TED演讲者：Dina Katabi | 迪娜・卡塔比

演讲标题：A new way to monitor vital signs (that can see through walls) | 一种（可穿透墙壁）监测生命体征的全新方式

内容概要：At MIT, Dina Katabi and her team are working on a bold new way to monitor patients' vital signs in a hospital (or even at home), without wearables or bulky, beeping devices. Bonus: it can see through walls. In a mind-blowing talk and demo, Katabi previews a system that captures the reflections of signals like Wi-Fi as they bounce off people, creating a reliable record of vitals for healthcare workers and patients. And in a brief Q&A with TED curator Helen Walters, Katabi discusses safeguards being put in place to prevent people from using this tech to monitor somebody without their consent.

在麻省理工学院，迪娜・卡塔比和她的团队正在研发一种不需要使用笨重的仪器就可监测病人生命体征的新方式，无论是在家中还是在医院，甚至隔着墙壁也可以使用。通过这次开阔眼界的演讲和演示，卡塔碧展示了一项早期研究成果，可以捕捉像Wi-Fi一样被人体反射的无线信号，为病人和医护人员提供一个稳定的生命体征监控记录。在之后与TED策展人——海伦・沃尔特斯的提问环节中，卡塔比还讨论了已经被研发出来，可以防止任何人滥用此项科技的保护措施。

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When I was a kid, I was, like many of you in this room, very much fascinated by Star Wars, and what fascinated me the most is this notion of the Force,	当我还是个孩子的时候, 同房间里的很多人一样, 很喜欢星球大战, 其中最令我着迷的, 是这个原力的概念,[00:12]
this energy that connects all people and all objects and allows you to feel people that you can't even see.	这股能量可以将所有 人和物体联系起来, 并且可以让你感受到 那些你看不见的人。[00:23]
And I remember many nights, I would be sitting at home, just, like, **concentrating** and focusing, trying to feel the Force, and I didn't feel anything, don't worry.	记得很多个深夜里, 我坐在家中, 尝试集中精力去感受这股原力, 不过你们放心, 我没感受到任何东西。[00:30]
(Laughter) And later in life, I became a scientist.	（笑声） 在我长大之后, 我成为了一名科学家。[00:41]
I joined the MIT **faculty** and started working on **wireless** signals.	我进入了麻省理工学院, 开始无线信号方面的研究。[00:45]
These are things like **Wi-Fi** or **cellular** systems, and I did a lot of work in that domain.	我在像 Wi-Fi,蜂窝网络 这样的领域投入了很多精力。[00:51]
But then, again, this Force thing kept **nagging** me, and at some point, I was just like, "Wait a minute, these wireless signals -- they are like the Force."	但对于“原力”的念想 仍然徘徊在我的脑海中, 某一天,我突然想到, 对了,这些无线电信号, 不就像是电影中的原力吗？”[00:57]
So if you think about it, wireless signals, they travel through space, they go through **obstacles** and walls and **occlusions**, and some of them, they reflect off our bodies, because our bodies are full of water, and some of these minute **reflections**, they come back.	如果你思考一下, 这些无线信号穿梭在空间里, 它们中的一部分穿过障碍物, 墙壁和闭塞的区域, 另一部分 则从我们身上反射, 因为我们身体中充满了水, 有些信号在反射之后, 又反射回来。[01:08]
concentrating: n.浓缩;精选/v.浓缩(concentrate的ing形式);专心 **faculty:** n.科，系；能力；全体教员 **wireless:** adj.无线的;无线电的/n.无线电/vt.用无线电报与...联系;用无线电报发送/vi.打无线电报;打无线电话 **Wi-Fi:** abbr.无线保真技术(wirelessfidelity);无线上网技术 **cellular:** adj.细胞的;多孔的;由细胞组成的/n.移动电话;单元 **nagging:** adj.唠叨的;挑剔的;使人不得安宁的/n.唠叨;挑剔/v.唠叨(nag的ing形式) **obstacles:** n.障碍;障碍物(obstacle的复数形式);阻碍 **occlusions:** n.闭塞;吸收;锢囚锋 **reflections:** n.反光;反响,回声;回旋曲	
