Technology Watch at CES
Fitness – Sport – Health - Wellness

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Abstract :

I went to CES 2018 with Milalogic from January 9th to 12th with my business school, Grenoble École de Management, in order to make observations of recent developments in the domains of fitness, sport, health, and wellness. The main purposes were to connect with the trends and innovations of the year, as well as to discover which technologies and which companies stood out with revolutionary products that could change our lifestyles.

Executive summary *: "Discover every trend that will improve your way of life and allow you to be in better shape in the future. In CES 2018, Loïc measured paths to find the current tendencies, the revolutionary technologies and the best products as well as unimaginably innovative prototypes. Do you want to know how to improve your sport performance, how to improve your sleep or that your health is followed at a distance by your doctor?*[1] *Then embark with Loïc at the heart of CES 2018."*

Technology Watch

The domains of sport[2], fitness, wellness and health were central topics at CES 2018. Most of the companies in these market were ewhibiting at the Venetian Hotel; however, some firms, notably startups, exhibited their work in Eureka Park, while the others were on the 2nd floor of Sands Expo Hall C on the *top* floor. In this area, a space called "CES Sports Zone" was entirely dedicated to exhibit sport companies. Another one was dedicated to sleep tech, and the last one organized for health tech. In Eureka Park, companies were not arranged in a such strict way, therefore it was quite necessary to be attentive and open minded at every stand one encounters.

95% of the companies we are going to examine about were in Venetian Hotel. Only 5% were in Las Vegas Convention Center In the latter, stands were larger but the products exhibited were not as innovative. They already exist and everyone knows these products, as already well-established companies were presenting them.

To effectively organise our information, we will separate the topic into three parts: firstly we will examine the developments in fitness and sport; next, we will see the development present in health technology; and, finally, we will examine the innovation in the wellness domain.

Fitness and Sport

This year, the main trend about fitness and sport was related to **technologies of connected assistance** for runners and cyclists, as well as **management and analysis of effort.**

In Eureka Park, two companies presented especially promising developments for athletes. Both offer technologies that analyse athlete performance, thus greatly reducing the chance of repetitive stress injuries. These exciting developments would provide a real support to runners as, unlike jack-of-all trades products, they are specifically designed for running.

The first technology I shall introduce is the from the firm **Beflex :**

Beflex is a Korean company, present in Eureka Park.

Here is a photo of one of the CTOs, wearing the prototype headphones during the CES.

Their technology enables the runner to analyse their performances as well as their running technique and form. The technology is seamlessly integrated into earphones or glasses. Data processing is made in real time and allows the runner to change their technique immediately or their running speed. Beflex technology covers twenty different measures at the same time, which can help a runner improve their performance as well as their *safety* level, as the latter greatly reduces injuries. The sensors are stickers applied to headphones, and they analyse the repartition of strength between the runner's legs.

The headphones measure speed, distance, cadence, step length, step width, vertical oscillation, head tilt angle, stance/flight time, shock, maximum leg force, balance, and consistency – it's a very complete set of analytics, and most runners could benefit from it.

Coaching is delivered in real time via the earphones and allows runners to correct the problems immediately in full stride, rather than greatly reducing pace or even stopping to consult a similar technology integrated into a watch or a smartphone. Additionally, earphones are linked to an application, available on IOS or Android. Workouts are stored in the *partner app*, which will analyse runs so the runner can boost performance over time, like with a connected watch or other smartphone applications like Nike Running or Strava.

One of the main benefits of this technology is the analysis of the distribution of strength between the right leg and the left leg. Under normal circumstances, this gap is very difficult to perceive and often responsible for numerous repetitive stress injuries for the runner, like periostitis. It can also analyse force of the foot pushing off the ground and posture in order prevent back or knee injuries, or further understand why we suffer from them. Reflex's product could also be a very effective analysis tool for doctors.

