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AI FOR GOOD GLOBAL SUMMIT
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>> ANJA KASPERSEN: Pedro, can you hear us? Please can you say some sentences so we can make a test here in Popov room to see how the audio is? Yes, we can hear you. Thank you very much. Everyone is taking their places. We are about to start. Thank you.

So good morning, everyone. If I may ask you to take your seats so we can start the session. And we don't run in to your coffee break. It is a very exciting session. The title of this session is Poverty Reduction and Capacity Building. Allow me to first introduce myself. Some of you may have met me before. My name is Anja Kaspersen. I work with the International Committee on Red Cross. I'm very excited to be here with an exciting panel. I will come back to who those are in very shortly. But first just remind ourselves what the session is about.

Mr. Anthony Guterres noted in his opening statement there is a lot to be gained from the benefits of Artificial Intelligence but also great risks of leaving people behind, and that's what is the discussion today is really about. How we tackle the growing digital divide or digital inequality, this is in my view not an access issue but a question of ensuring that digital

development especially in countries leap technology is matched by maturity in digital governance.

Even if people have access there is a higher risk of exacerbating division. How can AI help end deprivation. That's one of the core questions. And unlike a lot of the issues that we have been discussing over the last two days, some of them may appear a little science fictione, the issue of deprivation and poverty is very existent with us today. We have one of the worst humanitarian crises, food crisis happened in Yemen. We have issues around food security. This morning the news media was reporting on the outbreak of cholera in Yemen. We have the Horn of Africa, so Somalia. Will technology be it in the form of AI or AI being used together with other technologies be able to help us.

I am happy to introduce as our first speaker to speak on the practicalities and field level perspectives on these issues from the World Food Program Mr. Robert Opp. And he will enlighten us on what the World Food Program is doing and share some concerns around some of the hurdles we need to overcome. With no further ado, Robert, I will leave the floor for you and will return to the audience after the presentations for you to engage with us on this important issue.

(Applause.)

>> ROBERT OPP: Thank you, Anja. And good morning, everyone. My presentation loaded up please. Okay. Thank you. Well, my name is Robert Opp. As Anja said I am the director of innovation and change management division at the World Food Program. And this Plenary discussion and the breakout session this morning as well are all about the issues of poverty eradication of things.

Hunger and poverty are very closely correlated. The reality is that in the world today we still have 800 million people that do not have enough food to eat. That translates to 1 in 9 of the world's population. The -- most of these people live in poverty, most of them in extreme poverty as well. And, of course, hunger has different causes. One of them, of course, would be natural disaster, people displaced from their homes from natural disaster.

Another one that we are seeing a lot and Anja just referred to we see a lot of hunger conflict. They are pushed out of their homes and they are unable to purchase food or grow food for themselves and families. We have the situation of chronic hunger which affects most people who are living in hunger. This is a picture of six Guatemalan children. You can see how short these are compared to the benchmark. And these are all nine years old. And they haven't had enough to eat over the period of their childhood. And that means they are stunted physically and

mentally because of not getting enough food. And they will probably not recover from that.

Despite population growth over the last 15 years we have reduced hunger by about 2 million people. We look towards the Sustainable Development Goal. And the Sustainable Development Goal is to end hunger by 2030. And the question is how are we going to get there. How are we going to accelerate our progress because at the current rate we won't make it. And this is where what the topics that we are discussing over the last couple of days and today some of the exponential technologies that Marcus Shingles introduced to us on the first day were looking at these trends such as universal Internet, Internet of Things, rise of computing power and, of course, Artificial Intelligence that underpins or that is underpinned by a lot of those things how can that be brought to bear against hunger.

So the first one is when we look at satellite imaginary. Humanitarian responses use satellite images for quite some time. The issue is that it takes analysts quite a lot of manual labor and time to sit there and look at those images. This is an image of an internally displaced camp in South Sudan over time. And the issue is how do we know what's going on here and can we use machine reading to look at those images. And now that we have so much satellite imaginary available to us how can we speed up all of that and expand the way that we are monitoring the humanitarian contexts.

The second example is using -- for the last few years the World Food Program has used the fact that cell phones are almost ubiquitous. How can we use mobile phones to call people and understand what their status being affected by crisis and hunger and we have done. We have developed a chat bot that's capable of interacting with people in 20 different languages and what would be the future trend of this if we were to expand. What people are being faced by in terms of crisis or hunger. And then we often need to deliver food and other materials to very difficult to reach areas, the most difficult are the ones affected by humanitarian access concerns. We can't get access because we are concerned about the safety of our staff or truck drivers going in to certain areas. Could we use autonomy vehicles underpinned by technology to do that? On the production side when you look at what needs to happen in terms of greater food production, there really is a lot of work that can be done using satellite images, the data from low cost sensors, all of the data that we have available to understand and build predictive crop modeling to be able to understand if there is going to be production problems.

