ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 13, Issue 4, pp: (12-22), Month: October - December 2025, Available at: www.researchpublish.com

How to Make Your Car Smart by Exploring the Environment's Events

Abdellah Redjaimia[1], Artem Avakiants[2], Gu Qing[3], Liu Ruiying[4], Li Yafei[5]

[1] Xuanhua Vocational College of Science and Technology, No. 77, Chengguoqiao Road, Xuanhua District, Zhangjiakou City, Hebei Province, P.R China, 075100

[2] Xuanhua Vocational College of Science and Technology, No. 77, Chengguoqiao Road, Xuanhua District, Zhangjiakou City, Hebei Province, P.R China, 075100

[3] Xuanhua Vocational College of Science and Technology, No. 77, Chengguoqiao Road, Xuanhua District, Zhangjiakou City, Hebei Province, P.R China, 075100

[4] Xuanhua Vocational College of Science and Technology, No. 77, Chengguoqiao Road, Xuanhua District, Zhangjiakou City, Hebei Province, P.R China, 075100

[5] Xuanhua Vocational College of Science and Technology, No. 77, Chengguoqiao Road, Xuanhua District, Zhangjiakou City, Hebei Province, P.R China, 075100

DOI: https://doi.org/10.5281/zenodo.17311852

Published Date: 10-October-2025

Abstract: **Innovation one of the most valuable aspect which the word is focusing on, with it we can create a simple life, logic and easy protecting our lives as much as possible, the aim is well defined, we are focusing on the creation of smart devices which they can handle all our routine tasks.**

In this research paper, we are going to focus on one of the most useful objects, which more than 1 billion people use it daily and because of it, we can move and execute faster our tasks – "the car or automobile".

We present a study in the Artificial Intelligence field, in it we will show how we can create a system, which explores our environment's events and migrate them to the car sensors for executing some instructions.

We will show how we can determine functions and procedures to create them and launch in the right moment by the exploitation of the environment events, which they represent the logic parameters passed in any function or procedure.

Keywords: **Car, Automobile, AI, Events, Predicates, Parameters**.

I. INTRODUCTION

A car (or automobile) one of the best human creations which are the main device that we mostly used for transportation.

The easiest definition of cars:

The device that runs primarily on paved roads has seats, has wheels, and mainly transport people and goods everywhere.

Cars (automobile) have a big value nowadays, depending on them the economy developed.

By the year of 1886, Karl Benz created his Benz Patent-Motorwagen and the year of 1886 is honored as the birth year of modern cars.

Cars (automobile) turned to be widely available in the early 20th century.

Huge variants nowadays are under use with plenty of companies specialized in automobile technology development.

Different designs and concepts are added, we can find now automobiles, which they can run even on the lands rather pave roads, range rovers with powerful motors that can even across deserts (sand) and Climb Mountains and hills.

Cars (automobile) have multiple sensors such as sensors of driving (GPS, GPRS…etc.), parking (DDS), passenger comfort, lights, weather..etc.

Over the decades, many sensors are developed and plugged to vehicles, cars nowadays are more featured and complex, but at the same time are more comfortable and smart.

II. EVOLUTION OF THE AUTOMOBILE

When we turn back time to the first car ever, we start to have some suggestions on how it looked like? Perhaps wheels made with stone and the body was woody, powered by Fred Flintstone's feet, no glasses, and maybe the motor was manually working.

In this part, we will site the evolution of cars from the early start, which was with steam and electricity power by the years of (the 1700s-1890s) to modern smart vehicles (present).

- Steam && Electricity Power Period (1700s-1890s)

The first concept ever - electric vehicles.

In this period, cars used to steam and electricity power to be run.

Design launched in the late 1700s.

Those "vehicles" use steam to be powered. This resource and for many years used to power trains. The big mince in this innovation that, Steam cars need a long time to start up.

At the beginning of the 1800s, inventors around the world started thinking about electric-powered cars.

Inventors from England and France have made it by the creation of vehicles, which they were much similar to modern-day EVs.

In 1890, William Morrison made the first electric car in the U.S. The car was able to get a speed of 14 miles per hour and had six sits.

In just 10 years, 1/3 of the cars in the U.S. were electric. They were so popular simply because they were not as difficult to start as steam-powered cars.

Like today, the first EVs were quiet and did not cause air pollution.

- Gas-Powered Period (1890s-1930s)

Here it was the innovation of the first gas-powered car in 1885 (Karl Benz) and he got funding for his innovation in 1886. Benz's first vehicle designed with three wheels and sat two people.

This innovation of automobiles launched the beginning of the vehicular revolution in America.

The first samples were so basic and they were just for testing, they did not even have windshields, doors and round wheels – very strange rectangle wheels that they even did not allow the best car's movements.

We can say that Karl Benz's first gas car was the best innovation for the production of modern vehicles, and many car marks started to follow his experience for their own cars.

At the time, electric cars had a high reputation and many people used them. The only problem that faced this innovation was that the middle class for them it was too expensive to buy.

This problem solved when Henry Ford came and made his own innovation by immigrating to the gas Model to be mass-produced Model and then cars were affordable for the majority of the population.

Ford was working with Thomas to innovate a strong battery for electric cars, but the success of the Model T melt all the progress.

Another plus for the electric model that it was invented in 191x2.