At the moment, there is no official release date and the product is still in its prototype stage. As of today, the least expensive earphones would cost $150. My peers and I look forward to trying them and seeing for ourselves if all these promises are kept!

A company from Japan called **Orphe Track** allows runners to analyse their stride. It is a treadmill that - besides having the classic features of a treadmill - shows if the runner has a neutral stride, in pronation or supination. Furthermore, one also sees where the strength is let applied, and this data also may prevent an injury or help the runner understand the reason why he has pains. It is interesting to combine this technology with a classic treadmill to have a more scientific approach to the running, with a two-in-one technology.

Here is Orphe Track treadmill, which analyses the runner's stride on the screen

In the CES Sports Zone, at the top floor, a company presented a similar technology, but was at a more mature development stage. **Solos** develops connected glasses for running and cycling. At first, glasses were only developed for cycling; but since then, the Solos software has been freshly updated to work for runners. After the update, it includes the most common tracking metrics such as elapsed time, speed, pace, cadence, and heart rate. In addition to music, the glasses can also display visual notifications (say, if one receives an important email), as well providing audio turn-by-turn navigation. It's a very important guide and support as well, but these glasses are unable to analyse strength repartition between legs or muscles. The major advantage of this technology is that the user is not distracted during their workout and receives real-time information without having to to look at their watch or smartphone. The runner or cyclist can remain totally concentrated on their workout. Solos glasses have also been approved by the US Cycling team.

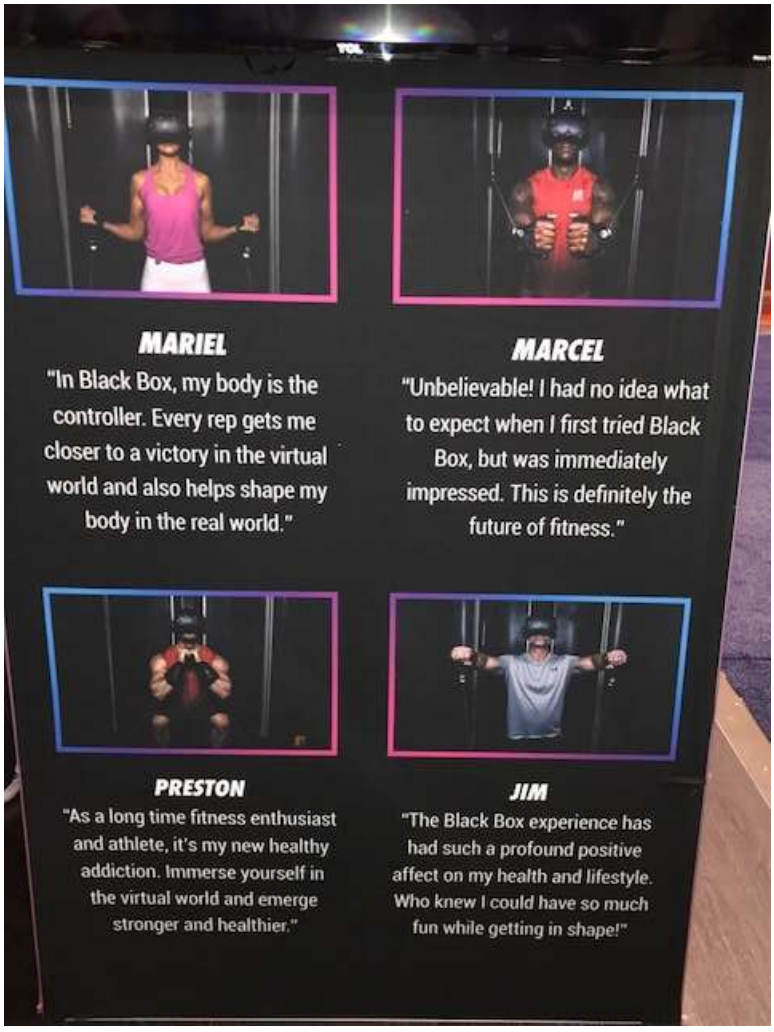
Here is a demonstration of Solos Glasses during the CES (the same demonstration was also done by a runner)

Other companies such as **Valencell**, **Qardio**, **Healthcare** display different measures (speed, distance, heart frequency) to improve health and performance, but they simply do not stand out from the rest. They are integrated into a connected watch, which collects a lot of information.