Will there be a drought, other production issues and how can farmers really target the use of their inputs to a much greater

extent and have greater yields as a result of that. And there is a lot of work going on in this area. We have a small company out here called Harvesting that's in the main foyer. They are working on this issue exactly.

And the final example is looking at food systems. A lot of times hunger can be a result of a very inefficient food system and most of the food systems that we see in the developing world are quite inefficient. And the issue is how can we match farmers who are producing food with buyers in the market and all of the intermediaries in between, supply chain providers. And we started developing platforms that would match farmers with markets. This is an app that's being used in Eastern and Southern Africa to do precisely that. How can we take that to the next level with optimization engines to really understand where a farmer who wants to market a particular product can go at any given time for the best price and the best condition.

And so just to come back to the original question, can AI help end hunger. But our answer is yes. It won't do it alone. But it really can play a very important part as a tool in helping to address some of the issues that we talked about today. And I'm happy to discuss that more. Thank you.

(Applause.)

>> ANJA KASPERSEN: Thank you so much for that, Robert, and also for keeping to time. So just a quick question, follow-up question because one of the issues of AI and there has been a lot of discussions especially in the breakthrough group on ethics and privacy. You are helping the most vulnerable of the vulnerable. Seeking refuge from war and conflict and other big crisis. How do you deal with the protection element of using technology helping vulnerable at their most vulnerable?

>> ROBERT OPP: I think that we have a very strong concern about that. Particularly as you said because the people that we work with are very vulnerable, particularly refugees or people that may not have a relationship with their state, that is -- there is concerns about their security. We -- I mean this is not necessarily Artificial Intelligence related but we are looking a lot at technologies like block chain that may actually give more -- a greater security to people if they need to have -- to be registered in humanitarian systems, they could do that and control their own data.

It is a distributed ledger that's very secure, more than a server being based somewhere else. So that's one example. But in general we have to be very careful to invest in security necessary to protect the identities, protect the information of those people because quite frankly I feel like no one is really safe, but out of all the people in the world they have really no means or no advocacy to stand up for themselves in some cases.

>> ANJA KASPERSEN: Really experiences that AI and other technologies truly crosses borders and permeates everything in their lives. Thank you so much for that. We will visit that. It is interesting to hear about the block chains. I think that's one of the issues to come back to. Even if it is not distinctly AI the combination is interesting.

Let's move over to the next speaker and looking at my notes and make sure I pronounce your name correctly Padmanabhan who is the vice-president of Adobe but a strong advocate and serves those that need it the most and do not create the digital divides. Thank you.

>> PADMANABHAN ANANDAN: Thank you first of all. And thank you for inviting me here. It is an amazing honor to be in a place like and speaking to an audience not only because of the qualifications, diverse range of experience you all have but speaking in the UN Forum. And this is the kind of thing that you dream about in your life. Thank you for getting me here.

While I wait for my slides a few personal remarks, I have been a computer scientist working in the area of research, computer Artificial Intelligence for more than 30 years. One of the things that I have learned through that process is that the application of research to the real world in terms of affecting people's lives no matter what strata it is it is a complex problem and requires something beyond technology itself. It requires a number of social and other community aspects to come together. I'm still waiting for my slide deck. Otherwise I can just talk.

I'm not sure. Okay. So I'll -- I have my slides in front of me or something like that. The title of my talk was going to be -- I guess it is coming up -- is AI for the Underserved. And it is a former phrase that used to be talking about a few years ago called Technology for the Underserved. AI for the underserved. And the question I have been trying to address what is it that it means in terms of addressing the vast community of people who are below a certain level of strata in socioeconomic aspects with respect to how AI can help them. And, you know, when you think about that, it is really a case of some type of inclusion. If you think about people who work and live in rural areas in many countries such as India where I come from any kind of access to the mainstream lifestyle of mainstream society in terms of the comforts, technology aspects is actually a challenge. So it could be financial inclusion in terms of money and so on. And this is a topic that has been dealt with many times. It could be inclusion in terms of education, inclusion in terms of health care, inclusion to communication and other type of access to infrastructure and all that. So this is in some sense the fundamental challenge. If you are not able to be

included in the social process wherever you are, you are not really able to make progress in life. Food and hunger is a natural part of it but it applies to any aspect of life and society.

Now how can AI in terms of these kinds of aspects actually help? I don't need to give you statistics about the problem of inclusion. When I was preparing for this talk I did a bunch of search and browsing online and you can find tons of examples of images and statistics that tell you how the problem of inclusion is severe. But the question that we want to ask itself is how can Artificial Intelligence help in this process. Now to think about this I want to take back -- okay. Good. Now I can skip forward a few slides, I think. Yes. So these things advance. Going to skip over. These suggest some statistics and things that I picked on. I don't need to dwell on them, especially for this audience.

