Introduction:

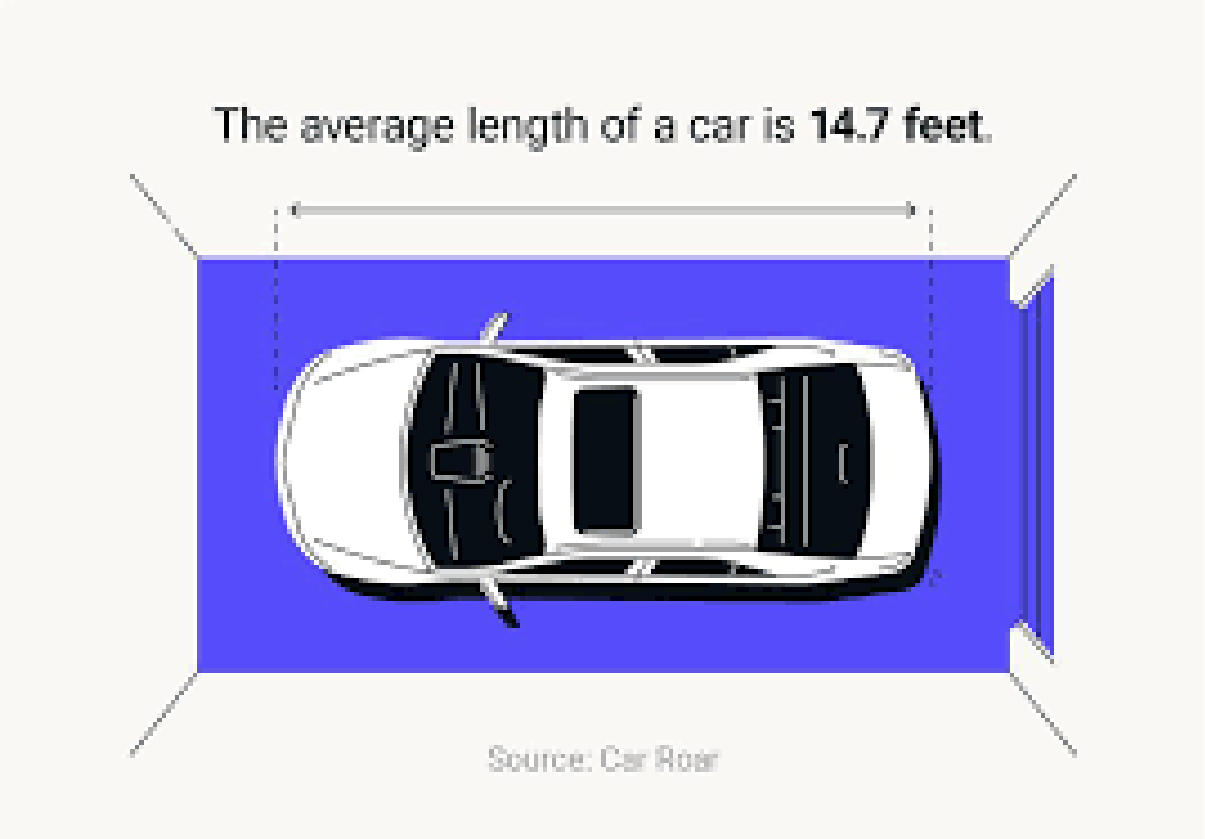
If you want to maintain a safe following distance while driving, you should employ one of two rules: the two car lengths' worth of space rule and the three-second rule.