And if, just if, I had a device that can just sense these minute reflections, then I would be able to feel people that I cannot see.	如果,我能有一个仪器 可以捕捉到这些反射, 那么我就能够感知到 那些我看不见的人了。[01:24]
So I started working with my students on building such a device, and I want to show you some of our early results.	于是,我和我的学生们就开始 研发这样的一个仪器, 我想给你们展示一些早期的成果。[01:36]
So here, you see my student standing, and here is our device.	在这里,你们可以看到 我的学生站在白线圈中心, 这是我们的仪器。[01:44]
And we are going to put the device in the other office, behind the wall, and we are going to monitor him as he moves.	我们把仪器放在了 一墙之隔的另一间办公室里, 我们将用仪器 来检测他的移动轨迹。[01:48]
This red dot is tracking him using wireless signals.	这个红点代表无线信号 追踪到的他的位置。[01:57]
And **as you can see**, the red dot is tracking his movements very **accurately**, purely based on how his body **interacts** with the surrounding wireless signals.	你们可以从屏幕上看到, 红点可以准确地展示他的运动轨迹, 而这种监测完全依赖身边的 无线信号和他身体接触的情况。[02:02]
Pretty accurate, isn't it?	相当准确,不是吗？[02:13]
He has no wearables, nothing.	而且他的身上没有任何穿戴式设备。[02:16]
(Applause) Now you might be wondering, how is it possible	（掌声） 你可能会感到好奇, 为什么我们可以完全

that we can sense people and track them, without any wearables, through walls, and the easiest **analogy** to think about is radar.	不用 穿戴式设备,并且隔着墙 来感知和追踪人体呢, 最简单的类比就是雷达。[02:18]
as you can see: 正如你所看到的;你是知道的 **accurately:** adv.精确地,准确地 **interacts:** vi.互动;相互作用(interact的三单形式);交互 **analogy:** n.类比；类推；类似	
I'm sure many of you have seen this picture.	我相信很多人都 看过这样的图片。[02:33]
You transmit a wireless signal to the sky, it **reflects** off some airplane, comes back to you, and you start **detecting** these **airplanes**.	当你发射无线信号到空中, 它被飞机反射回来, 你就可以检测到飞机了。[02:35]
But if it were just radar, then we would have this 50 years ago.	但如果仅仅是利用了雷达的工作原理, 我们50年前就应该有这种技术了。[02:44]
So it's not just radar.	所以我们研发的 仪器不仅仅是雷达。[02:49]
There are two key differences.	它和雷达有两个关键的不同点。[02:51]
So the first difference, of course -- you can't, like radar, just blast wireless power at somebody.	第一个不同点,毋庸置疑, 你不能像雷达一样,随便就 向人体发射高强度的无线电波。[02:54]
You're going to fry them like if they were in a **microwave**.	那么做就等同于是 把人放进了微波炉。[02:59]
Don't do that.	切记不要那么做。[03:02]
So it means that you have to be able to deal with very weak signals, and that means that your device has to be very **sensitive**.	我们面临的问题是,这个仪器 必须能接收很弱的信号, 这就意味着,这个仪器 必须非常的灵敏。[03:04]
The second difference is that, unlike the sky, where it's empty -- if you are lucky, there is one airplane that you can catch there.	第二个不同点,这个仪器的检测空间 不像是天空,空无一物, 如果你很幸运,空中只有一架飞机, 你就可以轻松地跟踪到它。[03:13]
Like, look at the room and look how many objects and people there are.	但是看看现在这个房间, 有那么多人和物品。[03:21]
