# Smart India Hackathon – 2019

## IDEA PROPOSAL

**Title:** Pani Puri, Dahi Puri vending machine.

## Introduction:

People go crazy for tangy and spicy chat dishes. But the one thing that concerns most people is the ‘hygiene’ issue. The panipuri hawkers are always doubted for their filthy process of making panipuri and the dirty napkins they use for cleaning their stall. The world is developing by replacing almost every traditional method by various vending machines. They have proved to be highly efficient, useful and hygienic way for the welfare of the people.

## Abstract:

Here, we have provided a solution to solve the hygiene issue by introducing a Pani-puri/ Dahi-puri vending machine. The vending machine has different executing stages which will work sequentially. As the user enters a Rs 10 coin, coin will checked if it is valid or invalid using Image processing. Once the coin detected proves to be valid, the user will be provided with two options of Pani-puri and Dahi-puri.
Firstly, three puris will be dropped on a rotating plate which will controlled by a stepper Motor. The respective ingredients will be dropped from the pipes connected to each container. The taps used to open the pipe outlet will be controlled by servo motors.
IoT will be used to measure the volume in each container and it will be displayed on a website. Machine learning will predict the number of puris that can be made with available amount of ingredients using the data provided by IoT.
Cleaning mechanism includes a motor which will drive the water current through the pipes connected along the walls of all containers. The pipe has holes at specific distance through which the water gushes out and washes the containers.

**Components used:**
1) Arduino Mega
2) Raspberry pi 3b
3) Camera
4) Ultrasonic sensor:HC-SR04
5) Stepper motor
6) Servo motor
7) Dc motor
8) Stepper motor driver
9) Dc motor driver
10) 12v/10amps smps
11) Coin module

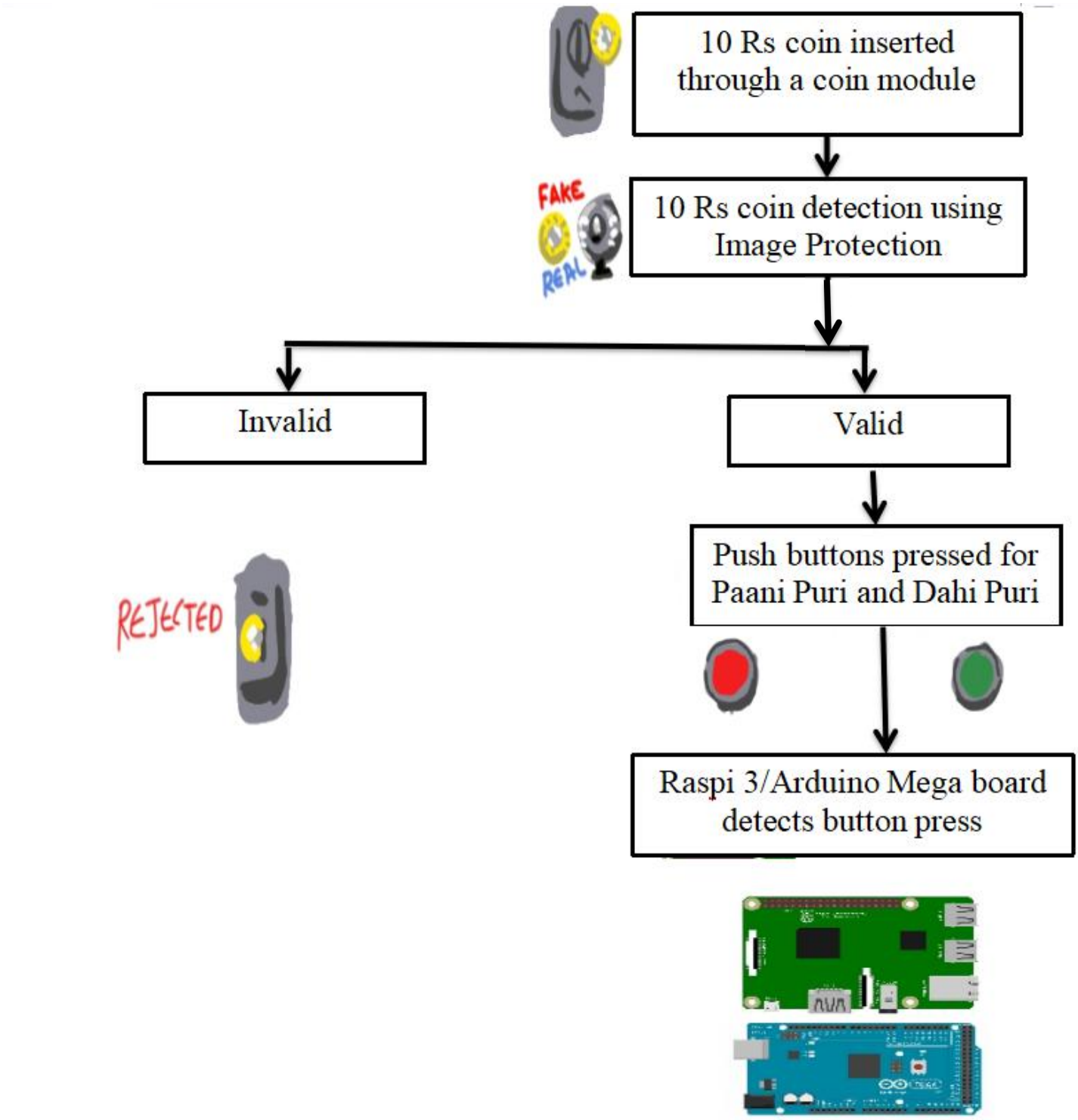
**Software used:** Arduino IDE, Anaconda, jupyter notebook, opencv, python 2.7