Idea of Implementation in the code:

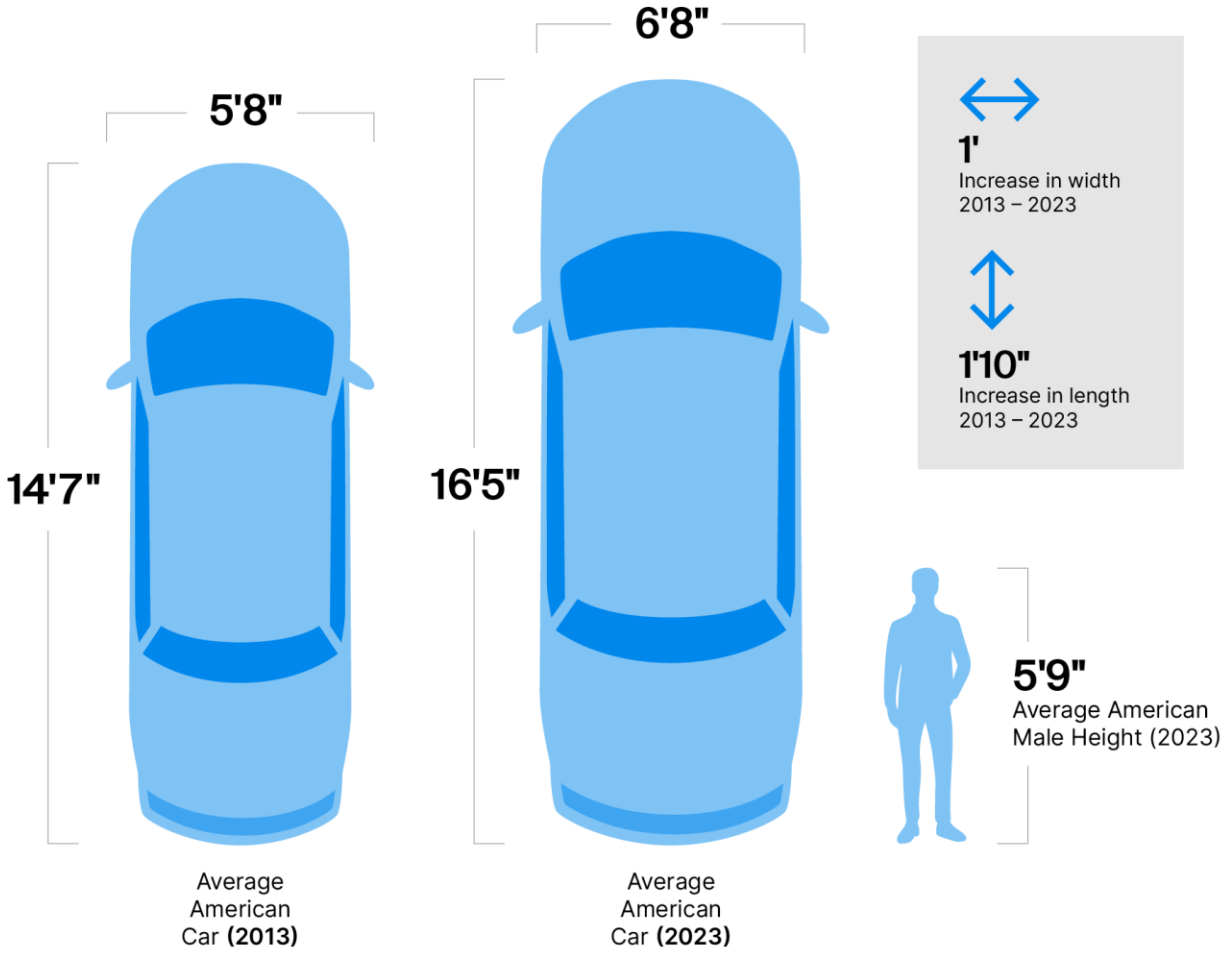
Creating a parameter called SAFETY_DISTANCE_RULE This parameter could take one of two values either TWO_CAR_LENGTH or 3-SECOND and according to the value of the parameter one of the two rules will be implemented to maintain a safe distance between vehicles.