reflects: 反照/反射 **detecting:** n.检测;检定/v.发现;探知(detect的现在分词)/adj.探测的 **airplanes:** n.(美)[航]飞机(airplane的复数) **microwave:** n.微波 **sensitive:** adj.敏感的；感觉的；[仪]灵敏的；感光的；易受伤害的；易受影响的/n.敏感的人；有灵异能力的人	
So in indoor environments, the signal not only reflects off the person, if reflects off the person, off the floor, the ceiling, off other people around, and you get very complex reflections	在一个室内的环境下, 信号不仅会被监测对象反射, 还会被地面,天花板 和身边的其他人反射回来, 仪器会接收到非常 复杂的反射信号,[03:25]
where the same signal reflects off me and then off you, and then off the ceiling, then off the floor.	因为同一个信号会在你我之间, 天花板、地面等等物体之间来回反射。[03:37]
And you have to **make sense of** that mess.	我们必须能够理解这杂乱的信号。[03:42]
But we were lucky.	但我们还挺幸运的,[03:47]
We were coming **at the right time**.	在万事俱备的时代开始了这项研究。[03:49]
So two things helped us.	有两项技术帮助了我们。[03:53]
The first thing is radiotechnologies have evolved a lot, and over the last decade, radio technology became much more powerful, so we were able to build very sensitive radios that can sense weak and minute RF signals.	首先是无线电技术, 它在近十年来进化了很多, 正是得益于无线电 技术变得更加强大, 我们才可以制造出非常灵敏的, 可以监测到极弱射频信号的仪器。[03:54]
The second thing: machine learning.	第二项技术是:机器学习。[04:11]
So you keep hearing about machine learning and there was a revolution of machine learning recently, in deep learning, and that allowed us to build **machine-learning** models	你或许经常听到机器学习, 在近期,机器学习技术在深度学习这方面 又提升到了一个更高的层次, 这使得我们有能力去建造一个[04:14]
that can understand wireless signals and interpret them so they would know what happened in the environment.	可以理解并分析无线 信号的机器学习模型, 它可以理解在特定 环境下发生了什么。[04:24]
make sense of: 搞清...的意思 **at the right time:** 在适当时候 **machine-learning:** 机器学习	
So if you think of it, the radio is like the ear of our device and the machine learning is like the brain, and together, they have a very powerful device.	所以想想看,无线电 就像是我们仪器的耳朵, 而机器学习就像是它的大脑, 两者的结合让仪器变得非常强大。[04:31]
So what else can we sense about people using wireless signals?	那么我们还可以用这无线信号 去感知人的什么状态呢? [04:43]
Sleep.	睡眠。[04:50]
Sleep, actually, is something very dear to my heart, because my sleep is a disaster.	睡眠实际上是 我尤为珍惜的事情, 因为我的睡眠状况惨不忍睹。[04:51]
(Laughter) So one thing is when you start working on some **physiological** signal and you discover that yours sucks.	（笑声） 当你开始研究生理信号, 会发现自己的生理状况一团糟。[04:55]
(Laughter) So you can see why we can capture sleep, because the person walks and the device sees him as he walks to bed, when he stops **tossing** around in bed, when he steps out of bed, and that measure of sleep is what people call actigraphy.	（笑声） 你可以看到我们 是如何捕捉睡眠的, 因为我们的仪器可以感知 受监测的人什么时候走向了床, 什么时候在床上停止了活动, 和什么时候受监测人离开了床, 这种记录睡眠的方式也是 人们所说的“活动记录”。[05:03]

It's based on motion.	这是一种以活动为基础的记录方式。[05:20]
But it turned out that we can actually get sleep at a much more important level.	但实际上,我们可以更加深入地 监测睡眠活动。[05:22]
