjana Prifti Skenduli

I strictly believe that technology stands a chance to revolutionize and make our lives better, and this is something I advocate in every single possible way in my everyday life and work.

##### [00:03:34.810] - Arjana

This is the reason why we want to bring a AI and coding and programming technology in general to our listeners, to our schools, to our teachers and students as part of the EU Code Week. So speaking of AI, we've heard that there are a lot of benefits of AI, but what are the risks?

##### [00:03:57.340] - Marjana Prifti Skenduli

The problem starts actually with the lack of an officially agreed definition of AI. If we were to actually ask different people from different target groups, they will have a different perception or definition of AI. And the fact that scientists have not yet come up with an exact definition of AI and the fact that the field is currently and constantly being redefined with new topics being added and others leaving the umbrella of AI has make the whole landscape very complex to say the truth.

##### [00:04:36.970] - Marjana Prifti Skenduli

So that being said is very difficult then to kind of create awareness and educate masses about the risks and the advantages of AI. However, sharing a common ground and taking and agreeing actually on a general AI definition as the one that you gave before, I would say that the fact or the topic that or the limitation that basically sits on the top of the list when we talk about A.I. issues or limitations is the algorithmic bias. In the early days, we were talking about limitations such as computational resources and and everyone was talking about AI being so data hungry and so computationally expensive.

##### [00:05:26.540] - Marjana Prifti Skenduli

But today the list is a bit shifted completely upside down, and it looks like algorithmic bias sits the top of the list when we talk about risks. And that also conveys an important message to educators, technologies, policymakers with regards to making people aware of the black box technology that sits behind an AI solution. AI and in particular, machine learning being an important component of AI is being used to make nowadays important decisions in many sectors, and this brings up the concept of algorithmic bias.

##### [00:06:10.870] - Marjana Prifti Skenduli

What it means is the embedding of a tendency to discriminate according ethnicity, gender or other factors when making decisions such as for instance job applications nowadays are massively handled by AI powered solution. Algorithmic bias isn't any more a hypothetical threat that is simply conceived or talked about by academic researchers. Instead, it's a real phenomena. And last but not least, another limitation of AI, which I strictly want to emphasize is the risk of fabricating evidence to a whole new level.

##### [00:06:59.080] - Marjana Prifti Skenduli

We are sort of inclined as human beings to believe what we see. And personally speaking, on a personal note, I share a creed which is that of Carl Sagan. I don't want to believe. I want to know, right? So we are used to believing what we see when we see a leader on a TV stating that their country will engage in a trade war with another country, or when a well-known company spokesman announces an important business decision.

##### [00:07:29.920] - Marjana Prifti Skenduli

We tend to trust them better than just reading about the statement on a on their official websites or official media.

##### [00:07:39.610] - Eugenia

Right Marjana, so you just now mentioned quite a comprehensive list of the risk of A.I. and just give us kind of a rundown of what we can expect when we deal with artificial intelligence. But some of our listeners here may wonder what actually, some of the potential solutions to this risks that you've mentioned or how can we actually take action to to mitigate these risks?

##### [00:07:59.620] - Marjana Prifti Skenduli

You may have probably heard about the algorithmic authority, which is sort of taking over the institutional authorities and not because people are not anymore aware of it, but sometimes you don't have a chance to choose among the two. So the solution to this sort of problem is just awareness. Getting to know more about how solutions that take over certain aspects of our lives are being modelled, are being designed and then fight for ethical standards and ask for those ethical standards to be in place.

##### [00:08:34.600] - Marjana Prifti Skenduli

Social networks as well are becoming a source of this algorithmic bias spreading because most of the data that are being generated on social media, for instance, are, are being used to sort of create content recommendation solutions. And basically, these recommendations that are being collected are pertaining to a bunch of users or to a target, a community of users. Their clicks are being refined and used for recommendation solutions, but they can easily lead to sort of magnifying existing biases.

##### [00:09:12.910] - Marjana Prifti Skenduli

And that complicates a bit more the whole picture, especially considering that people nowadays spend a lot of time on social media and that is becoming actually a must in many aspects of our lives. When I talk about algorithmic bias and ethical concerns, sometimes we can put it as a societal perspective as well. I cannot leave out of this discussion, the work of the EU organization or institution, if you want in achieving transparency through regulation. So awareness and education has led actually to a major step towards transparency.

##### [00:09:58.750] - Marjana Prifti Skenduli

And in this umbrella, the European General Data Protection Regulation, the so-called GDPR is actually one of the biggest milestones in Europe with regards to building transparency through regulation and what they are doing and trying to promote through GDPR is exactly enforcing companies that deal with data, creating awareness among users so that they can fight for rights of access, rights to be forgotten and rights to get an explanation. The last point, actually without going too deep into that is, in other words, telling us that companies such as Facebook and Google who are sort of dominating the virtual arena, at least when providing services to European users, they must explain their algorithmic decision making.