And if you look at health care, the severe shortage of medical experts and facilities in rural areas. So the question is can AI help. So here I want to look back a little bit. About 13 years ago when I was working at Microsoft research as a research scientist we countered this whole movement that was taking place about applying information and communication technology for social development, especially in rural areas. There are quite a lot of organizations, NGOs, even companies that were investing in this problem and quite a lot of these experiments were happening in India, Asia. And I went to India and learned about it and inspired that we should open a research center in India with the aim of addressing these kind of problems from the point of view of technology. So we did.

In 2005 I established Microsoft research. And I had the great privilege to set up. Work that's been going on beautifully even now. But as we started working in it without very quickly we realized something, that, in fact, technology may not actually be the solution, the only solution or the primary solution to a lot of these problems. Social problems have to be addressed to social means. My colleague worked with me in order to build this area came up with this. So he is now a professor at the University of Michigan and this is his quotation. Basically what we finds is that technology no matter how well it is designed is really a magnifier or amplifier as to what people can do. And this is something we find in the context of trying to apply technology in horizons beyond the comfort zones that we all are in the upper straits of society. Just the process of getting technology in to various areas in rural domains and so on, encounters a myriad of challenges that cannot be solved by technology. Through a lot of experiments and work we have done when we work with organizations and agencies who have dedicated

their time and energy to address these communities and work with these communities and address their problems we can make progress. Rather than coming from the outside and bringing technology as a thing you throw at these communities if you talk to them and understand what are the problems they are dealing with on a specific and daily basis we can come out with interesting interventions that these social processes are already applying by leveraging technology.

I believe it will be the same with Artificial Intelligence. When we try to apply these technologies we will find the best way to apply them would be to look at many existing organizations and programs that are trying to work addressing these problems and find a way to work with them and enhance the work through the use of technology. Apart from that regardless of how you do it at many levels these suggest some of the natural thoughts that come to mind. Policy level, of course, is very important. Societal levels through large Governmental or private programs that have massive improvements are important. Small community level are very much important.

The one that I want to focus on today is really at the individual level. And the reason why I bring this up because one of the things that has recently emerged and this is something that most specifically I learned in my tenure at Adobe is the availability of data and information about large groups of people individuals, wide range of demographics helps understand a lot of what an individual needs. Allows us to segment people form clusters and specifically what may be needed for a particular individual is actually easier to data mine when we have that type of information.

One very, very simple, this is not the last thing and a couple of examples of this is actually, you know, the telemedicine, many examples of that and more recently one of the projects that started in Microsoft research, using cell phones as a means of interventions in the health care. And the reason I brought this up is because really when the -- when the format of technology is small, in fact, when we use devices that are simple and easy to access and available to everyone such as cell phones and when the interaction is at a very personal level, some exciting developments in the area of conversational agents and intelligent assistance has a tremendous intent in being able to be apply to. This because they can tailor themselves to the specific needs and learn from what is going on elsewhere and offer recommendations and choice, tailor choices for health care. Starting in the small and expanding to the large which is what I think we should focus on.

>> ANJA KASPERSEN: Thank you so much for that. One follow-up question which I think, you know, kind of builds on

your talk which, you know, as an Indian you spoke about your country initially, a country that lives two realities still trying to serve those that don't have access but at the same time being extremely mature in other aspects. Do you see India -- being a scientist and having worked in the space in Big Data and AI that there is sufficient maturity at the governance level to have two- pronged approaches to this?

>> PADMANABHAN ANANDAN: I don't think about it as a two-pronged approach. It is a natural thing that forward advances of technology happen in that part of the society which can actually afford to do those explanations. And the other side of the society which exists in any society is struggling for a livelihood. Naturally those will be important. But what's interesting when these two work together some of the most critical problems can be addressed by technology but it will not be addressed by starting with some blind eye for this and then trying to do something and throwing it back. It really can be addressed in a very much in place type of model. Not being addressed some very unique technologies that apply to the poor people that's going to work. It is going to be a way of using those set of problems and domains as a way of learning what we can build that will solve a large class of problems. I don't think it is a dichotomy as much as two sides of the problem.

>> ANJA KASPERSEN: Thank you very much. We will come back and hear more of your insights.

(Applause.)

>> ANJA KASPERSEN: Thank you. So the next -- the next speaker will be joining us remotely. So I'm not sure, did we get his image up on the screen or do we just hear his voice? Just his voice. He is just surrounding us basically. So we are bringing in Pedro Domingos. He is a Professor of Computer Science and Engineering at the University of Washington. And I guess I can say his big claim to fame he wrote a much read book called the Master Algorithm. And I will come back to that part and ask him a specific question, but first I leave it to him to give us a little bit of the science, technology, you know, angle to what we have been talking about, how do we distribute growth and ensure that AI is being used good to address prosperity and fight deprivation. Pedro.