Another major trend about fitness and sport at CES 2018 was about **interactive and playful sport,** which puts forward an exercised based gaming virtual reality platform in order to motivate participants.

In this field, I personally find the most important company to be **BlackBox**. Their technology uses virtual reality to combine gaming principles and high intensity cardio with resistance training. The company uses its own exercise rooms but licensing opportunities will exist for fitness chains, in order to propose Black Box VR workouts in other exercise rooms.

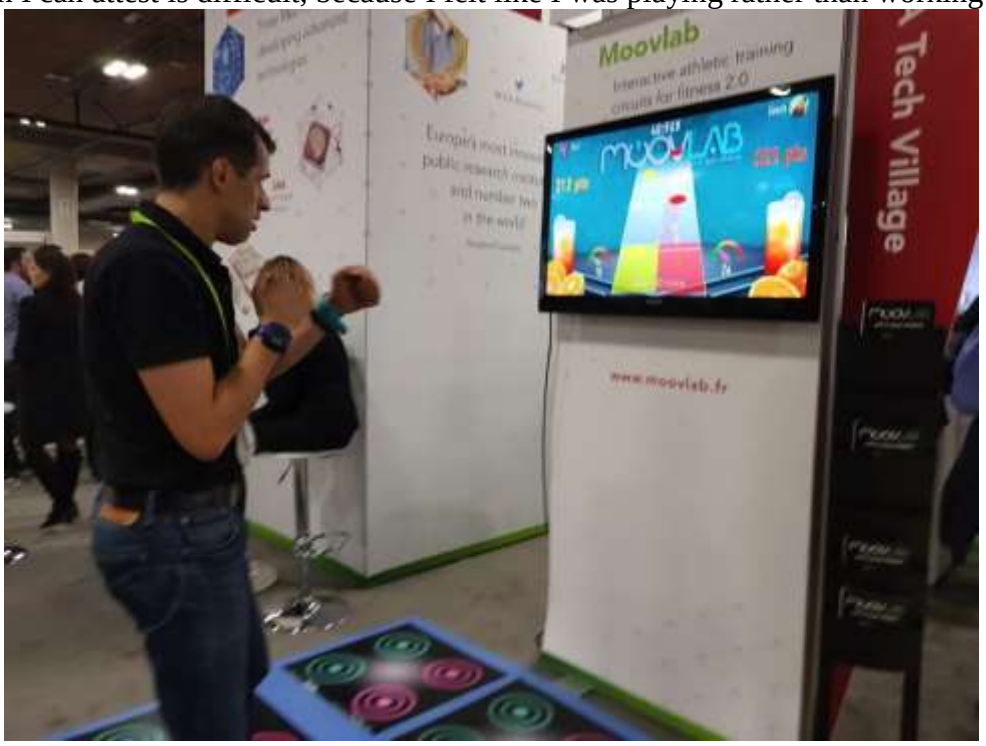
Franchisees will also be able to open their own Black Box VR setups. As one goes through the Black Box VR experience, one get a full body workout while the VR aspect is so mesmerising the participant forgets they are working out. Black Box VR will integrate resistance training through an electronically controlled cable system which will be seamlessly integrated into the game experience. Programs are personalised for everyone: each workout will automatically move the participant towards their goal by perfectly calibrating the resistance, intensity, and speed based on their long term goals and current progress.