We can understand the change in the brain waves that occur during sleep.	我们可以通过仪器来理解 人在睡眠时脑电波的变化。[05:28]
So, many of you probably know that as we go to sleep, our **brainwaves** change and we enter different **stages**: awake, light sleep, deep sleep and REM, or rapid eye movement.	很多人应该会了解, 在我们睡觉的时候, 脑电波会随着我们进入 不同的睡眠状态而改变: 醒着、浅睡期、深度睡眠 和快速眼动期各不相同。[05:35]
physiological: adj.生理学的，生理的 **tossing:** n.洗矿;抖动,摇动;颠簸 **brainwaves:** 脑波(brainwave的复数) **stages:** n.[计]阶段(stage的复数);舞台;戏剧表演/v.计划;表演;分阶段进行(stage的三单形式)	
These stages are of course related to sleep **disorders**, but they are also related to various diseases.	这些不同阶段的特征 不仅能反映出睡眠障碍, 更与多种不同的疾病相关联。[05:46]
So for example, **disturbances** in REM are associated with **depression**.	比如说,快速动眼期存在干扰 往往与抑郁症有关。[05:53]
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Disturbances in deep sleep are associated with **Alzheimer**'s.	深度睡眠期存在干扰往往与 阿兹海默症（老年痴呆症）有关。[05:59]
So if you want to get sleep **staging**, today, you will send the person to the hospital, they put all of these **electrodes** on their head, and they ask them to sleep like that.	通常如果你想知道 自己在各阶段的睡眠状况, 你需要去大型医院, 医护人员会将很多电极 连接到你的身上, 并且让你连着那些电极睡觉。[06:04]
(Laughter) It's not really a happy experience.	（笑声） 这实在不是一个愉快的经历。[06:13]
So what if I tell you that I can do the same thing but without any of these electrodes on the person's body?	但现在如果我告诉你, 我们可以不用在你身上贴电极 就可以监测你的各个 睡眠阶段的状况,听起来如何？[06:19]
So here is our device, **transmitting** very low power wireless signal, analyzes the reflections using AI and **spits** out the sleep stages throughout the night.	这是我们的仪器, 它会发射低能无线信号, 并且用人工智能分析信号的反射, 辨认出你在整晚不同的睡眠阶段。[06:27]
So we know, for example, when this person is dreaming.	由此我们可以知道, 例如说这个人什么时候在做梦。[06:38]
disorders: n.无秩序,混乱;小病(disorder的复数形式)/v.[电子]扰乱(disorder的单三形式) **disturbances:** n.[通信][电子]干扰;失调(disturbance的复数形式);困惑 **depression:** n.沮丧;洼地;不景气;忧愁 **Alzheimer:** n.阿尔茨海默病,老年痴呆症 **staging:** n.上演;分段运输;脚手架;乘驿马车的旅行/v.表演;展现;分阶段进行;筹划(stage的ing形式) **electrodes:** n.[电]电极(electrode的复数);电焊条 **transmitting:** v.传递,发射(transmite的现在分词形式)/n.传送,传递/adj.传送中 **spits:** vi.吐痰;吐口水;发出劈啪声/vt.吐,吐出;发出;发射/n.唾液	
Not just that ...	不仅如此,[06:44]
we can even get your breathing while you are sitting like that, and without touching you.	当你像画面中的人 一样坐着的时候, 它可以在不接触你的状态下 监测你的呼吸。[06:46]
So he is sitting and reading and this is his **inhales**, **exhales**.	你可以看到他在坐着看书, 这些曲线波动是他在吸气,呼气。[06:51]
We asked him to hold his breath, and you see the signal staying at a **steady** level because he **exhaled**.	我们让他屏住呼吸, 你可以看到信号停留 在了一个稳定的水平 因为他呼出了气,[06:55]
He did not inhale.	没有再吸气。[07:01]
And I want to zoom in on the signal.	现在我放大来看这些信号,[07:05]
And this is the same signal as before.	这些是和以前一样的信号。[07:07]
These are the inhales, these are the exhales.	这些是吸气的时候, 这些是呼气的时候。[07:09]
And you see these **blips** on the signal?	你看到这些信号上的小波动了吗？[07:13]