The main event, which made the gas vehicles Model disappeared, is the discovering of oil in West Texas, this discovery made the gasoline cheaper and cheaper and the sales of the gas car Model increased.

Nowadays is the opposite because of the cost of gasoline, which is expensive, this fact helped so much electric Model making a comeback.

-Modern Features Period (1930s-Pres)

The golden period with high-level production came new features; in it, we have seen the first features ever that are speedometers, seatbelts, windshields, and rearview mirrors.

Plenty of features were added such as windows and air conditioning.

Then cars started to be more designed and featured, with power steering (1951), cruise control (1957), three-point seatbelts (1959), and heated seats (1966).

In 1973, the first passenger airbag was plugged into the "Tornado" model.

Over 20 years later in 1998, the dual frontal airbags were created.

In the late '80s and early '90s, plenty of features were created such as keyless entry systems, electric doors and windows, sunroofs, and CD players. [4]

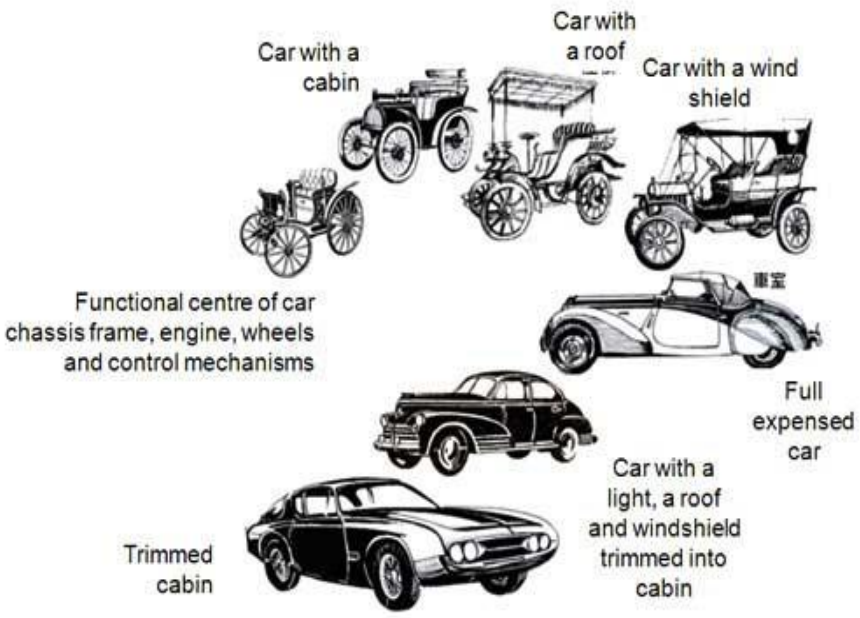


Figure 1: The evolution of cars

-Modern Vehicle Features

Cars with high innovative technologies, cars with plenty of sensors such as Temperature, Parking, GPS, Wi-Fi, and even the ability to drive themselves.

In this period, features turned to be standard in time when they were a luxury (or did not even exist at all).

In addition, driverless cars are realized.

It is amazing to see how deep the car's evolution moved ahead and where the technology will invent new features at all down the road.

Most cars in use in the 2010s are propelled by an internal combustion engine, fueled by the combustion of fossil fuels. Electric cars, which were invented early in the history of the car, became commercially available in the 2000s and are predicted to cost less to buy than gasoline cars before 2025.

ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 13, Issue 4, pp: (12-22), Month: October - December 2025, Available at: www.researchpublish.com

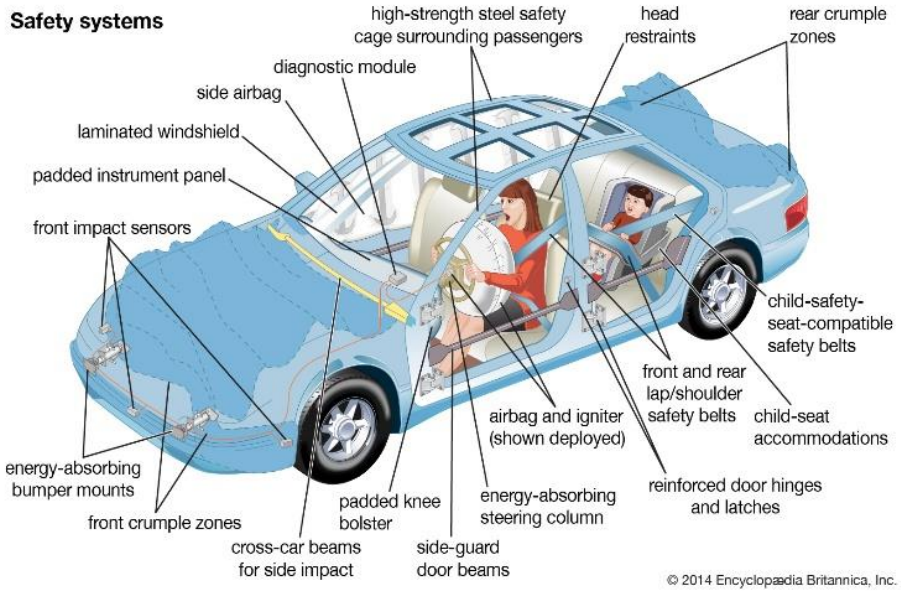


Figure 2: Modern cars with features

Below a chart shows the big demand of tesla electric cars, and the demand's progress in last 5 years.