>> PEDRO DOMINGOS: How do we empower people with AI? AI is a technology and the purpose of technology is to serve people. And the more powerful the technology the more it can potentially serve people but who will it serve. It will serve the people who understand it and who have the ability to control it. And what happens today is that for the most part AI is a black box which means that individual people, families, communities actually are not really able to do what they want with it. It is only large

organizations like companies that have a lot of the expertise to deploy AI that will use it for their purposes which you know largely includes serving people but they don't necessarily know them as well as the people themselves. So I think there is at least two important parts to this which is we the technologists have the responsibility to develop a technology in a way that makes it as useable, as accessible, as transparent for the users and for a wide variety of users including particularly the ones that are less wealthy, less fluent, et cetera, et cetera. And just as one concrete example which is machine learning which is the field I work in, it is based on learning about people from data which is a great thing. But the problem is that a lot of people don't even know that that is happening in a lot of the systems they use and they have no insight in to what the systems are doing at all. They don't even know what they could control, what the long being able to control it partly because those things are not being exposed.

To use an analogy it is like driving a car. People don't need to know how the engine of a car works but everyone needs to know about the steering wheel and pedals and how to use them to drive a car. And machine learning algorithms have the equivalent of the steering wheel and pedals of the car and those need to be exposed and easy-to-use. Everyone needs to acquire a basic understanding of AI. Again not at the level of the depth of how the technical things work but at the level of what it can do for you.

And let me just give you a few examples. One is precision agriculture. Precision agriculture can make agriculture much more productive, can get more things from the same land, can feed more people. Precision agriculture is in essence, you know, modeling and paying attention to the individual plant or the individual animal and choosing the actions very precisely, you know, to fit what is happening on the ground. This is potentially a great boom but it only works if it is in the hands of the farmer. The farmer has to have this technology and the control. He has to be expensive enough and robust and easy-to-use. The farmer has to know how to use it.

Another example is, you know, disaster recovery. Right? AI can play an enormous role in disaster recovery by making it easy for people to self-organize in response to a disaster. They have to have the tools at their disposal and know how to use them in a way that doesn't just depend on somebody, you know, centrally doing everything for them. And another example is education. AI can potentially make education much more individual instead of having one teacher for many opportunities, and AI can be a teacher for a student but AI is not going to do the whole job with itself. It needs to work with the real teacher and student.

And AI has the potential to increase inequality a lot. But also to reduce it a lot. AI can actually be a great leveller in terms of, for example, making services that are very expensive, much less expensive, like the services of a doctor or a teacher which I just mentioned or, you know, take a specialist in anything or a lawyer or, you know, a loan officer, et cetera, et cetera.

Because those things that right now take highly qualified people and for people who cost a lot of money. If they are done by a virtual agent can be very inexpensive and have an enormous role in empowering people, but these things have to be designed with those people in mind, not just the populations. For the most part they tend to serve today and the people need to learn how to use the AI, what the AI can and can't do. How to use the machine learning and how to use the natural language processing such that they can use it for the end. We have a lot of work to do. And I think this Forum is actually one of the places where we can make some progress in doing that work. Thank you.

>> ANJA KASPERSEN: Thank you so much for that and calling in remotely as well. So what you are worried about is that we don't have the sufficient level if I can call it public literacy and the fact that we also in some ways early adopters of technology we don't understand.

>> PEDRO DOMINGOS: Yes.

>> ANJA KASPERSEN: A follow-up question, given your book, master algorithm, based on unstructured learning given what you just said will be responsible?

>> PEDRO DOMINGOS: First of all, a large part of the reason why I wrote this book is precisely I think it is important to make an understanding of AI available to citizens and masters in level. The master algorithm is a good conceptual model for how machine learning works. Instead of having all the different algorithms with all bells and whistles and all complications we can have this unified framework that lets everyone use machine learning. And the analogy for this is the Internet. The Internet is called the Internet because it is something that interconnects networks. When you have the Internet you can connect to any network you want.

Not having to worry at all about which particular network that you are using and it is the same thing with AI. It is just that we are not at that stage. When interacting with a computer system that is learning about me, I don't know the algorithms. The reason why learning algorithms is a master, the master key is the open that all locks. So master algorithms is one algorithm that can learn to do all sorts of different things from driving a car to doing medical diagnosis to, you know, who knows what. It is the same algorithm but by being fed different data it can learn to do different things. So I think it is

important to No. 1 develop this concept, you know, you know, in everyone's mind. And we on the technology side need to make it available and make sure that master algorithm works going back to the steering wheel and the pedals with the constraints that we give it and with the objectives that we give it.

>> ANJA KASPERSEN: Thank you so much for that clarification, and it relates back to some of what Robert was talking about, also how we think around the deployment of algorithms and these technologies in the most vulnerable settings that we are facing, especially when we talk about poverty and deprivation.

So the last of our speakers is Anders Sandberg. And we are looking at ways of responsibility, scalability. I will leave it to you to explain to us what you do.

