SMART PARKING MANAGEMENT SYSTEM

Proposed By

CYBERCINATICS PRIVATE LIMITED

CYBERCINATICS

About Cybercinatics

* Startup recognized by Department of Industrial Promotion and Policy - "Startup India"

* Member of IT Association of Andhra Pradesh (ITAAP)

* Located in Visakhapatnam, Andhra Pradesh

Working Areas:

* Smart Cities

* Internet of Things (IoT)

* Industrial automation

* System Integration

* Image analysis and processing systems

* Android and iOS applications

Smart Parking Management System

* Proposing a Customized Automated Vehicle Parking System.

* Suitable for On street, Off street and Multi-level parking Lots.

* Public can know the availability of parking vacancies in Real-time through mobile application.

* Governance bodies can monitor the system from their Remote command and Control center.

* Parking fees will be charged as per parking time.

* Surveillance to provide security.

* Recognize violation and charge them with penalty.

* Entire System is according to the new parking guidelines for smart cities.

* Readily Deployable System.

System Architecture
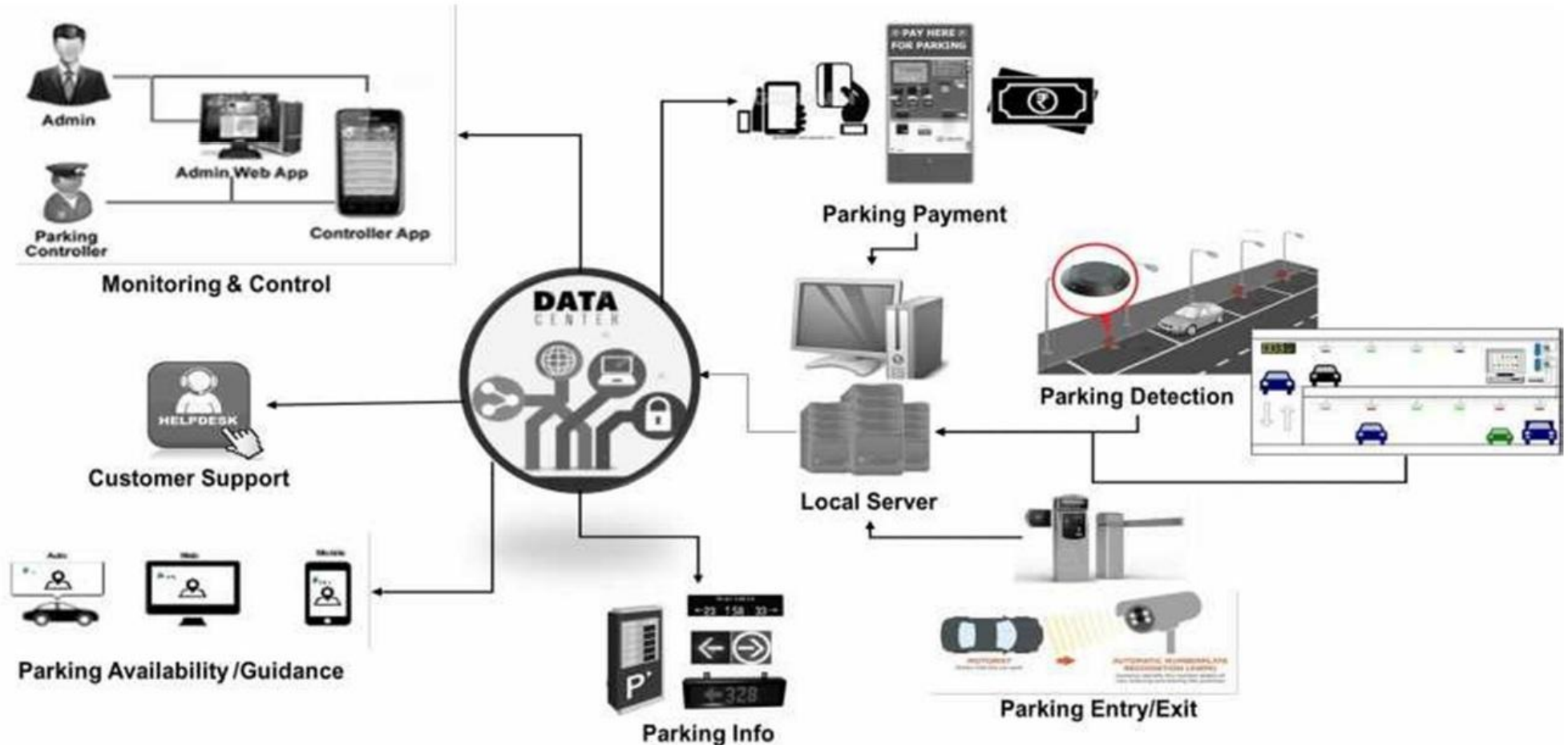
Architecture of Smart Parking System