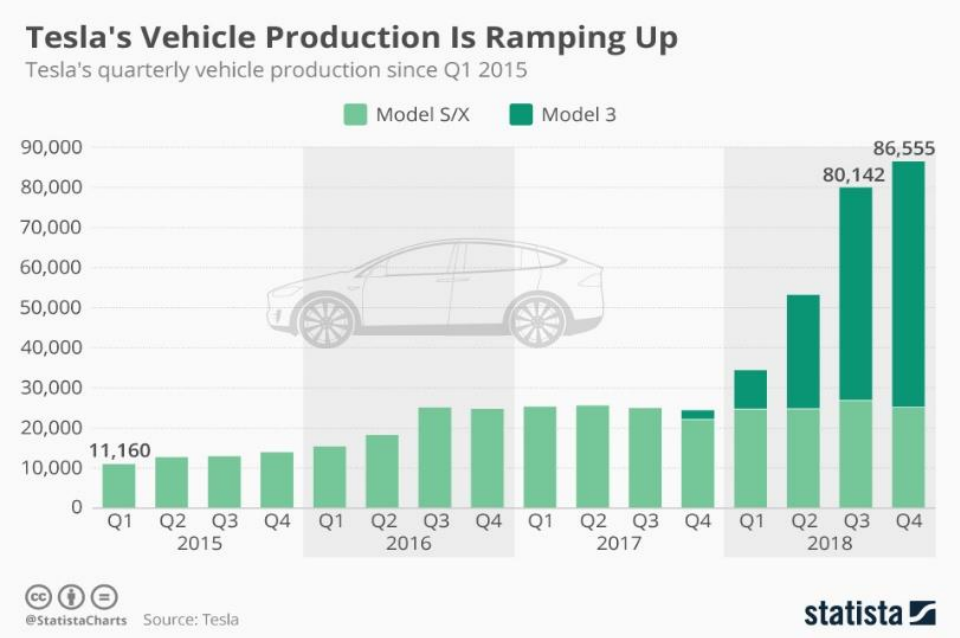


Figure 3: Tesla's Vehicle Production Chart

III. THE ENVIRONMENT

The term 'environment' is widely used and has a lot of definitions, meanings, and interpretations.

What does it mean? In general, the meaning of it for some people simply, 'nature': in other words, the natural green fields, air and wild animals with all of its possible non-human events, characteristics and processes.

For those kinds of people, the environment meaning or definition is related to the notion of pure nature with wildness creations or any objects, which they are not in touch - by human activities.

In IT (Information Technology and Computer Science field), especially people whom they work with logic cases (true or false clause), the term environment means any object or event located around the close study domain, for example, if we will take the earth as a close study domain then we can define that space is the appropriate environment to the earth.

ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 13, Issue 4, pp: (12-22), Month: October - December 2025, Available at: www.researchpublish.com

In literal and the most significant sense, 'environment' means 'surroundings', then the environment of any study object is the sum of all elements or objects and entities, which are, surrounded the study domain.

This definition and meaning are the closest one to the reality, that describes any study domain and it is related environment, which includes objects, elements.

By the way, the environment could be not touched at all that is mean that its situation is like the first time created but that does not ignore that the environment can be extended by humans additional events.

If we will take some creations from the human in the surrounding space then it is a necessity to add those creations to the environment as parameters [1].

For example, if our study domain is a boat that is in the sear.

The sea, in this case, is the initial environment and through it, we can get some parameters such as water, wind…etc., but if near the study boat located other boats then, in this case, we can ignore those surrounded objects because simply from them we can receive some additional events which belong to the extended environment.

Extended ENV = Original ENV + Human Creations

3.1- Exploitation of the environment

The main section in our research, our aim is understandable, in our research we are focusing on how to immigrate the environment parameters to a group of predicates (Initial Values) which they are going to be used for ameliorating actions **[2]**.

For that we need 02 sections to work on, the first is to define the domain which we will focus on and in our research is the car, the second section which is represented by the source of possible events and in our case is the environment.

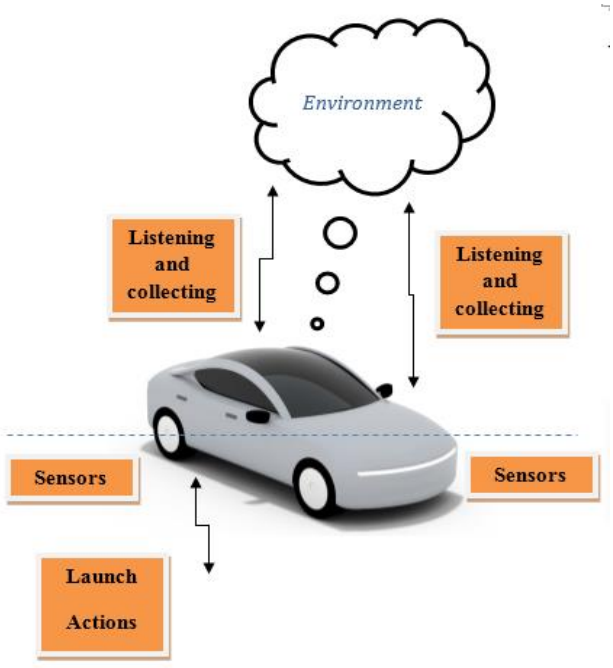


Figure 4 : Smart Car – Environment – Diagram

There are plenty of environment parameters, which we can exploit them for our defined object, those parameters will be in a system that will receive them as initial values, and based on those values, it will launch an action, more details further.

