**BeachBot: A High-Tech Solution to a Worldwide Problem**

**The Problem**

In 2012, the Blue Ocean Society for Marine Conservation collected a total of 2,690 pounds of trash from over 26 miles of New Hampshire’s coasts.[[1]](#footnote-0) And it’s not just New Hampshire — beach litter threatens the environment across the entire globe. From cigarettes to plastic bags to random bits of styrofoam, litter comes in many different shapes and sizes, and beachgoers often don’t realize the true impact of their actions when they leave such items behind. Most of the litter is made of non-biodegradable materials such as plastic, which never breaks down — instead, it release millions of microscopic beads known as microplastics, which are toxic to living things. Plastic ingested by an animal can also remain within it for the rest of the animal’s life. A 2015 study published in the National Academy of Sciences predicted that as many as 90% of all seabirds have plastic items in their guts.[[2]](#footnote-1) Another study found that plastic beach litter kills over 100,000 marine mammals and turtles each year.

The costs of beach litter also go beyond the environment; cities spend large sums of money on cleaning their beaches, both out of an environmental obligation and an attempt to attract more tourism. For example, California cities alone spend $428 *million* each year on cleaning crews for their beaches.[[3]](#footnote-2) Between the labor costs and the detriment to tourism, beach litter can have a substantial negative effect on a town’s economy.

Though many community-led clean-up efforts exist, they are generally infrequent (occurring once or twice a year), and are far too small to make a dent in the worldwide totals of beach trash. Hence what the world really needs is a sustainable market-driven solution.

**Our Solution**

We at BeachBot Labs imagine a world where clean beaches allow the natural environment to flourish and simultaneously attract tourists to enjoy their beauty. Beaches have been a wonderful part of every-day life for many people, and by attacking the problem of beach litter, we hope to help maintain and improve beach quality across the world. Our product, BeachBot, attacks the problem of litter by utilizing technology to help clean and preserve our beaches. BeachBot is a dog-sized solar-powered intelligent rover. It is aware of its surroundings, can identify objects as litter, and can then pick them up to keep beaches clean. BeachBot can help cities and towns everywhere by both cleaning up trash and helping beachgoers be more aware of their impact on the environment. Given the amount of money currently spent on beach cleanup, in addition to the costs of lost tourism due to dirty beaches, we expect that cities and private beaches will recoup their investment into a squad of BeachBots within a few years.

The spirit of social innovation drove us towards using technology to solve the beach litter problem. Recently, there have been massive developments in the field of machine learning. With software applications like advanced facial recognition and autonomous cars, machine learning opens up the world to possibilities of intelligent robots that can learn to perfect certain functions. BeachBot is an extension of this concept. As it traverses the sand, the rovers will constantly scan their surroundings and identify the trash in their path. Through thousands of training scenarios, BeachBot will learn to make the distinctions between people, seaweed, rocks, personal belongings, and actual litter. The beauty of machine learning is that though the software might make mistakes at first, it will be able to learn from its mistakes; by the time BeachBots are deployed to the world’s coasts, they will be so well-trained that they can operate almost entirely autonomously. For safety, all BeachBots will be equipped with a manual override system; each fleet of BeachBots will be monitored by a remote human being while the rovers operate around beachgoers, to ensure that nothing goes wrong.

Our goal extends beyond just collecting trash to spreading awareness on the beach litter problem. As it travels around, each rover will double a beacon for environmental consciousness. With signs attached to the side reading jaw-dropping statistics as well as simultaneously functioning as a mobile trash can, BeachBot will encourage tourists around it to dispose of their trash directly into the rover instead of onto the sand.

We have made significant progress on our machine learning algorithm so far, and we expect to have functional software before the end of 2016. The software will be able to take any image of the beach and identify the location of each piece of litter in the image. With the funding from the Social Venture Innovation Challenge, we hope to build a real, physical prototype rover and run our software on it. We plan to conduct pilot tests of the rover in partnership with local New Hampshire coasts while seeking additional funding to propel BeachBot further forward. Within two to four years we hope to be successfully operating teams of rovers on multiple local beaches. Our team has a very clear vision: a world in which beaches are kept pristine, and marine environment are gradually nursed back to good health. The wildlife, the cities, the tourists, and our company will all benefit. This is the true power of our high-tech, market-driven solution to today’s pressing problem of beach litter, and we hope you will invest in BeachBot to help make our vision a reality.

1. http://blueoceansociety.org/Research/coastal\_cleanup.html [↑](#footnote-ref-0)
2. http://www.pnas.org/content/112/38/11899.abstract [↑](#footnote-ref-1)
3. https://skift.com/2013/09/04/california-towns-spend-428-million-a-year-cleaning-up-polluted-beaches/ [↑](#footnote-ref-2)