**Methodology**

Algorithm

Step 1 : 10 Rs. Coin is inserted
Step 2 : Coin detection is done by the coin module
Step 3 : Coin is validated using Image Processing
Step 4 : Valid coin provides two options for Paanipuri and Dahipuri
Step 5 :Invalid coin will be returned to the user
Step 6 :Push buttons are pressed to select the option
Step 7 :Action is carried according to the buttons pressed
Step 8 : Puris on the plate will be cracked using a DC motor
Step 9 : Plate will rotate and servo motor connected to the taps are actuated
Step10:Taps open to fill the puris according to the chosen option
Step11:Taps closes according to the delay given
Step12:Paanipuri/Dahipuri is served
Step13:Using IoT we learn the volume of ingredients in the food tank
Step14:ML predicts the number of puris that can be made with remaining ingredients using the data provided by IoT
Step15:Food tank is cleaned using the AC motor

**Flowchart:-**


10 Rs coin inserted through a coin module
FAKE
REAL
10 Rs coin detection using Image Protection
Invalid
Valid
REJECTED
Push buttons pressed for Paani Puri and Dahi Puri
Raspi 3/Arduino Mega board detects button press

Dahi Puri

Puris are broken using Conical Cutter

Plate containing puris rotates

Servo Motor opens ingredient taps

Ragda, Chutney, Dahi and Shev are dropped.

Paani Puri

Puris are broken using Conical Cutter

Plate containing puris rotates

Servo Motor opens ingredient taps

Ragda, Chutney, Paani are dropped.

Using IoT the volume of Ingredients are measured and using Machine Learning, the no. of Puris that can be made is predicted

Food tank is cleaned

**Advantages**

i. Hygiene is maintained as there is no human interference.
ii. Panipuri/Dahipuri(s) will be served at a very high speed.
iii. Materials used in the fabrication of the machine will be made using food contact materials . Hence there is no chance of corrosion or rusting.
iv. As the body of the machine will be made using Polypropylene material and the skeleton will be made using aluminum which will be powder coated ,use of such materials will reduce the weight of the machine which makes it easily transportable.
v. Due to the extensive use of motors and actuators instead of sensors will reduce the chances of failing.
vi. It will be a complete automated vending machine. No human presence is required; he/she can monitor the ingredients through the web application which will be updated using IoT.
vii. Due to the use of Image Processing no fake coins as well as currency of different value will not be accepted by the system.
viii. Prediction of number of puris that can be made with the available ingredients using Machine Learning will help the owner to refill the ingredients again beforehand.
ix. After the food ingredients are over, the owner will be able to able to clean the food tank, food pipes and the rotating plate with the press of a button. The water will be collected in a small tank which will act as a drainage system.
x. This machine will be self dependent as it will process the coin, will complete the order i.e makes and serves panipuri/dahipuri , predict the amount of ingredient, display the quantity used and will also clean the tank once the ingredient are exhausted, so it is one of the cheap and innovative solution for the traditional panipuri/dahipuri.