System Architecture
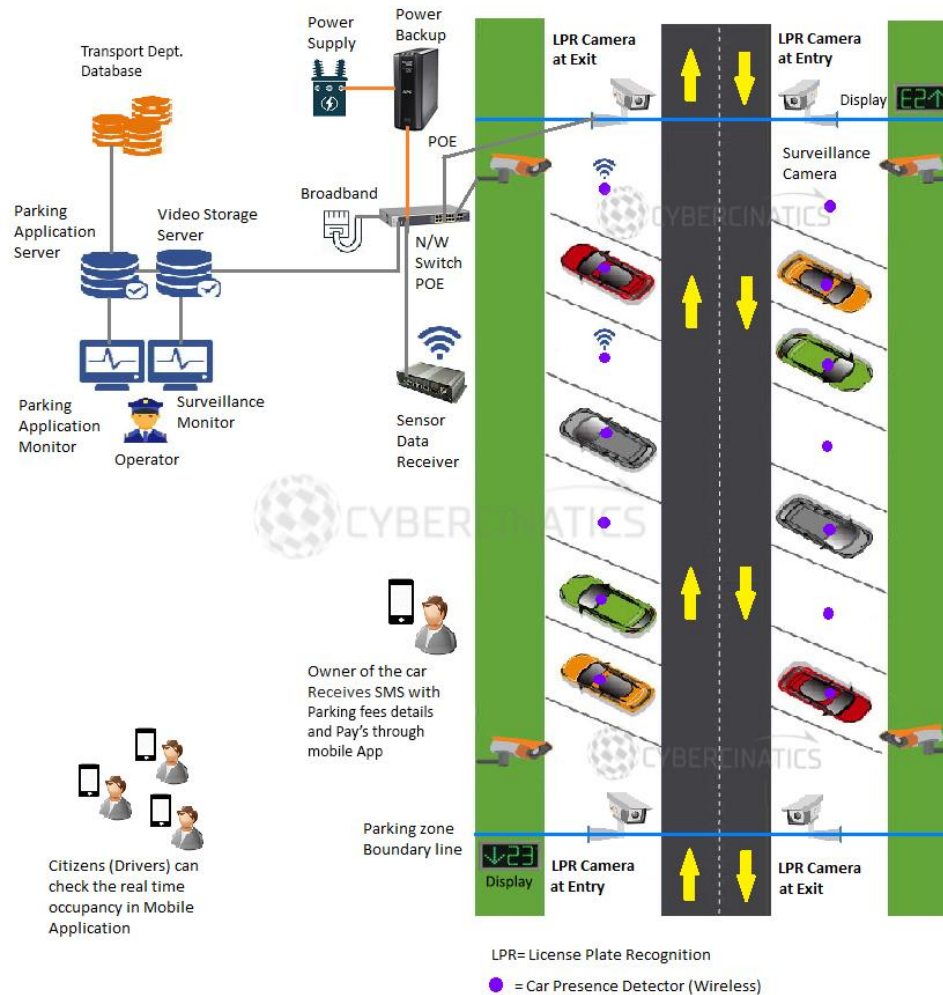
Architecture of On-Street Parking System

Smart Parking Zone Features

- Access the real time occupancy of individual parking Lots.

- Parking Management Software, Mobile App for users, Web-Portal for resource management.

- Real time location based view to citizens about availability of parking space.

- one-to-one mapping with parking sensors

- Captures & Stores the number plate images of vehicles entering and exiting parking lot.

- Generation of parking receipts at the parking Lot.

- Hardware failure can be reported & tracked through portal

- Various reports like payment status, check-in vehicle list, check-out vehicle list, hardware active status, payment pending list etc.,

- Provision for Manual Entry incase the cameras do not recognize the vehicle.

- Surveillance cameras at the Parking lots provide secured monitoring.

Parking Zone Status Displays

➤ Parking Zone should be allocated either On-street or Off-street.

➤ The parking zone is identified by Sign boards.

➤ The On-Street Parking Zone will have no obstructions on road.

➤ LED Signboards will be installed at the entry point of the parking Zone.

➤ Real time vacancy availability will be displayed on LED Signboards at the entry.

Vehicle Occupancy Detector

- Vehicle Occupancy Detectors installed on the ground; one number each for a parking slot.
- The Vehicle Detector is battery operated and will continuously sense the presence of vehicle in the slot and sends the data to the receiver wirelessly.

