

Reward Function 2 - Normal Parking: SAC, TD3, DDPG

```
1:  $reward \leftarrow 0$ 
2: if car has parked then
3:    $reward \leftarrow reward + 5000$ 
4: else
5:   if car is inside spot then
6:      $reward \leftarrow reward + \frac{10}{\text{car's velocity}}$  ▷ Encourage the agent to slow down
7:     if car is stationary then
8:        $reward \leftarrow reward + 10$ 
9:     end if
10:  else
11:     $reward \leftarrow reward - (offset\_x \times 6)$  ▷ Punishment based on
12:     $reward \leftarrow reward - (offset\_y \times 6)$  ▷ distance from x,y axis
13:    if car is moving forward then
14:       $reward \leftarrow reward + 1$ 
15:    end if
16:    if car collides then
17:       $reward \leftarrow reward - 10$ 
18:    end if
19:    if car is away from parking spot then
20:      if car is moving too slow then
21:         $reward \leftarrow reward - 5$ 
22:      if car is not moving then
23:         $reward \leftarrow reward - 5$ 
24:      end if
25:    end if
26:  else ▷ When the car is near the parking spot
27:    if car is moving too slow then
28:       $reward \leftarrow reward - 3$ 
29:    if car is not moving then
30:       $reward \leftarrow reward - 5$ 
31:    end if
32:  end if
33:  if car is in the right angle then
34:     $reward \leftarrow reward + 0.5$ 
35:  end if
36: end if
37: end if
38: end if
```