>> ANDERS SANDBERG: Thank you very much. I'm one of those computer scientists who end up in the philosophy department. That's why I don't have any slides. I am trying to do proper philosophy by hand waving. So the key issue about this whole discussion is human capital. The fact that we as a species are surrounding the planet is not because we are stronger or faster than anybody else in the animal kingdom but simply that we are slightly smarter and able to coordinate better. That difference is not that tremendous between us and the higher apes but it is enough to make that fate of apes in our hands. We are running the planet good. And the interesting thing, of course, Artificial Intelligence is an attempt to create a way of adding human capital or rather making human capital which you can then deploy. And this has a lot of very, very strong consequences. Because one of the key issues in AI once we get this to work at which point we will stop calling it AI and call it normal automation it becomes scaleable. You can copy information that has been learned and transferred between different robots or in the software systems. And it can be applied wherever various computing or connection to computing.

Now another important point that I want to point out is this lovely diagram we have all been watching for the past three days, the (inaudible) AI application, many of them are topdown goals. Their applications of smart techniques but then are applied to these problems and then we scale it up. But it is topdown. It is run by experts. It is run by people who know what we are doing and then applied around the world. I think it is very important to think about bottom-up processes. And in the past bottom-up processes had not much scaleable. If I did something I could tell my friends and family but that was about it.

Gradually we got better medium ways of transmitting it. Local knowledge and local solutions can be scaled up and I think this

is going to be tremendously important. As Pedro pointed out AI can widen access to services because as soon as you can turn a service in to a gadget it can become cheap. Something as a service you need to pay the seller whoever is doing it and that's a real problem. But the gadgets they become exponentially cheaper.

Let's go back. Going back to the first dates, Professor Rupert Stadler was mentioning a little girl somewhere in an underdeveloped country. Imagine that you are a little girl somewhere. What AI application would actually improve your life? Now autonomous cars would in a sense improve your life. They would improve the prosperity of society and in the long run have a big effect. Many interesting electronic assistance are possible. And when we talk about electronic assistance that's framing in the mode of a developed country. Executive lifestyle with cars and assistance and automated doctors but at least the software can also become access to that little girl using her phone.

What you want is, of course, food, water, shelter, safety, knowledge and hope. And bottom-up is an approach would be empowering these girls. I have been thinking about what you could put in to her Smartphone. We want her to have a Smartphone. We want to boost the Smartphone revolution. That's creating an intervention, can we make it easier than before to get people who are already getting it bottom-up but maybe organizations like ours would help. That would enable her to log in by showing her face and would make her account, not somebody else.

Many phones are shared in a village. Having a private account is tremendously empowering for a person. The next phone she will have access again. Access and reliability is important. Another important aspect is communication and being able to find your voice because this is about scalability. Her voice needs to be scaleable so she can tell other girls what she wants. And AI has an interesting role. We are getting pretty good at doing text-to- voice translation as well as voice-to-text translation. That's really useful if you are illiterate.

If you can scan a text even though you cannot read the letters and get it read to you, suddenly you are somewhat literate and you can interact. You can use image recognition technique. If you get the tax form or if you get the official message of some kind, it is not that you want to read it. You might want to have a dictionary explaining what official form is this, what is the supposed role. You can use it, of course, also to document things and work better with the formal parts of society. So you can document your transactions which is very important for fighting corruption bottom-up. If you film the corruption, if

you can document I did this, then we can overcome it. We have a language barrier. Many in the countries have languages that are rare and this is an intervention point that I think is going to be important. Their data poverty in terms of translation needs to be overcome. And we have issues of brain drain we need to fix. We need to handle the premature industrialization and ways of monitoring so we can detect what other techniques we might want to apply quickly. But scalability is really about understanding that this solution is adaptive enough and we can adapt it everywhere. But the adaption needs to come from little girls and the machine learning system they hold in their hands. Thank you.

(Applause.)

>> ANJA KASPERSEN: I'm glad to see that you got a head start on actually providing some very concrete solutions as well. So my initial question to you was what can be done with more than just a minor impact and you sort of looked in to some of these issues, but as you were talking what you are saying the newness of it all is kind of keeping us a little aback in terms of scaling some of these issues. So my question to you given what you talk and here is the protection person or the protection side of me maybe coming out when you speak about this little girl and facial recognition and personal account and how do you scale the ability to mitigate the risk? How does she protect herself?

>> ANDERS SANDBERG: To be honest, we don't know yet. Stuart Russell brought up a very important point in his talk but we might be seeing a malware revolution that might destroy some of the benefits and figuring out ways of automatically safeguarding software privacy and other functions. It is tremendously important in the developed countries but we are also kind of suffering from a technology depth, a security depth. We developed a lot of cool toys without thinking important. And we are going to pay for a long time. This is actually a point where Developing Countries have a chance of leapfrogging. If they are a bit more careful in what we select or wait even because we have to or because we choose to, and you get decisions once they are tested and we can get around it. I think this is an important intervention point. I think this is where NGOs and Civil Society and bottom-up communities are important. We need to monitor our software.

I didn't get the chance to talk about education software but I have been on Twitter worried a bit about the potential for propaganda. But again open curricula and ways of monitoring the mobile by NGOs might be a way of counteracting us.