These are not noise.	它们并不是噪音。[07:15]
They are his **heartbeats**.	那是他的心跳。[07:16]
And you can see them beat by beat.	你可以看到心脏的每一次跳动,[07:19]
So I want to stop here for a moment and show you a live demo.	我想暂停一下讲解, 来给你们做一个现场演示。[07:23]
Zach is going to help me with the demo, and we're going to use the device to monitor Zach's breathing.	扎克会帮助我做这个演示, 我们将在这里直接用我们的仪器 来监测扎克的呼吸。[07:27]
inhales: vt.吸入;猛吃猛喝/vi.吸气 **exhales:** vt.呼气;发出;发散;使蒸发/vi.呼气;发出;发散 **steady:** adj.稳定的；不变的；沉着的/vi.稳固/vt.使稳定；稳固；使坚定/adv.稳定地；稳固地/n.关系固定的情侣；固定支架 **exhaled:** vt.呼气;发出;发散;使蒸发/vi.呼气;发出;发散 **blips:** abbr.债券相关发行溢价结构(BondLinkedIssuePremiumStructure) **heartbeats:** n.心跳(heartbeat的复数)	
So this white box that you see here is the device, and Zach is turning it on ...	这个白色的盒子里 装着我们的仪器, 扎克正在将它的电源打开,[07:35]
and I see that he **breathes** well.	让我们看看他的呼吸怎么样。[07:43]
So we're going to do exactly what we did in the video with the other guy, so the wireless signal is going through, it's touching Zach's body, and it's **reflecting** back to the device,	我们正在做和之前视频中 完全一样的事情, 当无线信号传播过来的时候, 会接触扎克的身体, 然后反射回仪器中, 我们用这反射信号 来监测他的呼吸活

and we want to monitor his breathing, his inhale-exhale motion.	动。[07:45]
So we see the inhales, exhales -- so see, these **ups and downs** are Zach breathing.	我们可以在这儿看到他的呼吸, 这些上下浮动的曲线 就是扎克的呼吸。[08:00]
Inhaling, **exhaling**.	吸气,呼气。[08:10]
(Applause) So, he can breathe.	（掌声） 看来他呼吸得不错。[08:12]
(Laughter) Zach, can you hold your breath, please?	（笑声） 扎克,可以请你屏住呼吸一会儿么? [08:19]
OK, so now he's holding his breath, so you see the signal stays at a steady level, and these are his heartbeats.	好的,他现在屏住了呼吸, 那么你可以看到信号 停留在了一个稳定的水平, 还有这些是他的心跳。[08:25]
Beat, beat, beat, beat, beat.	砰,砰,砰,砰,砰。[08:32]
(Applause) OK, Zach, you can breathe again.	（掌声） 谢谢你扎克, 你可以正常呼吸了。[08:35]
(Laughter) We don't want accidents here.	（笑声） 我们可不想让他在台上缺氧。[08:38]
breathes: vi.呼吸;低语;松口气;(风)轻拂/vt.呼吸;使喘息;流露;低声说 **reflecting:** adj.反射的;沉思的/v.反射;表明;考虑(reflect的ing形式) **ups and downs:** n.沉浮;盛衰;高低 **Inhaling:** n.吸入;吸气/v.吸入;吸气;猛喝(inhale的现在分词) **exhaling:** v.呼气;发散;排出(exhale的现在分词形式)	
(Laughter) OK, thank you.	（笑声） 好的,谢谢你。[08:42]
(Applause) So as you can see, we have this device that can monitor so many physiological signals for you, and what is really interesting about this device is that it does all this without any wearables, without asking the person to change his behavior or to wear anything or charge anything special.	（掌声） 那么你可以看到,我们的这个仪器 可以监测很多生理信号, 最特别的是, 这个仪器不需要连接 任何配戴式设备, 也不需要让被监测者 改变他的日常行为, 不需要穿戴任何东西,也不需要充电。[08:45]
And that got doctors very excited, because doctors, they always want to know more information about their patients, particularly at home, and this is particularly true in **chronic** diseases, like **pulmonary** diseases, like COPD, or heart failure or Alzheimer's and even depression.	这令医生们十分感兴趣, 因为医生们 一直想要了解更多 他们病人的体征信息, 特别是那些患有慢性疾病的人 在家中的状态,尤其像一些肺部疾病, 比如说COPD (慢阻肺), 或是心脏衰竭,阿兹海默症, 甚至是抑郁症。[09:09]
