

Machine Vision based Parking

i Introduction

Visiting malls for buying necessities, shopping or for entertainment purposes has become an inevitable part of our lives. We all love taking our cars to the mall, loading up the trunk with our purchases and getting back home. But, a sizable chunk of our time gets wasted in looking up for the parking space for our vehicle, waiting in queue to pay for the parking ticket which is often delayed by human calculations.

“ This case study showcases how Winjit's Machine Vision solution that was installed at the parking booths in a mall which speeded up the process of space allotment and exit of the vehicles after payment, entering the premises.

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u Customer

The client is an established entity in various industries. The organizations run by the client comprises of over 25000 workers and 1000 plus management team across 6 verticals. The verticals or industries in which the client has deepened his roots are- Dairy, Hospitality, Retail, Ayurvedic OTC, Education, Beedi and more.

The client runs the biggest shopping centre in the holy city of Maharashtra, Nashik. Since running of a gigantic mall requires offering ample parking space to the customers as well, the client desires to switch from the traditional and conventional methods of handling the parking system to the new automated method, involving machine vision.



Requirement

To get the overall view of the scenario, Winjit Technologies MV team communicated with the client to understand the exact requirements. The team identified the key requirements as:

- ▶ Integrating MV with the current parking system.
- ▶ Cameras enabled with vehicle's registration plate detection and recognition.
- ▶ Showing space occupancy with the help of cameras.
- ▶ Creating and maintain database of the vehicles based on the registration plate.



Challenges

Even after installing technology oriented machines at the parking levels, the client was still not able to utilize the available parking spaces with efficiency.

Space was allotted to the vehicle based on the human eyes, which of course has its own limitations.

There was no proper track management of the cars as well. The parking tickets were provided just by mentioning the in and out time of the vehicles. No track record or history of the previously visited vehicles were kept by the management for future analysis.

Hence, a solution was required for automating the current process and maintaining records too.



Solution

Machine vision for smart parking was achieved by the Winjit MV team with the value addition of creating vehicular database.

For vehicle's registration plate recognition, the components preferred were CCD Camera, system with i5 processor, 8GB Ram, and 500GB hard disk.

For space occupancy, the following components- Raspi Cam, Raspberry Pi-3 with 4×ARM Cortex-A53, 1.2GHz processor, 1 GB RAM and on-board Wi-Fi was the preferred solution for the implementation.

Both the systems- registration plate detection and space occupancy were put in sync with each other. The CCD camera was installed at the parking entrance, whereas the raspi cams were installed all over the parking levels.

As soon as the vehicle entered the mall, registration plate of the vehicle was captured. In time was noted at arrival and the free space available was allotted to the vehicle. While leaving, out time of the vehicle was noted and duration was calculated, based on which parking fee was implied on the driver.



Benefits

- ▶ Vehicular database was created which helped in achieving better analysis.
- ▶ Reports were generated revealing the frequent visitors at the mall.
- ▶ Monthly vehicular footprint was calculated with the help of the designed MV system.



Achievements

- ▶ Ticketing time reduced by more than 70%
- ▶ Space utilisation increased by more than 90%
- ▶ Cost of operations management of parking reduced by 40%. chart
- ▶ With the help of registration plate recognition, the authorities were able to track the driver details as well (with help of RTO) in case of any theft or other crime.,



Conclusion

The solution installed helped in achieving swift entry and exit of the vehicles, with better space management of the parking lot. Even the satisfaction quotient of the customers was increased with such a service which raised the footfall in mall as well.

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