Here is a photo of Black Box VR presentation

Other companies use virtual reality or gaming to increase sport experience and motivate people to do sport in a more playful context. For example, **Moovlab**, a

French company from the Grenoble area. Their products use sensors to create a playful exercise experience. One practices sport in front of a screen, we choose a cardio circuit training workout (boxing, bike, bench press). The VR experience motivates people more easily and makes them feel like they are playing a game, rather than a very intense workout. The Moovlab team proposes that with their products one can do sport without even being aware of it.
I personally tried the Moovlab experience and I kept smiling during all the workout, which I can attest is difficult, because I felt like I was playing rather than working out.



Here is a demonstration of Moovlab during CES 2018

Finally, even if the technology isn′t innovative, I have to speak about Samsung VR.
Their stand was the biggest in the Sport Zone. Their virtual reality helmet allow to live a sport experience like a ski descent or the broadcasting of live sports events 360 through the helmet. For now they already have interesting partnerships as with the UFC or MLB (Major League Baseball)

Here is a picture with two mens trying Samsung VR

Wellness:

In the wellness field, there were two major trends in this ES 2018: the first one concerns **massage devices** and the second concerns **sleep tech.**

There were tens of companies which presented massage chairs of all kinds. Innovation in massage devices can also harmonise with sleep tech, as several companies are involved in both domains and supply a headband for eyes with their massage chair so that the customer can push the limits of profound relaxation and then fall asleep
The company with the most impressive technology is **Forrest**. These chairs, which look like has commonplace camping chairs, have revolutionary technology built into them. Among other innovations they possess small heating pads, vibrating and warming balls which move and can direct focused massages to a precise back muscle. It is even possible to create a specific route in the vibrating balls according to the needs of the person.

Here is one of the model of Forest chair (mid-range)

In regards to sleep tech, the space reserved for the companies of was absolutely, jaw-droppingly ginormous. The major trend of the conference are the technological developments which can put a sleeper in the most adapted environment for easy sleep. It can be achieved thanks to headbands, which when wrapped around the head can analyse sleep efficiency and put the individual in the best possible situation for deep REM sleep.

Among all these companies which presented incredible developments in the sleep tech sector there were two had tantalisingly interesting technologies.
The first one is **Nucalm**, which promises that twenty minutes of napping in their chair is equivalent to two hours of regular sleep. They also supply a helmet, a blanket, and a headband to cover eyes and the utilisation of this technology would thus allow a reduction of the stress, and to catch up on lost or inefficient sleep with ease. Its use would be completely relevant and interesting for the active people who don't have time to sleep enough because of their work or other secondary activities. The Nucalm stand experiences many visitors during CES, many people wanted to test it and have a rest.

A man testing NuCalm technology during CES 2018

The second company that was especially interesting is **Nightmake** whose technology was clinically approved by Harvard Medical School. Nightmake allows users to gently slip into the arms of Morpheus[3] by eliminating even the most minute background noises. The user can even personalise seemingly negligible details of the sleep environment with their smartphone using the Nightmake package. Unlike NuCalm, Nightmake is designed to be used in a room rather than simply shutting out outside stimuli with eye-masks and other related devices.

Here is the Nightmake package, which manage every detail related to sleep (light, noise, etc)

Health

Regarding health, the major trend was **preventive medicine**, to help doctors to spot and the first symptoms of diseases rather than rushing to treat more serious and complicated later symptoms that are much more apparent.

These technologies aim at revealing a disease before the patient has the first unpleasant symptoms, or to anticipate a heart attack or an AVC, to provide the first care before the disaster arrives.

For example, the **Health company** can predict a flu forty-eight hours before the first symptoms, thanks to sensors put on clothes. These sensors measure heart rate, temperature and much more data. As soon as the first worrying information is spotted, an alarm is sent to a medical team, which can react as soon as possible. Furthermore, this ongoing follow-up also can spot diseases that have not been diagnosed before. As of today, five people were already treated during a trial period including one hundred test subjects. This technology is only useful and intended for the medical professionals. It establishes a real support, via its analysis and its follow-up. Due to the rate of possible false diagnoses patients cannot use this technology to analyse themselves, as the analysis is better left in the hands of trained medical professionals.

