

Hydrowatch

I. ABSTRACT

We have designed a Hydrowatch that will keep people hydrated while not needing to carry a big, heavy water bottle. The hydration watch is light and wearable. Hydration sensors on the watch tell you if you are dehydrated and need to drink water. If you run out of water and are close to any surface of water, all you need to do is dip the watch in the water. Our wristband uses a special fabric that absorbs the liquid (even out of the air) and stores it with water gel that can hold up to 8 ounces of water. The watch has a built in straw with fibers that filter bacteria or parasites so the water is safe to drink. The watch recharges with solar energy, which also filters the water a second time to make sure it is extra safe to drink. This watch will keep you hydrated!

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II. Description Section

1. Present Technology

Watches now are like Apple watches, and wrist watches. Those watches can't carry or filter water. They also don't track hydration. A Smartwatch is just a plain watch that has a map and can text and facetime. There are also FitBits. FitBits can track your heart rate. FitBits are supposed to keep you fit healthy.

Our Hydrowatch design uses certain technologies that exist today for water filtration, water storage, hydration and heart rate sensors and special absorbent fabric. The limitation today is that they don't all come together in one to help a person stay hydrated.

Water Filtration Technology:

Water should be filtered so you don't get sick from bacteria or viruses. There is an invention called Life straw that filters water if it has bacteria to make it drinkable as

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shown in Figure 1. When taken apart, the Life Straw has little fibers that filter the water. We can use the fibers, since they are small, in the hydro-watch band to clean the water.

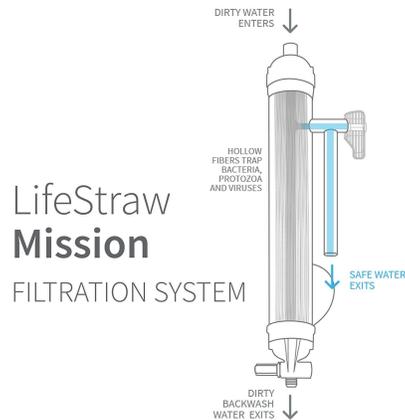


Figure 1: LifeStraw

Water Collection and/or Storage Technology:

Water is heavy to collect and store, so we are using water gel. Water gel (also known as sodium polyacrylate) which absorbs and holds lots of water in a small space. Water gel starts as a powder and can hold 400 times or more its weight in water. It is non toxic.

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Sensor Technology:

There is a wearable hydration sensor that senses when you need to drink water. The sensor lets you know how much water you need to drink to become hydrated again.



Fig 2: Hydration sensor

2. History

The 1st Smart watch was invented by Steve Mann in 1998. The 1st watch invented in 1770. The 1st Smart watch was released Sept.9 2014 by Apple company. It was invented by Steve Mann. That is the history of the present technology.

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3. Future Technology

Dehydration is a problem. 75% of Americans could be chronically dehydrated.¹ Without water you could die. Hydration affects all parts of the body. We invented a hydro watch. A hydro watch collects water also known as H₂O. When the hydration analyzer senses you are dehydrated, the watch will become something that will also hydrate you.

The watch will be able to hold 8 ounces of water through a special fabric technology.

There is fabric recently invented. “A team of college students developed a water harvesting textile from a fine mesh of carbon nanotubes. On one side of the mesh, the material is hydrophilic, meaning water loving—it attracts water. The other side is hydrophobic, or water repelling.”² We thought this fabric would make a great watch band to absorb and hold the water to drink. The band absorbs water and traps it inside the band. For example if you didn’t have water in your water bottle and you are near a river or a puddle, you would put your wrist in the river for the fabric to absorb the water. The

¹ Ericson, John. “75% Of Americans May Suffer From Chronic Dehydration, According to Doctors.” *Medical Daily*, 4 July 2013, www.medicaldaily.com/75-americans-may-suffer-chronic-dehydration-according-doctors-247393.

² “A Nanotech Device Harvests Water in the Driest Places.” *D-Brief*, 6 Mar. 2018, blogs.discovermagazine.com/d-brief/2018/03/06/water-harvester-technology/#.W-THcWhKjrc.

Hydrowatch

special fabric also attracts moisture out of the air and traps it inside the watch band so it is ready to drink.

Water gel will absorb all the water and hold it in the watch band until it is ready to drink.

Water gel can hold over 400 percent its weight in water.

A filtering straw would come out to make the water safe to drink.

