Petrol Pump Queue Management System with the help of ML

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ABSTRACT: This document analyzes the problems of managing vehicle queues at gasoline pumps in the Sultanate of Oman and identify solutions to minimize waiting time. This paper Propose the use of a technique based on artificial intelligence (AI) to manage queues. The proposed gasoline pump queue management system uses a supervised classification machine learning algorithm This is to identify the type of vehicle and power to estimate the size of the tank to automatically calculate the time required to refuel. The main idea is to show the timer count on the screens so that the drivers of the vehicles who are in the queue will know the remaining time for each vehicle and accordingly they can decide the choice of a particular queue, when there are multiple Queues at gas stations. In addition, this system will help workers in the oil industry.pumping station to organize your work, as they will be able to track which car is finishing First. How this system will organize the work process at the station with notification help On the screens, any problem or service requirement will be directly highlighted.

KEYWORDS: Machine Learning, Image AI, Tensor Flow.

I. INTRODUCTION

In most popular and big cities people seen the issues of managing queues of vehiclesat petrol pumps to minimize the waiting time. This paper propose the use ofan artificial intelligence (AI) based technique to manage queues. The proposed PetrolPump Queue Management System uses a supervised classification algorithm of machinelearning. This is to identify the type of vehicle and be able to estimate the tanksize to calculate automatically the time required for refueling. The main idea is todisplay the timer count on the screens so that the drivers of the vehicles that are inthe queue will know the time remaining for each vehicle and accordingly they will beable to decide the choice of a particular queue, when there are multiple queues at thepetrol pumps. Alongside, this system will help the Workers in the petrol pump stationto organize their work as they will be able to track which car is finishing first. As thissystem will organize the work process in the station with help of notification on thescreens, any service issue or requirement will get highlighted directly.

II. RELATED WORK

Many studies have been found to optimize queues at gas pumping stations,Simulation modeling was one of the common solutions that has been practiced.in some gasoline pumping stations as a solution to optimize queues. Simulationmodeling has also been practiced in many sectors that include medical care, clientservices, industrial sectors and defense sectors, since they are objectives to emulatesense of reality that tries to emulate complete processes occurred in an operationenvironment. In 2013, simulation modeling was applied to reduce the service stationQueue challenge in Malaysia by using the WITNESS software package and this solutionwas improved in 2017 by using DEO (Experiment Design) that helpsby linking the input factors with the output of the simulation modeling.

The simulation modeling method is good but has some limitations, such as thoughts and imagination; efficiency level and processor programmingabilities; errors that may occur when using simulation modeling such as the keystrokeIt may result in an incorrect output. In addition, you need proper analysis tools.
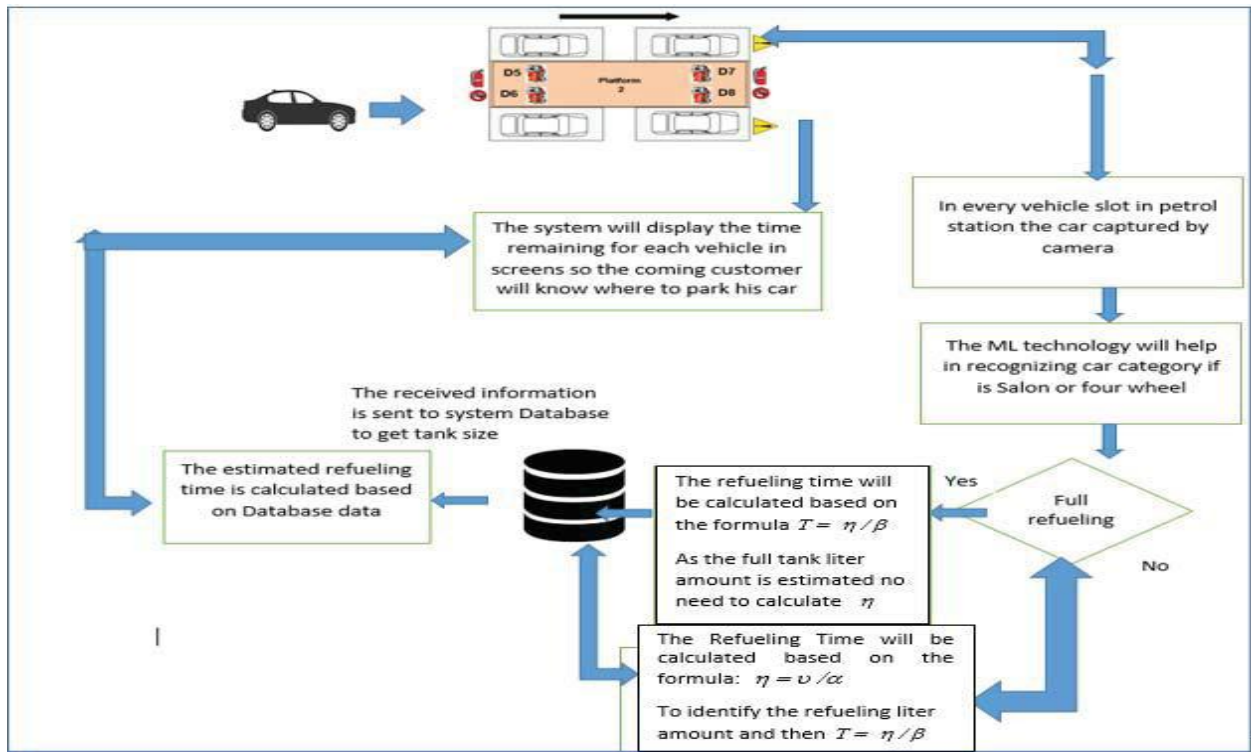
III. PROPOSED SYSTEM