Here is an example of the sensors of the technology on a Health Company jacket

A company called **Farasha** has another conception of similar technology. This technology is very evolved, with gloves and watches connected which measure blood pressure, heart rhythm, and share the data with the doctor and also with any members of the family who are chosen beforehand. For example, if the heart frequency is higher than what it should be, the doctor and may move to intervene.
On an athletic level, they also insist on the fact that can lower the risk of overtraining ,which is under normal circumstances very difficult to reveal. The company has just raised 500 000 euros from crowdfunding to further their development.

Farasha's presentation

Moreover, a large place was dedicated to the wearables, mostly represented by the connected watchs. Those watchs look like the Apple Watch but intend to have more and more features and are more and more present to the detriment of traditional activity traquers. Fitbit is the leader of this market which propose to the consumer a continuous monitoring of heart frequency, monitoring of daily activities and sleep or also a Multisports mode to follow several types of activities (running, cycling ...) and display real-time statistics on your wrist. Many Asian companies try to break into this market

Here is one of the Fitbit watch

Finally, the last health technology which is especially pertinent was situated in Convention Center. It isn't an innovation which appeared this year, because the product already exists, but as the company expands and is very useful to have an idea of the current state of its products. Indeed, **Inbody** is a very sophisticated balance which allows to collect a plethora of essential data within sixty seconds. One can learn our base metabolism, how many calories one's body consumes if completely inert (more and more the modern work day). This information is essential if we want to lose weight or to gain it without putting on excess fat (bodybuilders). Everything involving a diet wholly depends if one chooses to have a caloric surplus or a caloric deficit. Furthermore, with this technology one can see the distribution of muscles in one's body: between the right hand, the left hand, the right thigh, etc. Moreover, we also know if we have a diet containing too much sodium, too much glucose, or any other nutritional deficiencies. This very and fast analysis allows one to modify one's diet, one's hydration, or one's sport practice to be in better health. The sensors (situated in hands and under feet) are very sophisticated and this balance will undoubtedly be an essential element in the future. This data is very sophisticated yet and understandable for all, and the product is extremely utile even for the average joe.

Here is a man testing the Inbody balance during CES 2018

In addition, I feel obliged to add a company with an enormous wow factor.

This company is called **Whill** and it presented an all-terrain wheelchair which would revolutionise the life of disabled people. The stand was very impressive with a demonstration on loose gravel and pieces of mulch, surfaces generally impossible to navigate with a standard wheelchair. This wheelchair can drastically increase the autonomy of disabled people and allow them to leave the house alone with greater certainty and get off the beaten path (literally!) of parking lots and other similar surfaces. One possible constraint is that a wheelchair costs 4 000$ but for somebody with the financial means it could be completely and literally life changing. In my personal opinion, their stand was brilliantly presentable and seemingly everyone stopped to observe their demonstrations. The Whill stand was without a doubt the most hands-on with their demonstrations. Furthermore, they received an award for the second consecutive year.

Myself on a wheelchair from Whill

The final word

There were numerous innovations during this CES 2018, in multiple domains that were incredibly interesting and innovative.
Those in the sport and fitness domain can really improve the lives of people: be it the performance of an athlete, the decrease of the risk of injuries or early diagnosis, or to simply be in a better health. They really put technology at service ameliorating and perfecting human physical performance. Everything is done to improve the sporting experience. Many cameras are developed to allow filming his exploits or landscapes during ballads, as with GoPro or Sony. We try to propose to the sportsman a moment always more complete and richer.
However, there do rest flaws in certain products from this domain.
For example, one can and must wonder if the products analysing sport performance do not inspire or incentivise an athlete to push their limits too far. A possible solution would be integrating alerts into these platforms so as to avoid this risk. Also, the tracking involved in the products could stir fears of an Orwellian dystopia.
Some products in the health department also risk individual consumers falsely self diagnosing injuries or sicknesses and thus siphoning medical ressources away from those who really need said care.