>> ANJA KASPERSEN: What you are also saying is what Robert is talking about using a ledger or more crypto approach to

technologies and what Padmanabhan was talking about building greater literacy and how to build greater literacy. These things need to come together and then --

>> ANDERS SANDBERG: Yes. One of the most important insights in computer security it doesn't matter if your encryption is perfect because somebody will write the password on a Post-It note. You need to understand what kind of privacy you wish to have. And that requires literacy and it requires playing around with things and talking to people about it and sharing that information. Right now far too much security, very technical over or left to the people in white lab coats. We shouldn't do that.

>> ANJA KASPERSEN: I fully agree. Thank you so much.

(Applause.)

>> ANJA KASPERSEN: A bit mindful of time and I'm warning because it is so exciting but I am going to go a few minutes over. You will have time to get your coffee. I am going to open for five questions, four, five questions. I will collect them and then go back to the panelists and then do a round of interaction. And then we will see how many more we can fit in.

Asha, since you were the Chair of AI for the prosperity panel if you can quickly share your key take-away from our discussion yesterday to kick off this.

>> Sure. So we came to several conclusions but more importantly in terms of short-term actions we believe that something to be done to organize, collect, curate, and act on data that matters for applications of AI for social good and that includes putting together a community like you have, for example, on GitHub or Kagel that would encourage students from around the world to use their skills in AI, to solve important problems, that would have to be connected with people from NGOs, UN or other organizations that collect that data, prioritize which problems, you know, that AI research community should focus on and translate the resulting models in to actually deployed systems. And finally funding for this deployment should be organized to help philanthropy, Government, UN or others that could provide funding for these to prioritize to, you know, identify which projects are more worthy and choose where they want to put their money.

>> ANJA KASPERSEN: Thank you for that. It is always important because we were talking about the future of prosperity using II which is highly linked to this topic. We are saying to in some ways crowdsource the building the literacy part. There is a question over here. A question.

>> We are obviously living in a time where the individual gets more and more transparent. And the technological environment becomes more and more opaque. And I'm coming back to

the little girl perspective which I like a lot. And it is a very good approach to say we have to foster the literacy of this little girl but there is -- I think it is dreaming to say that everyone can have a control over what is happening around him in the technological environment. So there has to be a balance between control and trust. And I actually asked if it is not the responsibility of the United Nations to have an international element on data protection. The European approach is a good approach. But in the end it is a global responsibility and I think that the adequate institution to do this is the United Nations, to have obligations for the countries, for the companies for people using these techniques. So I think it is the time that the United Nations approach an international legal instrument for data protection and privacy.

(Applause.)

>> ANJA KASPERSEN: That had some support in the audience, yes. And just UN being the collection of its Member States we are now speaking about all the Member States agreeing to an international legal instrument. Yes. So yes. And then I saw you. Yeah.

>> Thank you. I'm Zoltan. And yesterday in one of our sessions I raised a question about how do we put some of these debates in to the context of market shaping and market shaping concepts from an economic perspective. And I suppose to link that to some of the comments about the responsibility now going forward for NGOs and international communities, Governments, agencies, I suppose the other question is where does the responsible private sector sit in the and you link that to market shaping, it is an essential question because essentially in order to deliver these technologies, these solutions, these products, these commodities you have to create markets and markets enable people to economically develop and survive their circumstances. It is a question about where the responsible private sector can sit in this.

>> ANJA KASPERSEN: You are talking about the industry responsibility and ensuring safe products to market.

>> But also helping to create the markets. To create a -- often you will find that distributors may not actually see enough profit in order to distribute something in a particular context or area. And I think the people who can apply a lot of capital to that will be coming from industry. But they may not really understand it but could be a powerful enabler. That sort of slightly more, sorry, I'm going a bit too far. But that sort of deeper push for industry to say what can you do to actually help enable social development in this context.

>> ANJA KASPERSEN: Thank you for clarifying that. Yes. The gentleman to the right, first, yes.

>> Hi. I was wondering if as a concrete step going out and working in the field specifically towards deploying those technologies in a social good context and if that's something that makes sense and would be feasible.

>> ANJA KASPERSEN: Thank you for that. And just again reminders that the session's focus is on how do we fight deprivation and poverty and not the generics of AI. The lady over here.

>> Hi. This is Ladea from Wikipedia Foundation. Following up on the comment on basically starting small and scaling, I have a question for Robert. So you discussed or you showed us some examples of basically hunger and poverty. And I want to ask if you want to start from somewhere, if you want to work on one problem in the specific issue of hunger, where do you think we should start from given that you know Artificial Intelligence kind of the things that we can offer, and the kind of problems that you are facing, I think it is -- it is potentially not realistic to think that we can start on all these fronts. Where we would start and I appreciate that this won't be what you will call out if you call out the specific problem, will not necessarily be the most important problem. I understand but where do you expect us to start looking in to this problem?

>> ANJA KASPERSEN: Thank you for that. One last question here and then we will go back to the panelists.