Fig 1.1 Architecture

- In every vehicle slot in petrol station the car capture by camera.
- This capture image is recognize with help of ML technology. The ML technology will help in recognizing car category if is salon or four wheel.
- The refueling time is calculated if driver select full refueling, the refueling time will be calculated based on the formula $T = \eta / \beta$.
- If the driver select refueling option is amount based, The refueling time will be calculated based on the formula : $\eta = v/\alpha$
- The received information is send to system database to get tank size. This estimated refueling time is calculated based on Database data.
- The system will display the time remaining for each vehicle in screens, so the coming customer will know where to park his car.

IV. ALGORITHM

Refueling Time Duration Formula :
Returning back to the factors that calculates time duration for the vehicles with specified amount of memory :
A - Petrol price per liter.
B - amount of fuel pumped in the vehicle per minute.
V - the amount requested by the user to be refuelled.
n - Refueling liter amount.
T – Refueling time duration.

$n = V/A$
Therefore :
$T = n/B$

But in case the customer request for full tank refuelling the depended factors are :

B - amount of fuel pumped in the vehicle per minute.
n - Refueling liter amount.
T – Refueling time duration.

$T = n / B$

V. SIMULATION RESULTS

Training the program :
First of all we have to train the program for recognising the image of cars and getthe information of that car like model, fuel tank capacity etc.

Image Detection :
When car is coming to the petrol pump station then camera capture the that carimage , after that in background process tensorflow or any other image recognition libraryscan that image right to left , top to bottom and after that scanning they recognisethat object and get the information that car like which type of car and car fuel tackcapacity etc. In image recognition car is recognise on their logo , that logo indicate thecar model and their other detail also.

Time Calculation :
After the image recognition and information collection programs next step is tocalculate the tank refuelling time and show on display for other drivers to see waitingtime of given car.

VI. CONCLUSION AND FUTURE WORK

Our system is about queue management solution for a busy petrol station in an Artificial Intelligence way by applying supervised machine learning algorithm .Machine Learning not only can detect and recognize objects in images, it can also detect in real time videos which makes many application processes.In our project, with the help of Artificial Intelligence we recognize the vehicles categories as salon and four wheel this will make the system able to estimate the average fuel capacity tank of each category and estimation of refuelling time duration.This time duration is depend on user selection, if user refill the fuel with the specific amount then the refilling time is calculated as given entered amount, and if user select to refill the full tank then the refilling time is calculated as vehicles fuel tank capacity.

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