##### [00:10:54.280] - Marjana Prifti Skenduli

And however, it's not very clear. What exactly counts as an explanation, but again, is the first step, and it is absolutely one of the best achievements of the EU. The fact that we have GDPR and we can actually fight for our rights when it comes to transparency and regulation.

##### [00:11:16.470] - Arjana

When it comes to algorithmic bias in schools. I can also remind our listeners of what happened last year in the UK with the UK exam results. So decisions were made by the black box, the algorithms. And many students were not allowed to or were not able to enrol at universities of their choice and also their results were downgraded. It is important to raise awareness and also increase AI's accountability and transparency.

##### [00:11:50.880] - Marjana Prifti Skenduli

Another serious implication that comes along with the implementation and the widespread of the AI is the changing notion of privacy. It has been long known that technology companies collect a lot of information about their users. Earlier, it was mainly grocery stores and other retailers that collected buying data by giving their customers loyalty cards and enabling the stores to sort of associate purchases to individual customers. However, as such, the above kind of data logging is not yet A.I. The use of the AI will lead to new kinds of threats to our privacy.

##### [00:12:29.160] - Marjana Prifti Skenduli

And one of these privacy concerns or threats is the ability to de-anonymize people, breaking the anonymity of data that we may have thought to be safe. The basic problem is that when we report the results of an analysis, for instance, the results may be so specific that they make it possible to learn something about individual users whose data is included in the analysis isn't a classic example, for instance, is asking for the average salary of people that were born in a given year and having a specific zip code in many cases.

##### [00:13:10.170] - Marjana Prifti Skenduli

This sort of analysis could be an analysis of a very small group of people, and it might be potentially easy to unveil their identity. Of course, we are aware of the possibility of fabricating fake evidence. People can be put in places they never visited, with people they never met by photoshopping, and this is something that is not any more new. But it's also possible to change the way things look by simply adjusting lighting or pulling things apart in an image or in a video.

##### [00:13:50.340] - Marjana Prifti Skenduli

So just to keep it short, A.I. is offering us a very wide range of technologies and approaches and therefore allowing us to fabricate evidence to a whole new level. Let me bring here some examples to make the conversation a bit more realistic. Face to face, for instance, is a system which is capable of identifying the facial expressions of a person and then putting them on another person's face in a YouTube video.

##### [00:14:31.150] - Eugenia

Thank you for those very insightful examples Marjana, as well for the concrete list of the risk and also limitations of A.I.. I think there was a very comprehensive, you know, view of A.I., and I think it was very interesting. We want as well with this episode, with this podcast to bring it a bit closer to schools, to students and to teaching in general. And so in the next section of the recording, we want to talk a bit more about this and how do you raise awareness for this risk and for these limitations?

##### [00:15:03.340] - Eugenia

How do you work with your students in your lectures and how do you raise awareness about this very important topic?

##### [00:15:10.930] - Marjana Prifti Skenduli

There are easy ways to learn how to teach A.I., no matter the grade level or subject. It starts with the educator who has to feel comfortable integrating the topic of A.I. into learning. Educators can weave the fundamental concepts of A.I., like learning about data science and ethical design into the classroom, and this allows students to to understand the potential impact of the AI now and in the future. In my everyday work, I teach to undergraduate students and actually I feel that they have a lot of questions and they are eager to get to know about A.I..

##### [00:15:51.790] - Marjana Prifti Skenduli

And in most of the cases, the end of the course is actually very, very interesting because it sort of shows us to the classroom and to myself every time I teach an AI course, how students perception with regards to AI has dramatically changed. So from that science fiction inspired perception, it goes to a more scientifically scientific and theoretical grounded perception. And they also learn to appreciate that A.I. is actually technology that can be used to make impact to create societal impact.

##### [00:16:35.890] - Marjana Prifti Skenduli

But also, my perception is that we need to start educating and creating awareness about A.I. early on, and we need to prepare also teachers of different levels, K-12 level as well to embrace technology and to start eventually teach AI in different matters, in different courses, different subjects. I would say that AI should not start as an isolated course because if you put it this way, then it will be a very difficult task for, let's say, high school teacher.

##### [00:17:14.710] - Marjana Prifti Skenduli

Rather than that, I'll go for the infusion of AI education and that should happen across different curriculas in math, science, music or library classes. Why not? So a similar approach can be taken by just embedding A.I. and talking about AI to different students in different levels, whether they are looking for patterns or trying to break problems into parts or decoding words, whatever is the problem or the domain that teachers are going to be unveiling to their students. It might be interesting actually to to infuse there and to use A.I..

