Please follow the outline below and answer all the questions.

Team Members:

Name	Contact Info	Major	Current Year in School
Kaiwen Xu	kaiwen_xu@student.uml.edu	Computer Science	2nd year
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Advisor: (optional)

Name	E-mail Address	Affiliation
Prof. Guanling Chen	guanling_chen@uml.edu	Computer Science Department

Project Title (50 words or less):

Smart Showerhead

Project Concept (200 words or less): Provide us with a brief summary of your project.
- Describe your project and the problem it addresses.

Design a smart shower head to save water in the shower. Add a sensor that can calculate water consumption, connect with atomization function, can automatically turn off when people are not around showerhead. Build-in LED light to remind people water consumption, also come with a smartphone application can record how much water you used in the shower then give you some advices, also can setting the water consumption by the phone.

Section 1.

Problem (200 words or less): Provide us with a detailed summary of the specific problem you are looking to solve.
- What is the specific problem that your project is going to solve? (e.g. hard to afford/expensive prosthetic devices)

Many place in the world are suffering from water scarcity problem, home water waste is a serious problem, especially when people in the shower. Our problem is water waste in the shower. Our product's purpose is to save water and help people get into the habit of water saving.

Section 2.

Opportunity (800 words or less): Demonstrate your knowledge of the actual opportunity associated with your project. This includes numbers and market research/data on how many people are affected by the problem you stated in Section 1. Clearly discuss any research you conducted, including:
- A. Data on real-life people/customers you have talked to, interviewed, and/or surveyed who are actually affected by the problem or could benefit from your proposed project solution that you stated in Section 1 (e.g. 10 doctors about a new medical device)
- B. Is there another organization(s) or business(es) doing something similar to your project? If so, who are they and what are they doing similarly?
- C. Online research, numbers, databases and articles you found that supports the need and demand for your project
- D. Why is your project better/different than there's? (Competitor Analysis)

Showering drives almost 17 percent of water use in homes, and according to the U.S. Environmental Protection Agency (EPA), an average American family uses some 40 gallons of water per day in the shower. This amounts to 1.2 trillion gallons of water in the United States each year, enough to supply the water needs of New York and New Jersey over the same time period. If 20 percent of that is wasted, well, over 200 billion gallons, in a world where gigantic states and megacities are suffering from drought and water scarcity problems are expected to become still worse in the decades ahead.

The price of water in California is expensive, for a regular home in CA, the cost of water is $100 per month at least. And the average water consumption of taking shower is 21 gallons each time. The governor of CA state said people will be fined $500 if one use too much water in the shower in the future.

We found many products helpful for save water.

Low-flow showerhead - A conventional shower head uses between 3 and 4 gallons per minute (3.5 gpm), while a low-flow shower head uses about 2 gallons per minute (2 gpm). To find out how many gallons per minute your show head uses, take a plastic gallon ice cream pail or similar plastic one gallon container and time how many seconds it takes to fill that container. Now divide 60 by the number of seconds it took to fill your container: 30 seconds = 2 gpm, 20 seconds = 3 gpm, 15 seconds = 4 gpm. So if the price of natural gas is 70 cents a therm, the low-flow shower head will save $23.80 per year per person. If the price of electricity is 5 cents per kWh, the low-flow shower head will save $32.50 per year per person.

The Shower Manager (Shower Manager, LLC) – The shower timer that cuts the flow, its functions are: Full-flow times 5, 8 or 11 minutes; Alert tone 60 seconds before flow cut; Leaves just enough flow to finish rinsing off; 5 minutes reset time prevents extending shower. The Shower Manager is the answer to the problems created by excessively long showering. It works because it automatically and fairly manages shower times. As a combination shower timer and conservation device, it was specifically designed to make it easy for people to consistently take short showers, resulting in significant water and energy savings.

Existing solutions just save water on the shower device, but people still can take a long time shower under the condition of the unconscious. Our solution brings the user with water saving consciousness when they are taking shower. Our product can directly spray

water, automatically turn off when people are not around showerhead. Not only save the water through the function, but also have a LED light to remind people and can calculate water consumption then record the daily water flow, get into the habit of saving water while taking a bath.

Section 3.

Solution (800 words or less): Describe the solution you are proposing to the problem you addressed in Section 1. Please support your claims.

    A. Clearly describe your proposed solution (e.g. low cost prosthetic limbs)
    B. How does this specific solution solve the problem you stated above?
    C. How is your solution new, innovative and/or unique?
    D. How will your solution be sustained over time? Please provide details and be clear. (e.g. Will you work on it after you graduate? Pass it off to someone else? How will your idea continue on in the years to come?)
    E. What stage of development is your project in? (Idea stage, prototyping/testing stage, raising funds stage, ready to launch stage)
    F. Why is your project valuable? What value does your solution provide? To who? (Value Proposition)

I think we have a versatile water saving of product, including water atomization, infrared sensors, intelligent water-saving tips and other functions. Atomized water can save at least 50% of the water consumption, is an important function of our water-saving. Infrared sensor is that once the person away from the shower head will temporarily stop the water, back to the original position will continue. We will use a APP (intelligent water saving APP), we set the value of the one we want to predict, once the flow of water to achieve expectations, the water will become smaller. At this time, we will LED light flashing red light to prompt the user to control your shower time.

Our solution is not new, but can save water in more effective way.

We may work on it after we graduate or show our solution to some organizations really care about saving water in our daily life. Maybe cooperate with some companies can help us improve this product.

The stage of our project is in Idea stage.

Water is a vital element for all life forms. In developed countries, water is at the reach of a tap and always available. Compare this to a common situation in Africa, where the closest water source can be a river kilometers away. The water resources protection is our common responsibility, we should start doing small things little by little, like saving water in our daily life.

Section 4.

Resources (500 words or less): Demonstrate why you need funding from the DifferenceMaker Idea Challenge.

    A. How much funding do you require to implement your project?
    B. How much time will you and your team members commit to your project after the Idea Challenge?
    C. How will these DifferenceMaker funds be used to support your project?
    D. Please provide an estimated budget for use of DifferenceMaker funds from May 2015-2016.

The funding will about $1000.

Our team works on this project at least two days per week.

We will use the fund to buy different equipment to do more test to make a perfect product to save water in the shower.

Team building: we set up this group to discuss one idea. We discussed several idea and finally use this idea which is named smart shower head. (February, $0); Doing some research and find what material we need for this project. (March, 0); Start project and develop the applet to realize the function we designed. (April, $200); Make model and make the sensor. (May, 300); Combine two part of the product. (June, $300)；Test the product and record the parameters. (July, $200).