All of these chronic diseases are very important.	所有这类慢性疾病都不容忽视。[09:29]
In fact -- perhaps you know -- **two-thirds** of the cost of health care in the US is due to chronic diseases.	实际上,你可能知道, 美国三分之二的医疗支出 都源于慢性疾病。[09:31]
But what is really interesting about chronic diseases is that when the person, for example, has a problem that leads to the hospital and the emergency room, this problem doesn't happen overnight.	但慢性疾病真正麻烦的是, 比如说一个人的健康问题, 已经发展到需要去医院 或是急症室的时候, 这些疾病并不是一晚上发展出来的。[09:39]
chronic: adj.慢性的;长期的;习惯性的 **pulmonary:** adj.肺的;有肺的;肺状的 **two-thirds:** n.三分之二/三分之二的/三分之二地	
Actually, things happen gradually.	这些慢性疾病都是渐渐发展的。[09:50]
So if we can monitor chronic disease patients in their home, we can detect changes in their breathing, heartbeat, **mobility**, sleep -- and we can detect **emergencies** before they occur and have the doctor **intervene** earlier so that we can avoid **hospitalization**.	那么当我们可以在慢性疾病 患者家中对其进行检测, 我们就可以及时发现病人在呼吸、心率、 身体机能、睡眠等方面的异常, 从而在紧急情况发生之前, 尽早地通知医生进行干预, 这样我们就可以避免住院治疗。[09:52]
And indeed, today we are working with multiple doctors in different disease categories.	如今,我们已经在与多名医生合作, 对不同的疾病类型进行研究。[10:10]
So I'm really excited because we have **deployed** the device with many patients.	我对此真的非常兴奋, 因为我们已经开始使用 仪器监测很多病人了。[10:16]
We have deployed the device with patients that have COPD, which is a pulmonary disease, patients that have Alzheimer's, patients that have depression and anxiety and people that have Parkinson's.	比如说我们在监测慢阻肺患者, 慢阻肺是一种肺部疾病, 阿兹海默症患者, 抑郁症与焦虑症患者, 还有一些帕金森患者。[10:20]
And we are working with the doctors on improving their life, understanding the disease better.	我们在和医生们一起努力, 去了解这些疾病的成因, 去改善这些病人的生活。[10:32]
So when I started, I told you that I'm really fascinated with Star Wars and the Force in Star Wars, and indeed, I'm still very much fascinated, even now, as a **grown-up**, with Star Wars, waiting for the next movie.	在我演讲的最开始, 我告诉过你们, 我对星球大战非常的着迷, 尤其是星球大战里的原力, 实际上,随着我一点点长大, 甚至现在,我依然对其非常着迷, 期待着星球大战的下一部巨作。[10:38]
mobility: n.移动性;机动性;[电子]迁移率 **emergencies:** n.紧急事件;紧急需要 **intervene:** vi.干涉;调停;插入 **hospitalization:** n.住院治疗;医院收容;住院保险(等于hospitalizationinsurance) **deployed:** v.部署(deploy的过去式);展开 **grown-up:** adj.成熟的/n.成年人	
But I'm very fascinated now and excited about this new Force of wireless signals, and the potential of changing health care with this new force.	但是我现在对新的原力更加着迷, 对无线信号的力量, 以及新的原力可能改变 现有医疗现状的潜力。[10:54]

One of the patients with whom we deployed is actually my aunt.	现在配备有我们仪器的病人 之一是我的姑妈。[11:07]
She has heart failure, and I'm sure many of you guys in the audience have parents, **grandparents**, loved ones who have chronic diseases.	她患有心力衰竭, 我相信很多在座的听众, 你们的父母,祖父母,或是 所爱之人当中有人患有慢性疾病。[11:10]
