

CBSE
SCIENCE
EXHIBITION
2018-19

WashPort

A Smart Washing Machine for
Menstrual Pads

PSBB SCHOOL
KK NAGAR, CHENNAI, INDIA

BY: Devesh Paragiri and P. Balasubramanian



AFFILIATION NO: 1930040

NAME OF THE SCHOOL AND ADDRESS: PSBB SENIOR SECONDARY SCHOOL (CBSE) – NO.29, Alagirisami Salai, KK Nagar, Chennai – 600078

NAME OF SUB-THEME: Waste Management

INTRODUCTION

PURPOSE:

Use of Plastics has become indispensable due to its durability, anti-corrosive properties. Plastics take years to decompose and pose a major threat to our environment. The accumulation of plastic in our oceans is a greater cause of eco-system disruption. An estimated 100,000 marine animals die each year from suffocating on or ingesting bags. Dioxin and other toxins can leach out of landfills, further contaminating water bodies.

An easy and ecofriendly alternative to this is using cotton cloth. Cotton cloth which is used can be very easily reused and has many advantages such as less toxic materials, less irritation and prevents other side effects of hard chemicals used in sanitary napkins. The Wash Port can be used as a machine to wash these cotton cloths isolated from other cloths in the house.

SCIENTIFIC PRINCIPLES INVOLVED:

The main scientific principles involved are similar to that in a conventional washing machine except the driving or control systems for which we use a Raspberry Pi board. Centrifugal force is used to wash the pads and the ingenious tubing system to reduce cost and improve efficiency.

DESCRIPTION

MATERIALS REQUIRED:

Materials	Quantity	Purpose
Raspberry Pi	1	For Controlling the Wash Port
8 Relay Board	1	To Switch the Solenoids and Pump
AC-DC 24V Supply	1	To Power the Pump and Solenoids
DC Motor	1	To Make the Drum Spin
Pump	1	To Pump the Water in and out
Solenoid	4	To Allow the Inflow of Water
Drum and Washing Chamber Box	1	To Wash the Clothes(Cotton Menstrual Pads)

CONSTRUCTION AND WORKING:

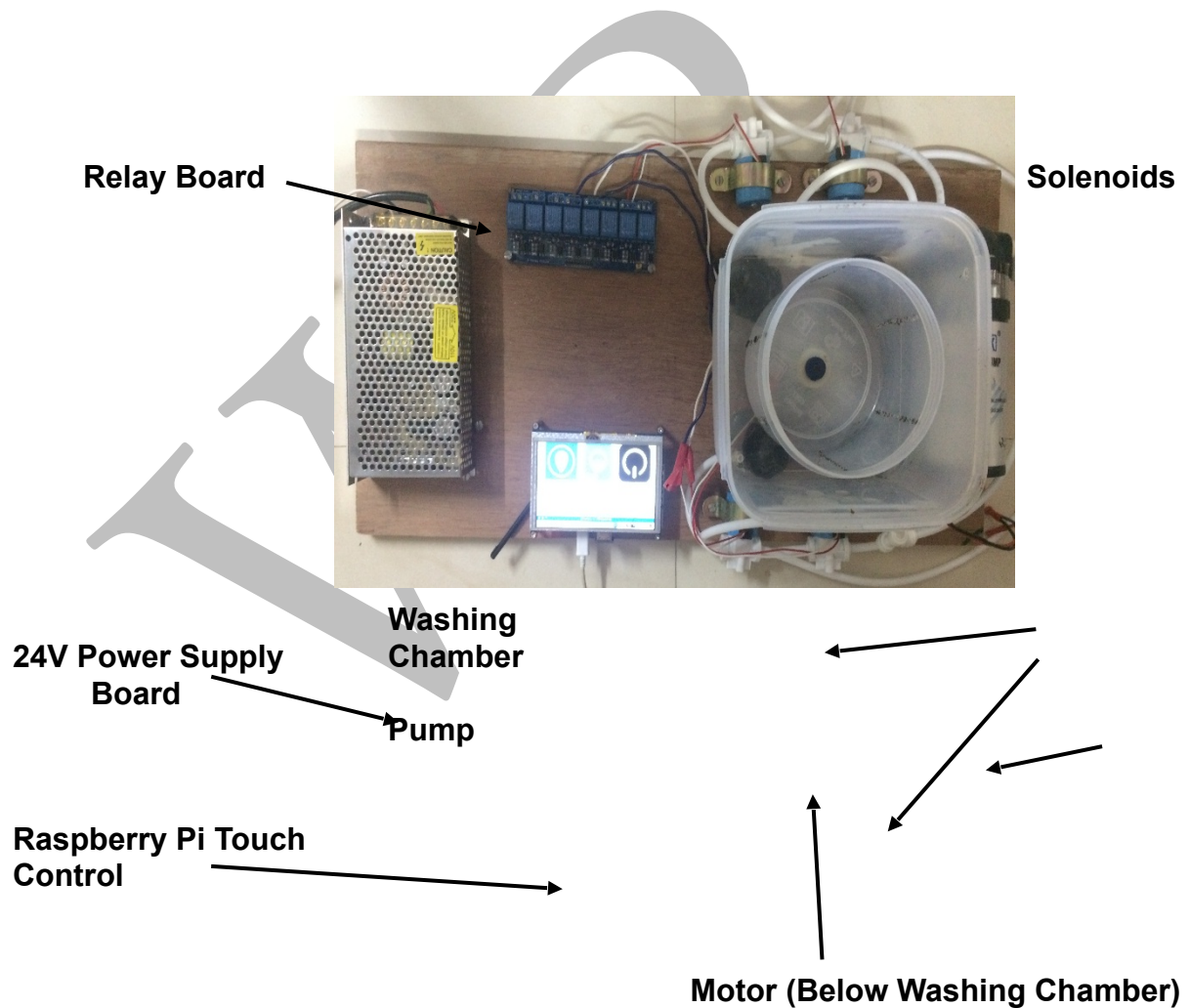
The relay board helps us to control the switching on and off of the components. It switches the 24V DC from the AC-DC adapter Power Supply. The GPIO pins are connected to the relay board which in turn controls the components. The solenoids are electromagnetic valves which regulate the flow of water in and out of the washing chamber. The pump along with the solenoid system helps pumping water in and out. We have used Python-3 for the user interface using GPIO pins from the Raspberry Pi-3. The GPIO pins allow us to control the solenoid valves, working of the pump and motor. During different protocols the pins are assigned several functions which enables WashPort to be an automatic washing machine. The Raspberry Pi is the brain of the project.

APPLICATIONS:

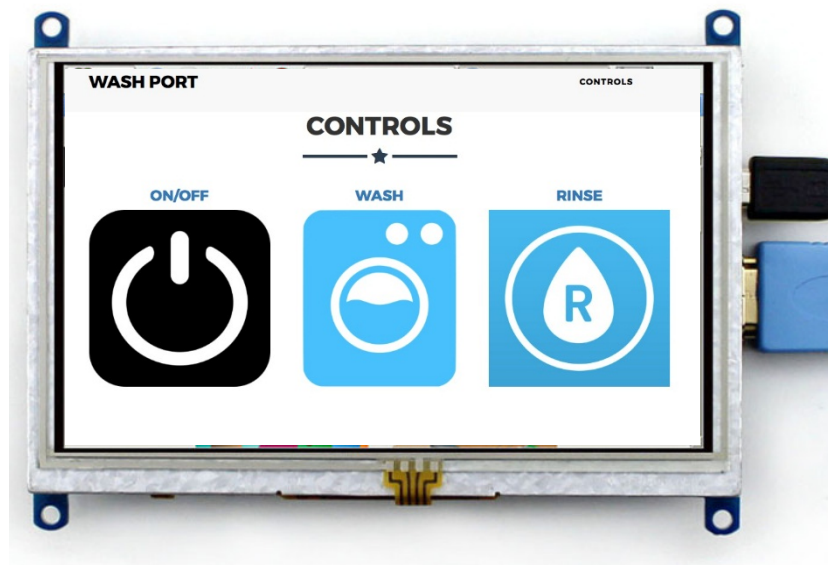
The main purpose of the WashPort is to serve as a cheap, efficient and hygienic way to clean the cotton pads to promote the use of reusable pads.