The sensors in the watch will tell the watch wearer if they are dehydrated. Two ways that sensors could work are:

1. "Sweat analysis: The technique most commonly used to measure dehydration is chemical analysis of sweat. Mineral content (sodium, potassium) decreases with dehydration. Conductivity of sweat varies with sodium concentration and can be an indirect measurement of dehydration. Another indication of dehydration is the density of sweat which has a direct relation to water volume in the body.
2. pH level of skin: Dehydrated skin has a pH level similar to that of water and a device that can identify this condition should have adequate sensitivity to detect the transition from acidic (normal skin) to slightly basic(dehydrated). Alkaline skin

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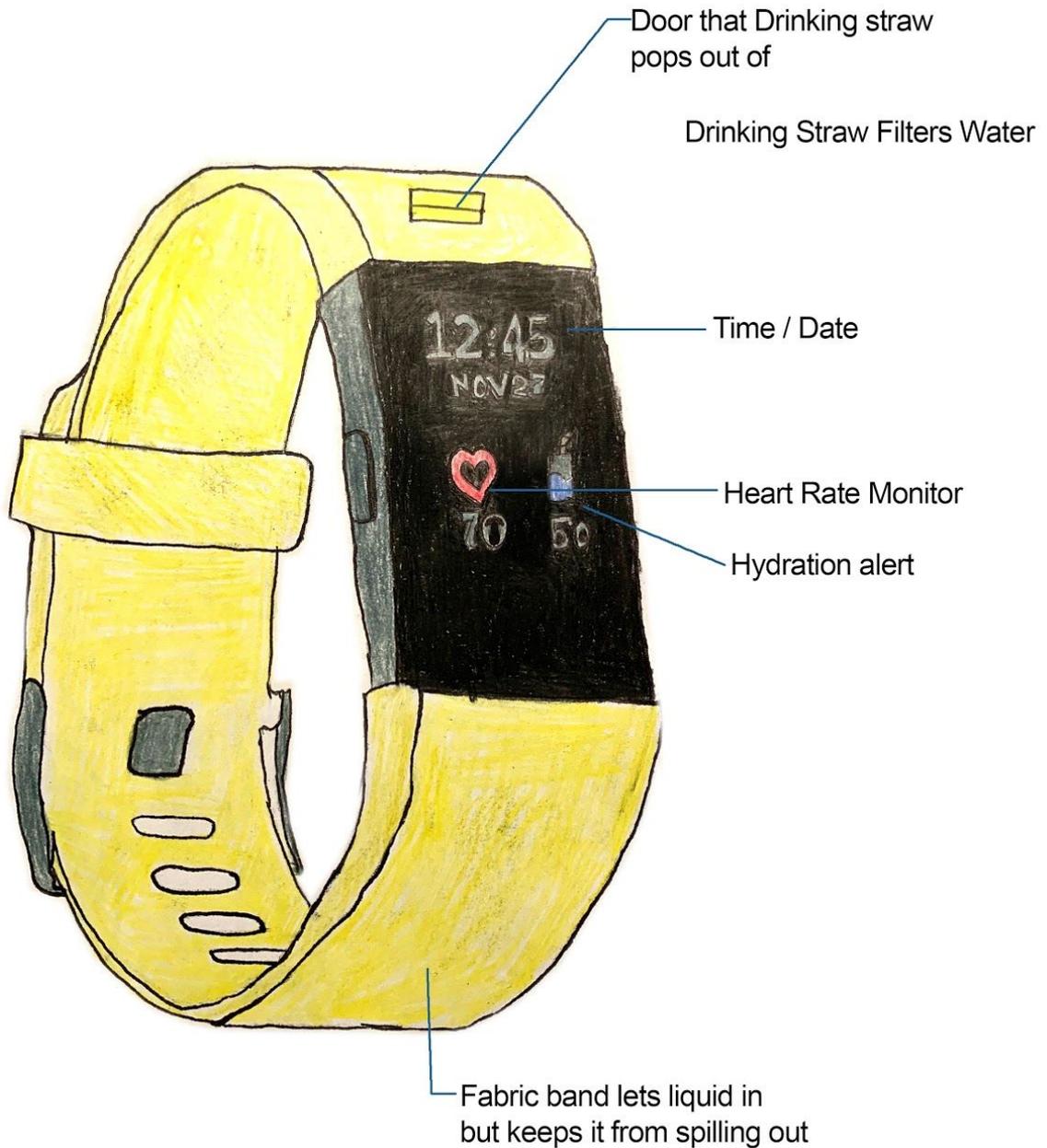
can also be induced by natural dryness or eczema which makes it more challenging to identify dehydration as the sole cause.”³

The watch would charge with solar energy which will also filter the water a second time. It will also have other smart watch features like telling time, heart rate monitor and GPS, which can also tell you where the closest water source is.