In our research, the object is defined to be the car, and we are going to show how to exploit the environmental parameters such wind, rain, snow, temperature, geographic location, traffic lights, and speed limits panels and all possible parameters which they have the appropriate sensor (the equivalent device) inside our object which is the car [3].

ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 13, Issue 4, pp: (12-22), Month: October - December 2025, Available at: www.researchpublish.com

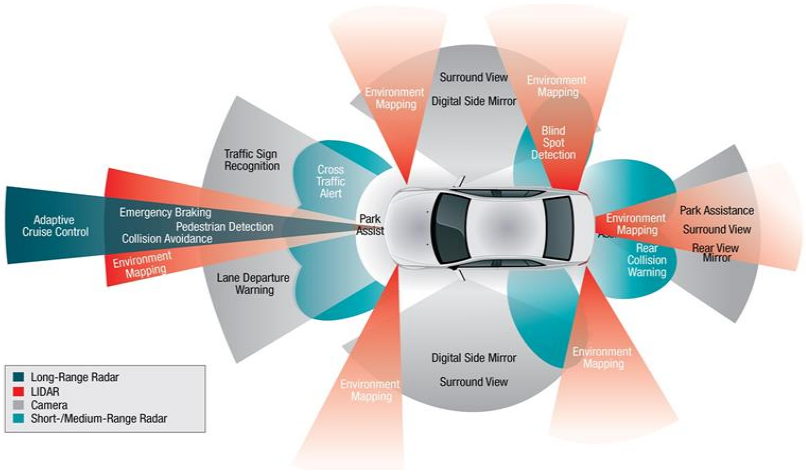


Figure 5: Car – Environment – Possible Parameters && Sensors

Basing on Fig 5, we can notice that our defined domain, which is the car, can receive any value of any environment's parameters by the default sensor manufactured or by any plugged extra sensor after vending.

IV. THE DOMAIN DEFINITION

As we have mentioned before that our implementation is focusing on specific domain represented by the car, to define any domain, we have to define ever parts of it and possible interactions in case of state updated, to define the car, and we need to across three steps: **[1]**

1- Study Object: Car

2- Parameters: the initial value, which sent by the environment and received by the appropriate car's sensor.

3- Actions launch the equivalent action matches the driver needs.

The parameters in our study are the group of sensors which are inside the study object *the Car*
such as windows sensor, doors sensor, lamps sensor,
glasses sensor, wheels pressure sensor, air conditioner sensor….etc.

Parameters
(windows)
(air conditioner)
(lamps)
(doors)
(speed)

Actions
(close-windows)
(open-windows)
(close-doors)
(open-doors)
(on-air conditioner)
(off-air conditioner)

Remark 1. The number of predicates is different from a car to another and in addition, the car's owner can add some new predicates for his/her car such GPS sensor, Speed Limit Sensor …etc.

Every predicate (car parts) has two Boolean states **true** or **false**, and has two possible actions in case true and in case false **[4]**.

ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 13, Issue 4, pp: (12-22), Month: October - December 2025, Available at: www.researchpublish.com

4.1: Implementation

We will focus on our example, which is defined, as the Study Object is The Car then simply and automatically Nature is the surrounded Environment, let is focus on some parameters, which are Speed and Rain.

Basing on our data, we can recognize:

- Parameters: two Speed and Rain.

- Possible Actions: four.

The binary table (1)

Speed	0	0	1	1
Rain	0	1	0	1

The binary table, which shows possible cases variant between logical states zero, or one, the number of cases is 2^2 in our experiment.

Possible Actions: four Actions.

* Act 1: Speed = False
  Rain = False.

* Act 2: Speed = False
  Rain = True.

* Act 3: Speed = True
  Rain = False.

* Act 4: Speed = True
  Rain = True.