ILLUSTRATION

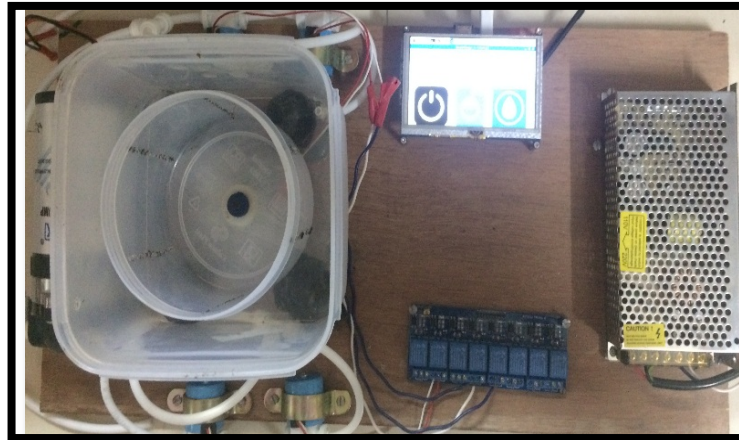
LABED DIAGRAM OF THE MODEL:



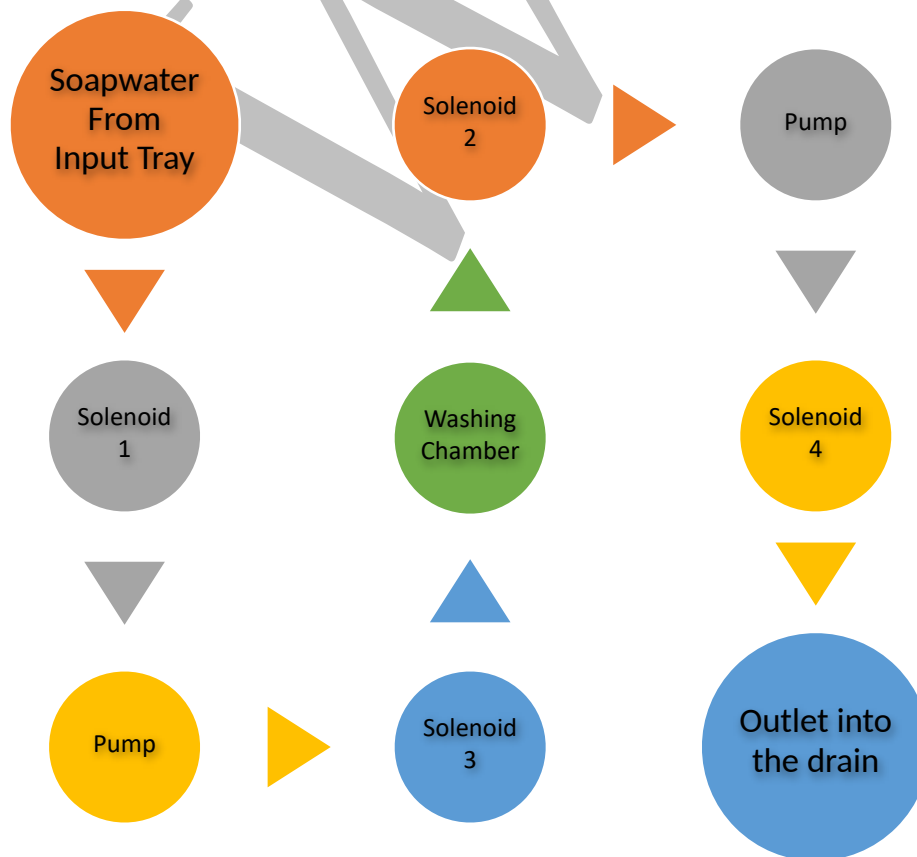
RASPBERRYPI INTERFACE:



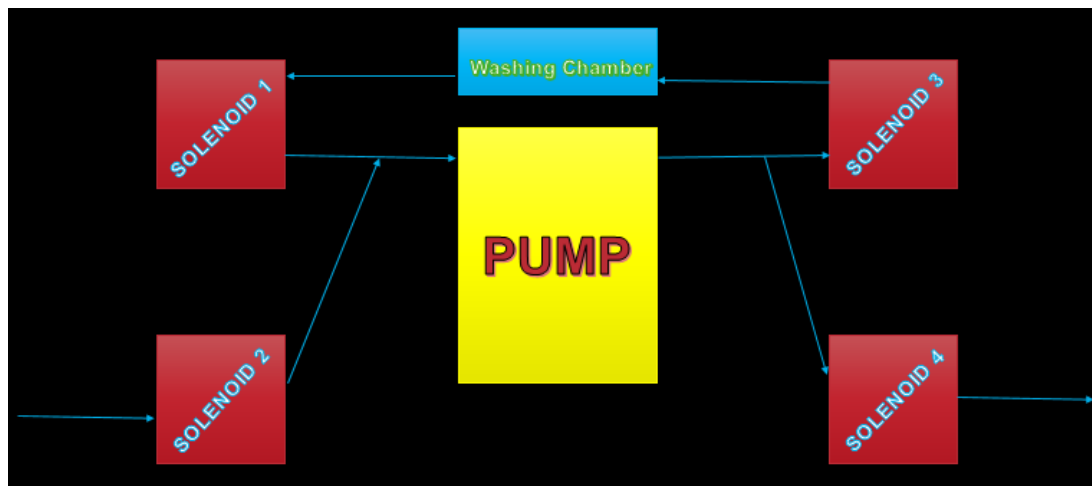
CLOSE UP PHOTOGRAPH OF THE MODEL:



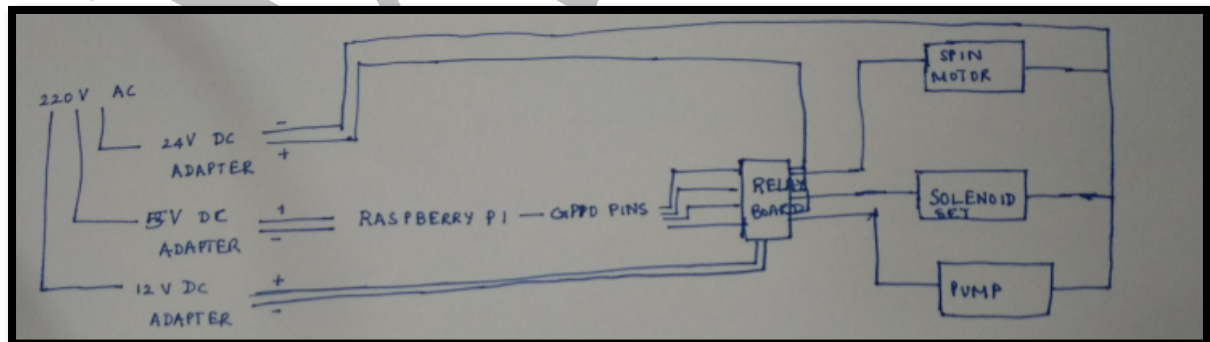
FLOWCHART OF WASHING MECHANISM:



WATER FLOW BRIDGE MECHANISM:



CIRCUIT DIAGRAM:



REFERENCES:

- https://www.huffingtonpost.com/dr-mercola/feminine-hygiene-products_b_3359581.html
- https://www.youtube.com/watch?v=4vwQpe3CCH4&feature=player_embedded
- <https://www.raspberrypi.org>
- <https://timesofindia.indiatimes.com/india/70-cant-afford-sanitary-napkins-reveals-study/articleshow/7344998.cms>

WIP