³ Balaji, Vidhya. “Sensing Body Dehydration.” *EDN*, www.edn.com/design/sensors/4459165/Sensing-body-dehydration.

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4. Breakthroughs

There is a fabric technology that we read about that we are excited about its ability to absorb and hold water. We need to build a prototype of the watch band out of the fabric to see if it would be a good material to hold the watch in place and hold different quantities of water. Along with the ability to absorb water, we need to make sure that it is sturdy enough to wear every day. We would test the watch band by wearing it many hours to see how durable it is. We also have to test the water that has been filtered. We would check the filtered water for bacteria and parasites and make sure the filter in our watch cleans the water so it is safe to drink.

5. Design Process

We had fun thinking up our invention of the Hydro Watch. We had lots of ideas. We loved drawing pictures of what the watch would look like. We also made prototypes of a hydro watch using water balloons and material. They didn't work out so great because they were too big and messy and there wasn't anything to clean the water. When researching, an advertisement for diapers started playing and we all were joking about diapers...then we said, "wait, diapers hold lots of liquid." Through the diaper ad we discovered water gel. Our biggest challenge was figuring out how to clean the water in a

Hydrowatch

small size. We heard about the LifeStraw technology and it fit perfectly with our hydro-watch. We originally wanted to design the watch with a predator sensor too, but it doesn't really fit with hydration.

Another challenge we have is thinking of a simple way to get water into the watch band and an equally simple way to get it out to drink.

6. Consequences

Positive things

It is good to have a watch that will help keep you healthy by getting clean water if your water bottle runs out. You won't need to carry water bottles anymore, so it will cut down on plastic and bulky water bottles that get heavy to carry. You will be drinking guaranteed clean water because you have your own filter. You can be hydrated all day because you will have your watch on all day and the sensor will let you know how much you need to drink.

Negative things

It will be expensive and not everyone will be able to afford one. It would be expensive to lose or if it breaks.

Hydrowatch

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Hydrowatch

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Hydrowatch

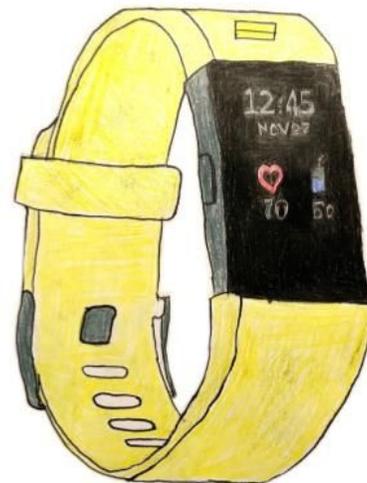
IV. Web Design

Page 1



The Hydrowatch will keep people hydrated while not needing to carry a big, heavy water bottle. It is light and wearable. The watch will tell you if you are dehydrated and need to drink water.

If you run out of water and are close to any surface of water, all you need to do is dip the watch in the water. The watch can hold up to 8 ounces of water. It can even absorb water out of the air to drink. The watch filters the water so it is safe to drink. This watch will definitely keep you hydrated!



This will be a Video of how the Hydrowatch works

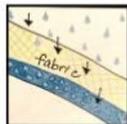
Hydrowatch

Page 2



Water Filtration Technology:

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Water Collection Technology:

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Sensor Technology:

Hydrowatch

Page 3



Hydrowatch



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This will be an animated image pointing out all the watch features and what they do

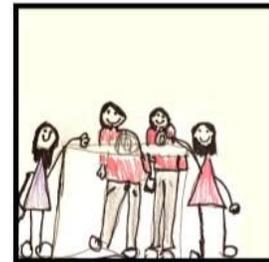
Hydrowatch

Page 4



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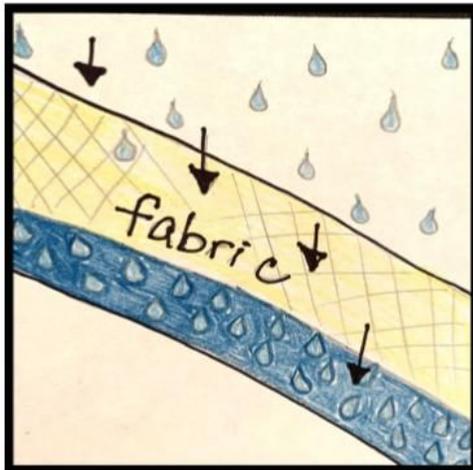
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This will be a video of us
Talking about our team and our
ideas

Hydrowatch

Page 5



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