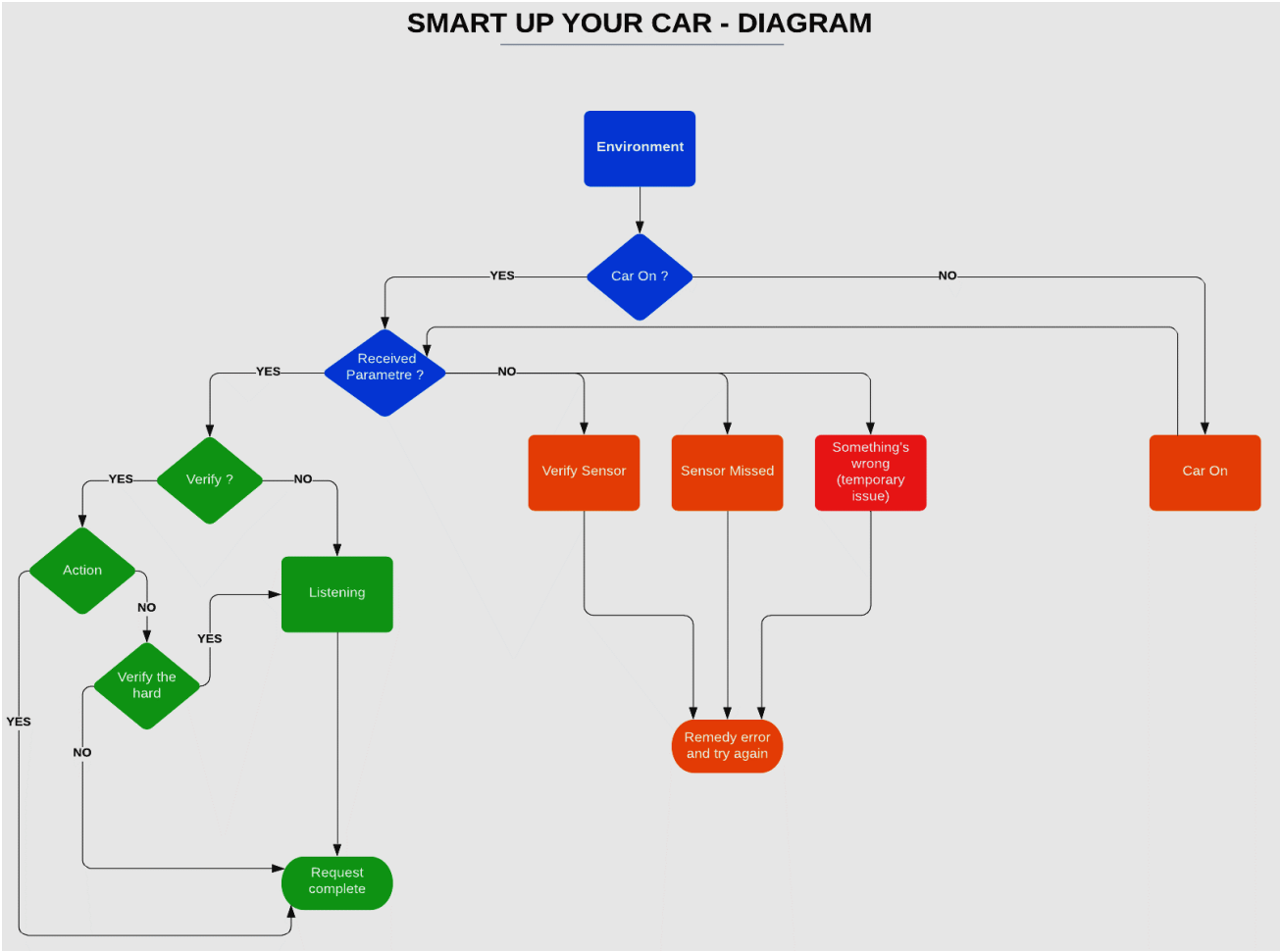
1.1. The Function

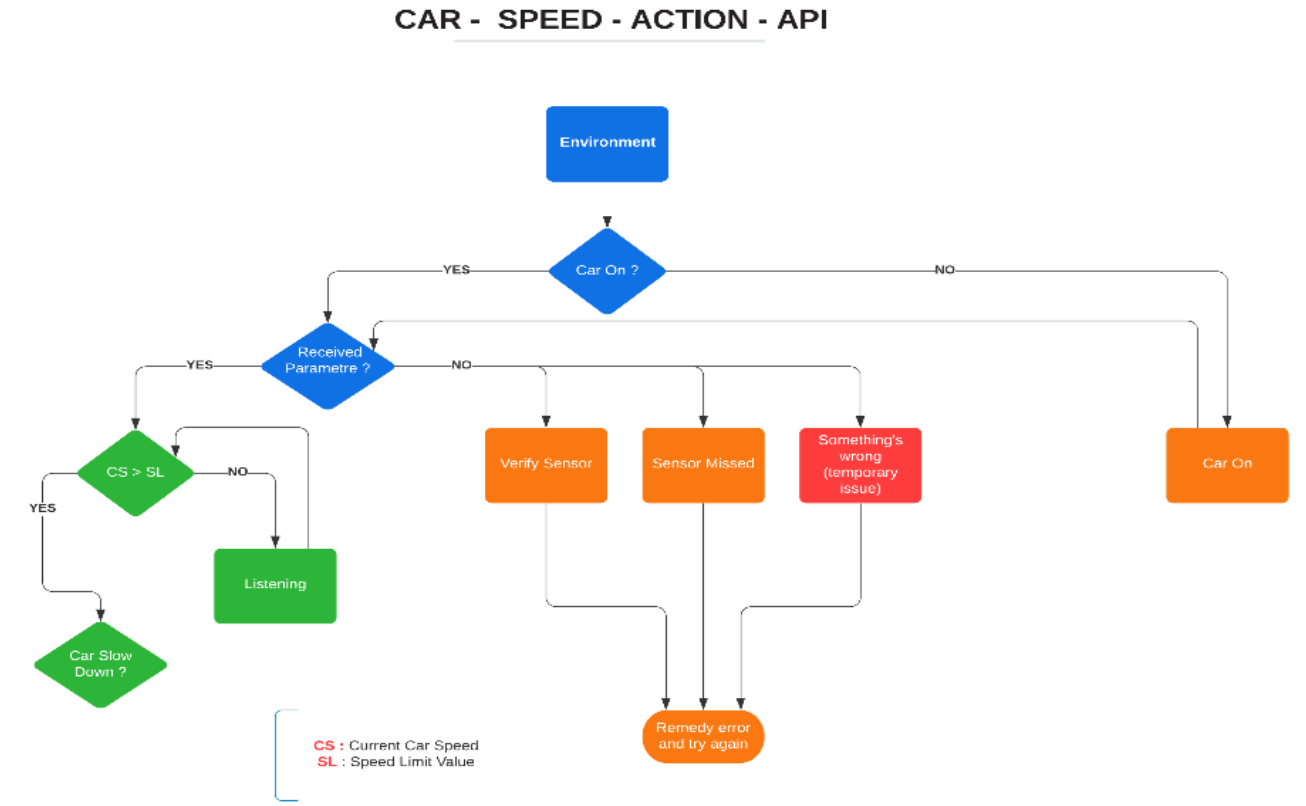
```
double SpeedL = getSpeedLimit(double x, double y);

Function Action (double Speed, Boolean Rain)
{
    if (Speed > SpeedL)
    {//it means the current speed is
      higher on the speed limit
       if (Rain == True)
       {//it means the weather is rainy
          CloseCarsWindows();
          Speed = SpeedL;
       }else
            Speed = SpeedL;
    }else
    {
       if (Rain == True)
        //it means the weather is rainy
          CloseCarsWindows();
       else
          don't do anything;
 }}
```