>> Thank you very much. Very inspiring talks. My colleague's point, building on it, what I wanted to ask when it comes to fighting deprivation and when it comes to building AI technologies that are aimed at solving these problems, one thing that struck me in a few of the narratives that we heard today that this idea over time the realization that the translation from research to actual practice requires a wide skill set that is not -- that is not limited to the technological, that requires an understanding of social forces and how to work with Government and grassroots population. And we have been talking a lot about ethical development of AI, ethics, what ethics to impose on Artificial Intelligence. Is there perhaps another way of looking at it and questioning do we need a code of professional ethics for software developers, for AI scientists like we have for physicians and other professions? Can we develop a code of professional competencies perhaps that can better prepare the AI in to the future to specifically target things like development and ending of deprivation?

>> ANJA KASPERSEN: Thank you for that. An important issue. Just preceding this conference is another conference by IEEE which is a standard association for everyone working in the engineering field that is exactly focusing on this specifically and trying to collect examples, because to my surprise there is

quite a few engineering communities and scientists communities that may not be a universal code but they are developing this within their own spheres and trying to integrate as much of like practical ethics as possible. So it is very promising to see that there is actually a grassroots movement on this and not all topdown to the reference of the role of Governments in all of this. It needs to happen in all directions. So I'm going to go back to the panelists. Why don't I start with you and you can also comment on your colleague's presentations as well.

>> PADMANABHAN ANANDAN: Thank you first of all. I want to pick up on a couple of comments that were made by market forces and residency idea. Here is something that about 10 or 15 years ago there used to be a fair amount of interesting discussion about a concept called the profit at the bottom of the pyramid. And there was this notion that corporations which are naturally driven by the profit motive can benefit by addressing the lowest strata of the market. In principle it is true. But it is more complex than that. The classic examples that used to be given was how seven countries in India would tailor the -- by tailoring to the market needs you may actually be able to bring that market in to play.

Now the purchasing power at the bottom of the pyramid is very small. There is something else that happened which is more global and universal and that has to do with affordable and appropriate technology that's universally useful. I mean trains and those kinds of things, electricity are examples. But the most recent example we all know in computing has been the cell phones. In fact, much of the way in which people in lower stratas of society are able to get access to the Internet is because of the phone. For the longest time was a challenge with respect of how to get Internet access and the regular methods of using computers it didn't work. And we were involved in experiments in rural Kiosks and they all failed. Maybe some of them didn't fail but basically by far. Once the cell phone came in to the picture suddenly things began to happen and they became cheaper and today Smartphones are available.

So I think there are technologies that have this capacity to be so important, so easy, so useful and become so cheap and affordable that they fill -- and that's where I think corporations remain to benefit. And one of the reasons that I mention the technology of conversation, agents and assistance and I believe that's going to be another class of technologies that will become pervasive. I think it is something easy to create and deliver on the phone. And kind of an interface is so natural and easy in your own language. I think it will only be a matter of time that's becoming a standard kind of item. Two ways to think about it, understand the market conditions and

tailoring your offerings to that market and understanding where these big, you know, labors where you can enter through these parts, I think that's probably the way to do that. And as to the residency program I think it is a fantastic idea. I think that's something we should create.

>> ANJA KASPERSEN: Take that with you in the breakthrough groups afterwards. Is Pedro still with us?

>> PEDRO DOMINGOS: Yep, I'm still with you.

>> ANJA KASPERSEN: Do you have some brief comments to share with us to take in to the discussion for the rest of the day?

>> PEDRO DOMINGOS: Sure, I have one thought. There is this thing that has come up on a number of times of AI governance, right? How much do we need, what form should it take and how should it be done. And I think it is important to realize that there is no fixed set of rules or laws or regulations or principles that will be good for governing AI. Because AI evolves very rapidly and particularly machine learning it is continually changing and adapting. Any fixed set of rules will allow things that shouldn't or forbid things that should be allowed and rapidly fall behind. So I have to -- what has to happen is that Governments, NGOs, UN agencies they need to have their own AIs whose job will be to interact with the AIs of stakeholders, of companies, of other organizations, of individuals and steer them in the directions that the organizations' mission needs is something people do now.

An ecosystem of AI is interacting and part of that ecosystem is NGOs, Governments and UN agencies and we need to start to do that. Instead of thinking we need to have a set of rules that will be useless and potentially harmful we need to think in terms of what are the AIs of these organizations going to look like.

>> ANJA KASPERSEN: Speaking about how do we -- the UN -- United Nations self-AI basically.

>> PEDRO DOMINGOS: Right.

>> ANJA KASPERSEN: Who controls and governs the AIs interacting with each other. And this leads me to Anders. And you spoke about being adaptive and adopting and building on what Pedro said how do we scale adaptive governance. And, of course, reflect on what you heard.