The two car lengths' worth of space rule:

The Average car length = 4.5 metres (14.7 feet)

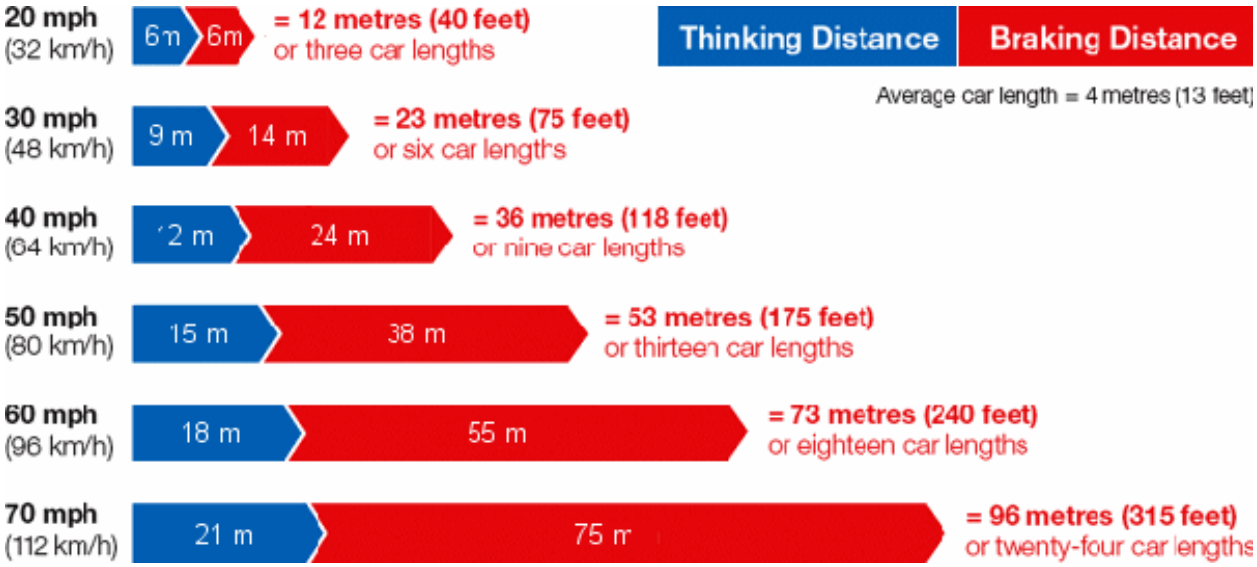


However, due to the rising technologies and the rapid changed in the car industry the average car length is always changing so in the code The car length will be a parameter that could be overwitten according to the length of the majority of the cars at the time when the system is in use.



The distance between the car and the next must be greater than or equal 2x(The Average car length) when the car's speed is 20 mph or less. If the distance is less than the safe distance then the braking system is activated.

Each car speed has a different set point since when the car is driving faster the time of impact is closer so the safe distance must be larger.



The three-second rule:

Determining the three-second gap is relatively easy. When following a vehicle, pick an overhead road sign, a tree or other roadside marker. Note when the vehicle ahead passes that marker, then see how many seconds it takes (count 1-1,000; 2-1,000; 3-1,000) for you to pass the same spot. If it is not at least three seconds, leave more space and increase your following distance.

Think of following distance in terms of time, not space. With a standard of 2.5 seconds, highway engineers use time, rather than distance, to represent how long it takes a driver to perceive and react to hazards. The National Safety Council also uses this standard (plus a little extra for safety) when recommending the three-second rule for following distance.

In terms of code: We will develop another perspective of the 3 second rule it is also related to the time and distance but taking into consideration the speed in which the car is driving. We will use case(speed) on all the car speeds (from 0 to 200) and calculate the time left for impact using the distance measured by the sensors between this car and the car Infront of it (time=distance/speed). The time calculate must be more than or equal 3 seconds to

maintain a safe distance between vehicles, if less then the braking system is activated.

https://www.travelers.com/resources/auto/travel/3-second-rule-for-safe-following-distance