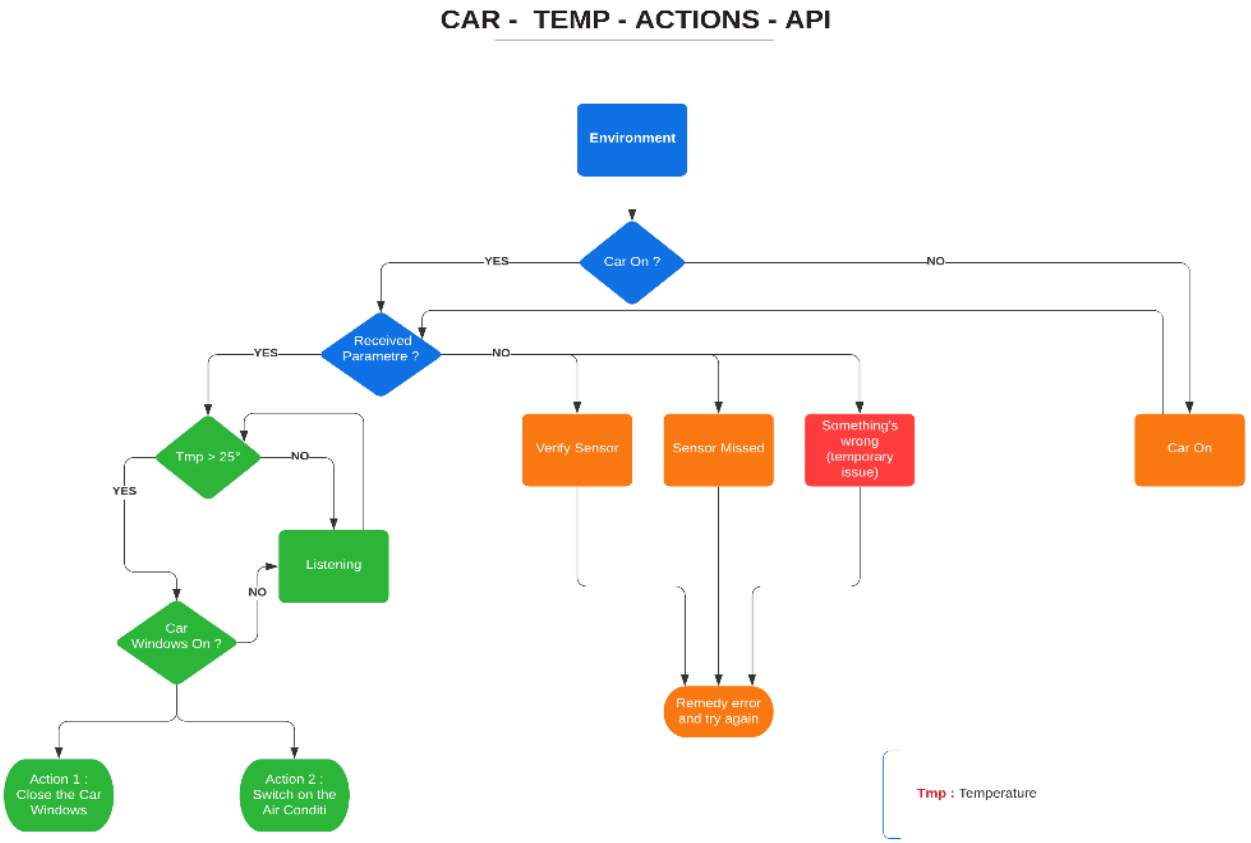
Remark*:* SpeedL: the speed limit, which belongs to the current location. getSpeedLimit: a function, which return a double value that, represents the current Speed limit value – the value can be got by the x and y parameters which they represent the car's coordinates.