>> ANDERS SANDBERG: Okay. Yeah, how do you scale governance? That is a very deep problem and in many ways we are just finding out how big a group of people you can coordinate as a functional technologist. And the reason we can coordinate as large groups is because we have over a long time developed technologies for governance. Institutional routines and we have Internet technologies that allows us to construct even larger forms of coordination, new forms of coordination. Fascinating

things like Wikipedia which demonstrates the power of crowdsourcing but we are still fumbling around in the dark. We have only been doing the Internet coordination for maybe 20 years at most. And it took us about 300 years how to figure out to use the printing press in order to coordinate society. So we are going to have to spend quite a lot of time inventing things and that gets over to this question about so how do we set our priorities.

On one hand I am a huge fan of exploration and it is super important we try a lot of things. We need very diverse groups trying diverse things to complex problems. However one of the big lessons I have learned from dealing with movement when you try to improve the world, typically the most important thing you can do is on orders of magnitude more important than the second most important. The effectiveness of various health interventions in terms of quality adjusted life years per dollars it can be a factor of ten between the best and second best. If you spend your efforts on the tenth best you lose most of the value.

So spending time figuring out what this actually is the most effective intervention is really worthwhile. We normally tend to think that an action is good. But if you risk losing much of the value you might actually want to sit down and think very carefully. That's why I really like this idea about crowdsource organizations, using NGOs and others to swift through all the possibilities and probabilities. Figure out what is scaleable and trackable and what is neglected. That's typically where you can get enormous wins. Now this is going to require a lot of flexibility.

So if I have a final point is we need to regulate using flexibility. Banding things is not as affective as simulating things. I am a fan of what we call the principle of technology development. If we can foresee, we can try to look at other technologies and institutions can be added beforehand and try to make the matter arrive earlier that removes the bad side. That might be a way of handling the privacy problems. We might want the regulation but we want to think about software to make it misuse the private information of little girls or organizations.

>> ANJA KASPERSEN: Thank you. Important points again to take with us in to the future discussions.

(Applause.)

>> ANJA KASPERSEN: And completely on purpose I left you with the last word from the panelists because you like myself we work with organizations that are really on the ground, trying to deploy technologies to the best of our means and understanding to help more and reach out. And you heard a lot of support for the work that you are doing and some of the complimentary ways

that you are thinking about AI and other technologies. So please.

>> ROBERT OPP: Thanks. And I want to thank my colleagues on the panel for all the things that I have learned from them in the last hour or so because I think it has been a fascinating discussion with lots of wisdom come out. And I would like to get to that point by answering the question that was asked about where do you start on an issue like hunger. And I would say -- I have to split hunger a little bit and say there is the emergency situation where people are desperately affected by hunger and they need humanitarian response right now. That's no matter what. And the AI systems and technologies we can bring to bear on that we have the obligation to do that. But if you are looking at the broader picture of hunger I would start with the food system's picture. And that is interestingly enough related to what my colleagues have been saying and comments from the floor about market access and entrance to the market.

There is such inefficiency in food markets that comes as a result of poor infrastructure, poor literacy, other problems and barriers. That if we can address those and those markets can work better so that farmers are able to produce better, that they can have insurance products to serve them, that they can be matched with the buyers and the distribution problems can be solved because you can literally have small farmers in Sub-Saharan Africa are affected by bad years when there is a drought, they don't produce enough. But they can equally be affected by a good year when they have too much surplus that they can't get to market because of infrastructure problems and you call it the good year dilemma.

So I think that we need more attention to companies, entrepreneurs, others that are going to enter in to the markets and find ways to make them more efficient and find products that are more accessible. And this goes to the AI systems and this is what Pedro was saying, we need accessibility provisional point of view and also from a technical point of view so that people can get to those and take advantage of those systems. And this is why the work of, for example, XPRIZE or some of the other organizations out there, ranks of entrepreneurs that are trying to find ways to establish products and there is good business to be had as well.

And the final thing I would say to your point we in the UN need the partnerships out there. This gets to the point of organizing computer science, AI scientists to offer their time or firms to partner with us. And we have partnerships with Facebook and Google and to match the best out there to bring to bear on these problems. They are absolutely critical.

>> ANJA KASPERSEN: Thank you. Thank you so much for that.

(Applause.)

>> ANJA KASPERSEN: I guess what we are talking about here is away from the acronyms, it is augmenting our own intelligence of becoming better adopters and that's kind of where we are now with an immature technology, but it has massive potential and challenges. One of the red threads that I have heard coming out of this and I encourage you all, discussions become concrete but one of the red threads how do we crowdsource solutions around. How do we crowdsource knowledge, competency, skill sets and, you know, I'm a little concerned about using the word organization, but something where we can all tap in to. What does that practically look like. Who governs it. How do we make sure it is adaptive and agile and where do we move forward from there.

I am excited to hear your feedback having solved all of this in the next time we meet in the Plenary. Thank you so much to the organizers for putting this on. A big thanks to the panelists for providing their insight and to Pedro for participating remotely. And thank you for the great questions and interaction from the audience. Thank you.

(Applause.)

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