So I want you to imagine with me a future where in every home that has a chronic disease patient, there is a device like this device sitting in the background and just **monitoring passively**	我希望让你们和我一起 想象一下这个未来, 在每一个病人的家中, 有这样的一个仪器 默默地监测病人的睡眠,呼吸,[11:21]
sleep, breathing, the health of this chronic disease patient, and before an emergency occurs, it would detect the **degradation** in the physiological signal and alert the doctor so that we can avoid hospitalization.	以及身体健康状况, 它可以在紧急情况发生之前, 检测到病人的生理信号的异常, 并且向医生发出预警, 从而避免住院治疗。[11:32]
This can change health care as we know it today, improve how we understand chronic diseases and also save many lives.	这可以大大地改善 现有的医疗状况, 让我们对慢性疾病 有更深层次的理解, 并且救助很多的生命。[11:46]
Thank you.	谢谢。[11:54]
grandparents: n.祖父母(grandparent的复数);外祖父母 **monitoring:** n.监视,[自]监控;检验,检查/v.监视,[通信][军]监听,监督(monitor的ing形式) **passively:** adv.被动地;顺从地 **degradation:** n.退化;降格,降级;堕落	
(Applause) Helen Walters: **Dina**, thank you so much.	（掌声） 海伦 · 沃尔特斯: “谢谢你,迪娜。[11:55]
Thank you too, Zach.	同样谢谢你,扎克。[12:02]
So glad you're breathing.	很高兴看到你还在正常呼吸。[12:04]
So Dina, this is amazing.	迪娜,这仪器非常的不可思议。[12:05]
The positive applications are incredible.	它积极的应用前景是不可估量的。[12:08]
What is the framework, though, like the **ethical** framework around this?	我想问一下它的框架是什么? 比如说, 使用此仪器需要遵从的道德框架? [12:11]
What are you doing to prevent this technology from being used for other, perhaps less positive types of applications?	你们有什么防范措施, 去防止别人不正当地使用这仪器呢? ” [12:15]
Dina Katabi: Yeah, this is a very important question, of course, like, what about **misuse**, or what about, I guess you could say, about the Dark Side of the Force?	迪娜 · 卡塔比: “对,这确实是 一个非常重要的问题, 就像如果有人滥用, 或是,像黑暗原力? “[12:21]
HW: Right, right.	海伦 · 沃尔特斯: “对,是的。” [12:29]
(Laughter) DK: So we actually have technologies that prevent people from trying to use this device to monitor somebody without their **consent**.	（笑声） 迪娜: “我们实际上有开发一些技术, 去防止任何人使用此仪器 来监控未征得本人同意的个人。[12:31]
Because the device understands space, it will ask you to prove, by doing certain movements, that you have access to the space and you are the person who you are asking the device to monitor.	因为这个仪器能识别空间, 它会要求被监测人做出指定动作 来向仪器证明你有 在此空间活动的权限, 以及你愿意被此仪器监控。[12:43]
Dina: n.[军][电子]第纳干扰器 **ethical:** adj.伦理的；道德的；凭处方出售的/n.处方药 **misuse:** vt.滥用;误用;虐待/n.滥用;误用;虐待 **consent:** vi.同意;赞成;答应/n.同意;(意见等的)一致;赞成	
So technology-wise, we have technology that we integrate to prevent misuse, but also, I think there is a role for policy, like everything else, and hopefully, with the two of them, we can control any misuse.	所以从技术的层面来说, 我们有这样的技术去防止滥用, 但同时,我觉得就像其他事物一样, 需要特定的法规约束, 希望在技术和法规的双重约束下, 我们可以控制住滥用。” [12:54]
HW: Amazing. Thank you so much.	海伦 · 沃尔特斯: “太好了,谢谢你。” [13:09]
DK: Thank you.	迪娜: “谢谢你。” [13:10]
(Applause)	（掌声）[13:11]