

REPUBLIC OF RWANDA

ULKPOLYTECHNIC INSTITUTE



Research Proposal:

Design and Implementation of Artificial Intelligence
powered Roads Traffic Control and Car speed tracker

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PROJECT PROPOSAL

OBJECTIVES

The main object of this study was to design and implement a suitable algorithm for an intelligent traffic signal and car speed tracking. The main operation is to sense available car on waiting cue by the way adjusting the traffic signal timing, by employing mathematical functions to calculate the appropriate timing for the green signal to illuminate, the system can help to solve the problem of traffic congestion. At the other side, a hardware will be chosen to sense speed of passing car, this subsystem will be checking car speed with average precision. Once a car having a high speed is detected an automatic action is taken by taking the plate picture and submitting it to the investigation office. Also it's applied for car which try to move while the road artery is stopped on traffic signal. The new timing scheme that will be implemented promises an improvement in the current traffic light system and this system is feasible, affordable and ready to be implemented especially during peak-hours.

SCOPE OF THE PROJECT

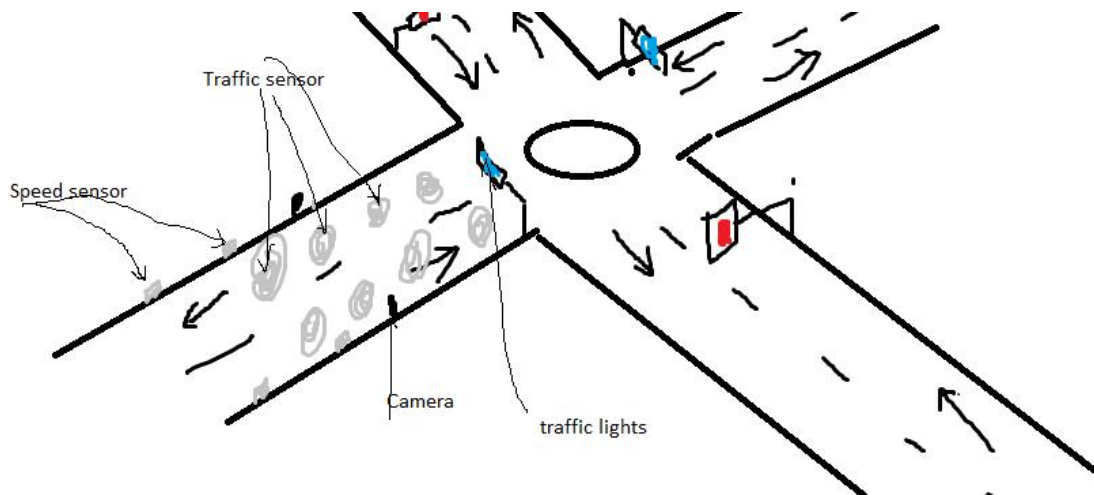
Many traffic light systems operate on a timing mechanism that changes the lights after a given interval. An intelligent traffic light system senses the presence or absence of vehicles and reacts accordingly. The idea behind intelligent traffic systems is that drivers will not spend unnecessary time waiting for the traffic lights to change. An intelligent traffic system detects traffic in many different ways for us we will use induction loop. Similarly, induction loop and infrared barrier are used to sense the speed of cars. Due to high switching and real-time CPU infrastructure demand, we choose to use Raspberry Pie computer to power the all system running Node-RED system and communicating with the AI Cloud Services SAAS (Software As Service)

PROBLEM STATEMENT

According to the circulation regulation and average traffic pre-evaluated in a road artery the circulation regulation will establish the maximum speed that car must not exceed to avoid accident. Tracking car's speed is used to be done by Policeman which prompt the decision to be made on emotion basis, corruption... Using an artificial policeman will be both accurate and none-compromised by surrounding environment.