##### [00:18:04.180] - Marjana Prifti Skenduli

So my sort of advice would be let's not make A.I. become the topic or a topic. It's not a separate thing. It just need to be integrated into every single discipline. And specifically, kids and teenagers need to understand the role of AI and ethical considerations because they will be the ones in charge of implementing A.I.. They need to be aware of the biases, they need to be aware of the limitations and instead consult sources which are scientifically proven and also be also.

##### [00:18:46.060] - Marjana Prifti Skenduli

And keep it real, right? Because by consulting only certain articles on media, there is a lot of room for actually misinterpretation.

##### [00:18:58.990] - Arjana

If I may say that your message to our listeners, to all the teachers out there is that they shouldn't be afraid, they should give it a try and teach A.I. because A.I. is all around us. Students use it on a daily basis, so we need to raise awareness of its benefits, but also its risks.

##### [00:19:28.590] - Eugenia

So now that we heard a bit more about the impact of AI in society at large, we want to bring it a bit closer to our audience, our listeners. How can teachers start working with their students at school? Can you give us some concrete examples and ideas that you've created? One of the learning bits of Code Week, which I remind the audience that Learning Bit is a short training module that includes three lesson plans and a video. So Marjana here has, um, develop a Learning Bit

##### [00:19:56.670] - Eugenia

on the topic of AI, I recommend our listeners to go to our website and check it out. But aside from that, Marjana, what are some teaching tips and recommendations to introduce AI in the K-12 classrooms that you can allow or share with our listeners?

##### [00:20:11.310] - Marjana Prifti Skenduli

Oh yeah, my actually everyday experience teaching is a bit different because I deal with more adult groups, but still, it helps me actually often contemplate what can be done differently. And how can we work with these students five years back in time so that by the time they reach university, they have a much more robust understanding of what A.I. technology or related knowledge are? So it might be a way to follow, for instance, or a to follow from teachers trying to analyze historical events and social studies by using A.I. evidence or sometimes in elementary school, teachers may use A.I. to kind of provide provide patterns, right?.

##### [00:21:10.500] - Marjana Prifti Skenduli

Viewing patterns or visualizing concepts might be really interesting, and it might be a way for students to grasp concepts much more easily. In other ways, I may think about teaching sequencing skills that are somehow associated with literacy instruction or engaging math classrooms with content around algorithms and data. So trying to sort of push those traditional math concepts a bit further and try to challenge our our students early on with concepts that might not necessarily sound fitting for their age, looking back at our traditional schooling system. So it might not always be early to talk about algorithms in the elementary grade, it might not be early to talk about machine learning and classification in high school or preschool, sorry high school or element upper school, but still bringing those concepts into their tables and bringing to to students in a very easy and illustrative way.

##### [00:22:31.470] - Eugenia

So now that we've taken a look together on how we can actually bring AI to our schools and to our school planning, then I wander a bit farther. So what do you think is the future of artificial intelligence in education? What do you think this looks like?

##### [00:22:46.350] - Marjana Prifti Skenduli

AI and education are tightly connected with one another and we are going to be actually leaving an area where AI and education are going to be strictly connected. But it's not only about learning and preparing for AI, but it's also about learning with AI, using AI powered tools in classrooms and also learning about AI in terms of technologies and techniques. So if I can break it down into three pillars, this coexistence between AI and education is going to be exactly about learning with AI, learning about AI and preparing for A.I..

##### [00:23:38.700] - Marjana Prifti Skenduli

If we manage to tackle these three important objectives in different levels of the educational system, then we are probably going to be very successful in preparing the generations of the future because the goal is for now as I see it, to contribute to mainstreaming both the human and technical aspects of AI. And this is something we can achieve not only by relying to the default schooling system, but also by creating, boosting and also and supporting, also financially but not only, initiatives such as EU Code Week or other training programs for school students so that we can really come up with, um, realistic targets and achieve objects in the long run.

##### [00:24:36.070] - Eugenia

I think that was a good way, a good conclusion, no? To the episode, and to a good last messages. So thank you very much for joining us today, Marjana. Thank you for your insights on this very important topic. So thank you very much for joining us, Marjana.

##### [00:24:53.740] - Marjana Prifti Skenduli

Thank you for having me. It's always a pleasure to come back here.

##### [00:24:56.900] - Eugenia

Thank you. And once again, I invite our listeners to check out the Learning Bit that Marjana contributed to with the fantastic lesson plans and the topic of artificial intelligence. Just go to our website codeweek.eu, where you will as well find several resources and several materials that will help you start your coding journey.

##### [00:25:16.270] - Arjana

See you next time for a new episode of our Code Week podcast with some interesting fact on coding and digital technologies in education. Goodbye.

##### [00:25:26.200] - Marjana Prifti Skenduli

Goodbye. Thank you.