With sleep tech products such as NuCalm, the promise of a twenty minute nap being equivalent to two hours of sleep could be abused by consumers, creating a real disturbance in their true sleep schedule.

All these products are magnificent, revolutionary, but it is necessary to keep a critical look to know if we really need it, and to counter-balance the technological utility with the possible risks associated with these products.

Appendix

List here the actors that were exhibitors during CES 2018 that you considered during your mission.
For each of them, indicate the following:

Company	Illustration	
Health	@-HEALTH	- Health wants to improve the conditions of health worldwide by revolutionising the way the actors of the medicine diagnose the cardiovascular problems.
Moovlab	MOOVLAB	- Moovlab ry to convince people to exercise, they are promoting the idea of « gaming sport »
Beflex	beflex:	- Belfex develops Engine monitors your running form and provides real-time coaching to maximise running performance and minimise injury risks.
HumonHex	humon	- HumonHex allows to Train smarter by measuring the way your muscles use oxygen in real-time!
Black Box VR	BLACK BOX	- BlackBox createa the world's first virtual reality gym. Step into the immersive experience and discover a whole new way to get fit.
Peloton	PELOTON	- Peloton is the only exercise bike streaming indoor cycling classes to your home live and on-demand. Also available for running.
Qardio	QARDIO	- Qardio allows you to watch more easily and more intelligently your cardiac health. Improve the state of your health by watching your tension

Magic Fit		- The Magic Fit MOVE is a dance, fun and fitness platform that you can enjoy at home or on the go! It's fun and easy to use. Adding vibration to your dance routine or exercise program can optimise your activity and help you burn calories and tone muscles while you play
Electron Wheel	electron	- Electron Wheel contains a powerful motor, smart & intuitive sensors, and an efficient battery that delivers plenty of kick to transform your ride. Just replace your existing front wheel and experience your bike in a whole new way.
Forrest	FORREST 福瑞斯 — For rest, for best —	- Forrest Brand Massage Chair Combating Stress And Back Pain Reclining Massage Armchair Sofa
Orphe Track	Orphe	- It's the world's first Smart Shoes Platform which analyses various kinetic data from your feet such as walking, running, kicking, jumping and dancing
Whill	WHILL	- Personal Electric Vehicles are bringing a fresh perspective to personal mobility with an innovative design and state-of-the-art technology—creating the confidence to drive anywhere with unprecedented independence and style.
Solos	solos	- Solos is raising funds for Solos Smart Cycling Glasses with Heads Up Micro-Display on Kickstarter! Heads up, hands free and fully immersed. Solos is the first and only Augmented Reality Bike Glasses developed with USA Cycling!
Valencell	VALENCELL	- Valencell has the most accurate biometric sensors for wearable technology that continuously measures heart rate and activity in virtually any form-factor.
Sleep Number	sleep number	- Sleep Number is adjustable beds, memory foam mattresses, kids beds, bedding, pillows & more.

NuCalm		- NuCalm is a clinical system designed to help your mind and body relax naturally within just minutes. Designed by neuroscientist Dr. Blake Holloway as a way to treat patients with post-traumatic stress disorder
SleepPhones		- SleepPhones are the world's most comfortable bed-friendly headphones! These patented, ultra thin flat speakers are enclosed in a soft headband that can help you fall asleep faster, stay asleep longer and wake up refreshed.
E-Skin		- E-skin is a connected garment imagined in Japan transforms your body into a lever of control for virtual reality and increased.
InBody		- InBody distributes InBody body composition analyse: the most accurate, precise, and convenient method to measure body fat, muscle mass, and much more.