PROPOSED SOLUTION

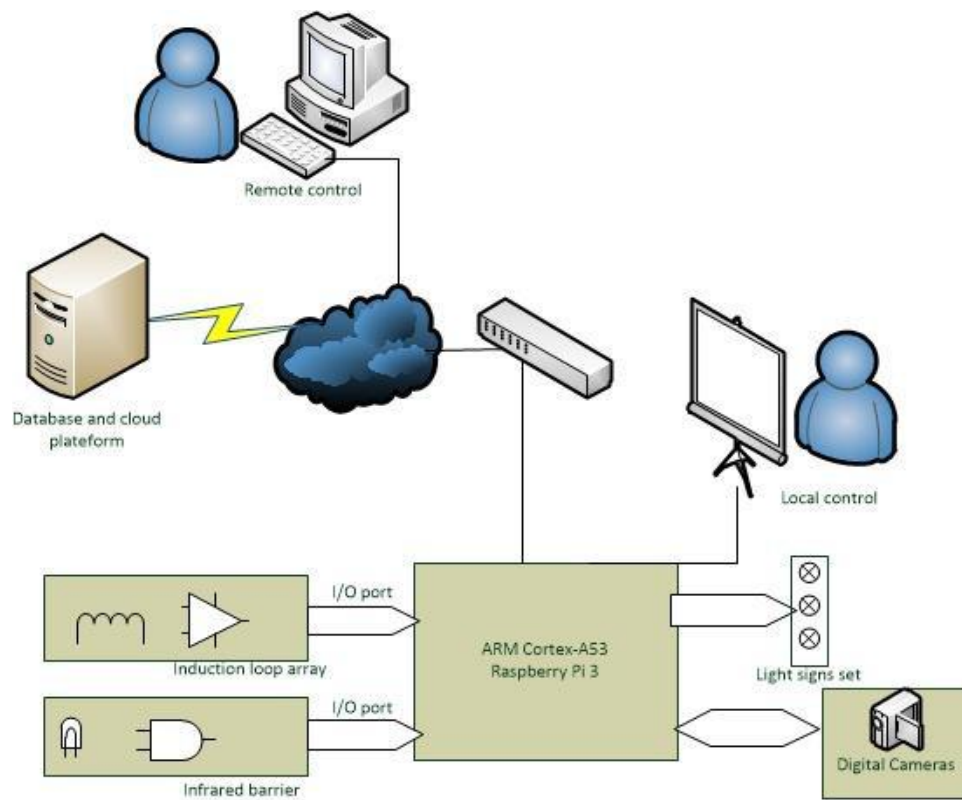




We thought about a system that can be easily implemented in order to achieve a minimum of 80% resolution to the problems recently cited. Our system will be using modern technology including IOT and artificial intelligence to sense physical world and interact to make decision on happening staffs.

The system will measure the speed of cars on the roads with no contact. Any car exceeding the normal speed will get its plate submitted to the police and thereby a sanction will be given to the car's owner. The system also senses the traffic level on the road to adjust delays between traffic lights signs. For any time, a car plate tracking can be activated and so, any car will be scanned to find out the wanted one. A control room will have, remotely a Real time video of a road for example according to where the devices are placed. The traffic lights also are sensitive to ambulance sound therefore adjusting traffic signals timings accordingly.

SYSTEM BLOC DIAGRAM



PROJECT TITLE:AI POWERED ROAD TRAFFIC CONTROL AND CAR SPEED TRACKING				
No	Materiel	Unit price	Qt	Tot (frw)
1	Arduino nano	7,500	1	7,500
2	Node MCU	12,000	1	12,000
3	8MP Sony IMX219 Sensor Camera V2	38000	1	38,000
4	8 pin DIL socket	500	8	4,000
5	14 pin DIL socket	500	4	2,000
6	NE555 timer	400	8	3,200
7	HD74L08 Quadruple 2-input AND Gate	1000	2	2,000
8	LM339N Quad differential comparators	1000	2	2,000
9	Resistor 1k ohm 1/4 Watt	100	16	1,600
10	2N2222A NPN transistor	300	8	2,400
11	Resistor 47 ohm 1/4 Watt	100	8	800
12	Resistor 100 ohm 1/4 Watt	100	12	1,200
13	5mm Blue LED	100	4	400
14	5mm Red LED	100	4	400
15	5mm Green LED	100	4	400
16	Resistor 18k ohm 1/4 Watt	100	8	800
18	LM324N Operational Amplifier	500	2	1,000
19	1nF Ceramic capacitor	150	8	1,200
20	TSOP1738 infrared receiver	2000	8	16,000
21	Mini variable resistor 50k	300	8	2,400
23	5mm 940nm Infrared led diode	300	8	2,400
			Total	101,100frw