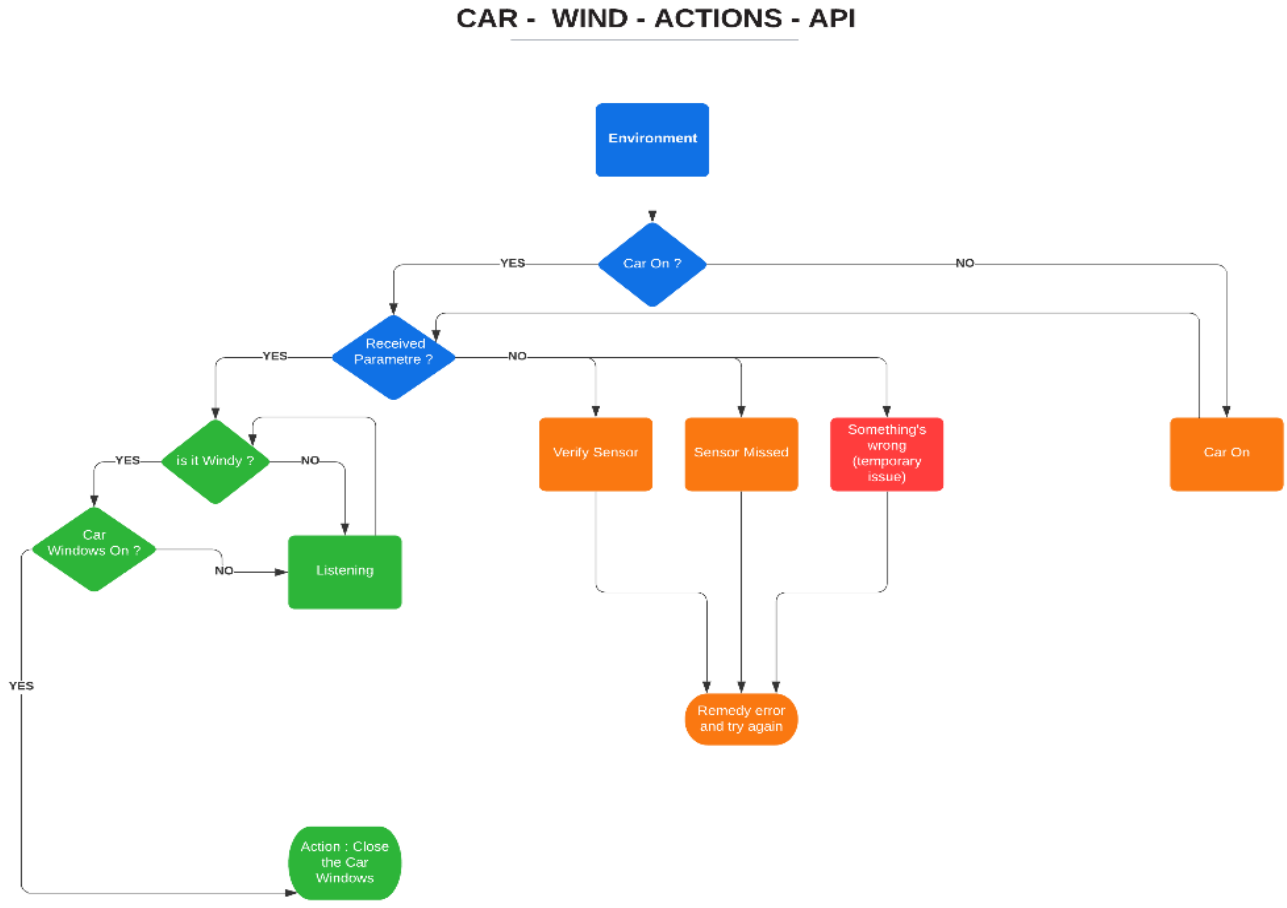
ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 13, Issue 4, pp: (12-22), Month: October - December 2025, Available at: www.researchpublish.com



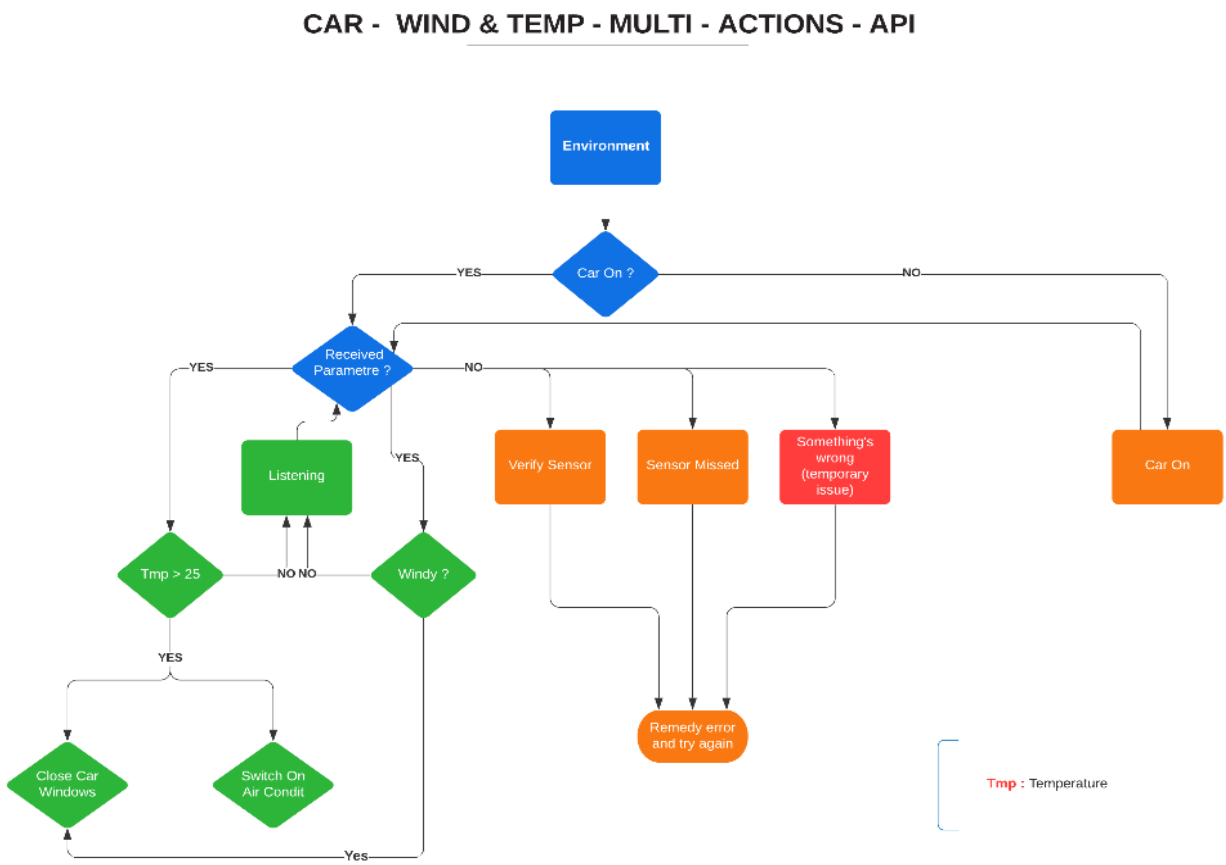


ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 13, Issue 4, pp: (12-22), Month: October - December 2025, Available at: www.researchpublish.com





ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 13, Issue 4, pp: (12-22), Month: October - December 2025, Available at: www.researchpublish.com



It is noticeable that every parameter can cause n actions; some actions can be launched automatically if any sensor receives a value from the environment.

In our example of Wind and Temperature, the hot wind can launch multi actions; in this case, two sensors will be listening to the environment, a sensor that presents the wind (Car Wind Sensor), and the second, which presents the temperature (Car Temperature Sensor).

Effectively there is no static relationship between the environment events and the possible actions permitted.

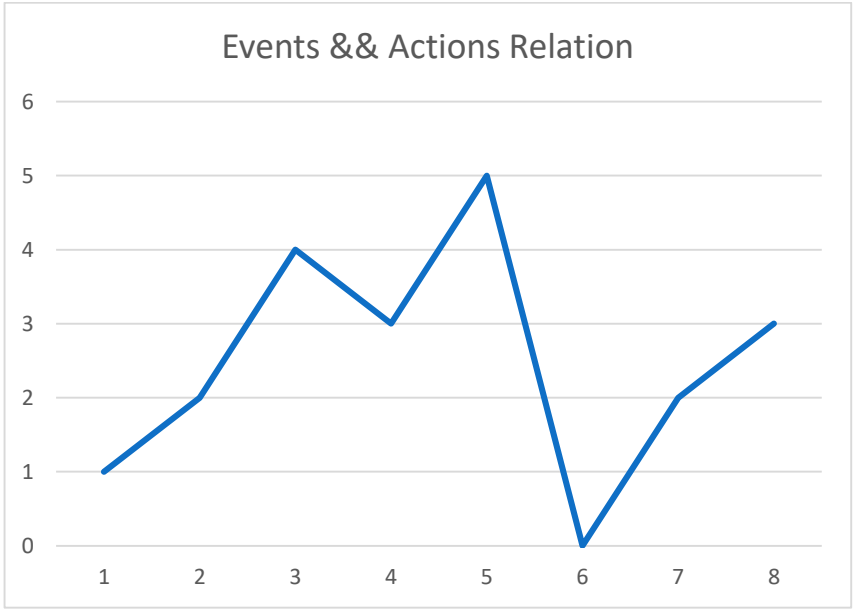


Figure 6: The Relation between Events and Actions

REFERENCES

● **Dissertation**

[1] A Redjaimia (2017) MULTI-AGENT SYSTEM AND ITS USE FOR A SMART ENVIRONMENT (CASE SAFE ROAD). Dissertation, Lobashevsky State University Russia, Nizhny Novgorod

● **Book**

[2] SMART ENVIRONMENT - link your thoughts to your space – January 10, 2019 by Abdellah Redjaimia and Lamine Kassaoui.

● **Article by DOI**

[3] Abdellah Redjaimia (2017) Multi-Agent Robot System and Events Executing Using GPS Cloud. Global Journal of G Technology & Optimization. https://doi.org/10.4172/2229-8711.S1:110

[4] Abdellah Redjaimia, Mohammed El Amine Ghomrani (2016) Multi-Agent Robot System and Events Executing Using GPS Cloud. SciencePG. https://doi.org/10.11648/j.ajrs.20160401.11