Vehicle Occupancy Data Receiver

➤ The receiver (works in 865Mhz to 867Mhz ISM Band) updates this Occupancy data to the server in control center through the internet using wired Network.
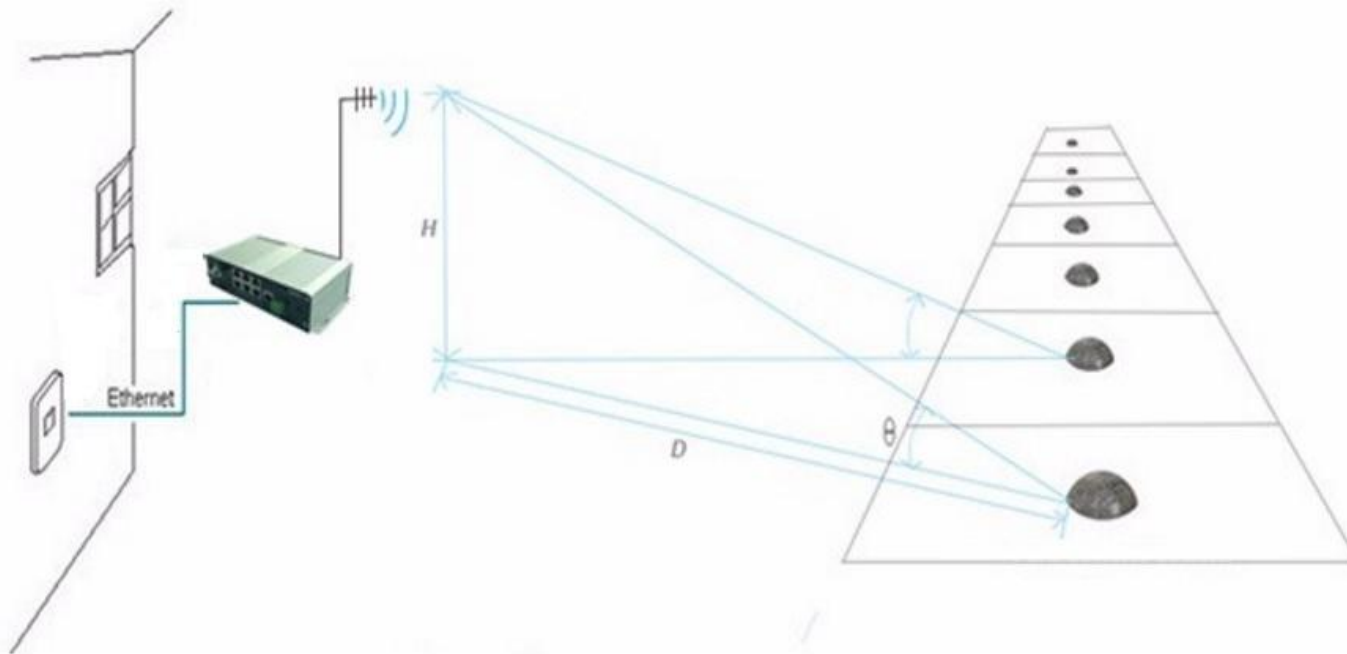
ANPR Camera

- Automatic Triggering & Detection of Vehicles.

- In-Built Recognition software.

- HD 1280X720.

- Day/Night Modes.

- PoE, Ethernet, 14-25W, -30°C – 55°C, IP67.

Automatic Number Plate Recognition Camera

Parking Management Software

Parking software with the Parking Zone details, Zone status, Payment status etc.

Parking Vacancy & Payment Status

Displays the Individual Parking Zone details and also the parking vacancy in the zone.

Displays the parking zone details like total entered cars of the day, total cars paid, payment pending cars and also we can get the single payment details of particular vehicle through the unique ID.

Vehicle Check-In into Parking Lot

Auto-generated vehicle number through the ANPR Entry camera to be confirmed by the operator

CarNumber	UniqueID	CheckInTime	EntryCamID	Mobile
AMSAF4234	27022018110300	2018.05.09 11:28:08.718	001157006	9985899899
ANSAF4234	18042018115556	2018.05.09 11:28:08.718	001157006	9985899899
AP31CY7009	19032018182256	2018.05.09 11:28:08.718	001157006	9985899899
AP35AF4234	10052018121504	2018.05.17 03:00:08.718	001157006	8807550969
APP30CL4567	28022018180026	2018.05.09 11:28:08.718	001157006	00112233
IND00UP1122	02052018151939	2018.05.09 11:28:08.718	001157006	00112233

Check-In cars List in the Parking Software.

Vehicle Check-Out from Parking Lot

Auto-generated vehicle number through the ANPR camera at the exit of the parking zone

CarNumber	UniqueID	ExitCamID	EntryCamID	Amount	CheckOut Time	CheckIn Time	Mobile	ImageID
AP31AF4234	28022018180120	001157006	001157006	40	2018.05.09 12:38:08.718	2018.05.09 11:28:08.718	9985899899	1509639067306
IND78UP1122	11052018172659	001157006	001157006	20	2018.05.17 03:00:08.718	2018.05.17 02:00:08.718	0011223344	1511757962811
APTRYUUIUIU	100001	1001	10001	20	2018.05.08 12:23:333	2018.05.08 02:23:333	100000001	100000000001
AP31CY7009	123411122222	001157006	001157006	40	2018.05.15 12:10:111	2018.05.15 10:10:111	9998999990	1511757962811

Vehicles will be added to Payment Pending list once the vehicle leaves the Parking Zone. Payment mode can be cash or mobile to be selected by the operator. Automatically cleared from list once payment is done.

Management Panel

Management panel for User Management, Manual check-in & check-out entries, payment reports etc.,

Vehicle Parking Challan Generation
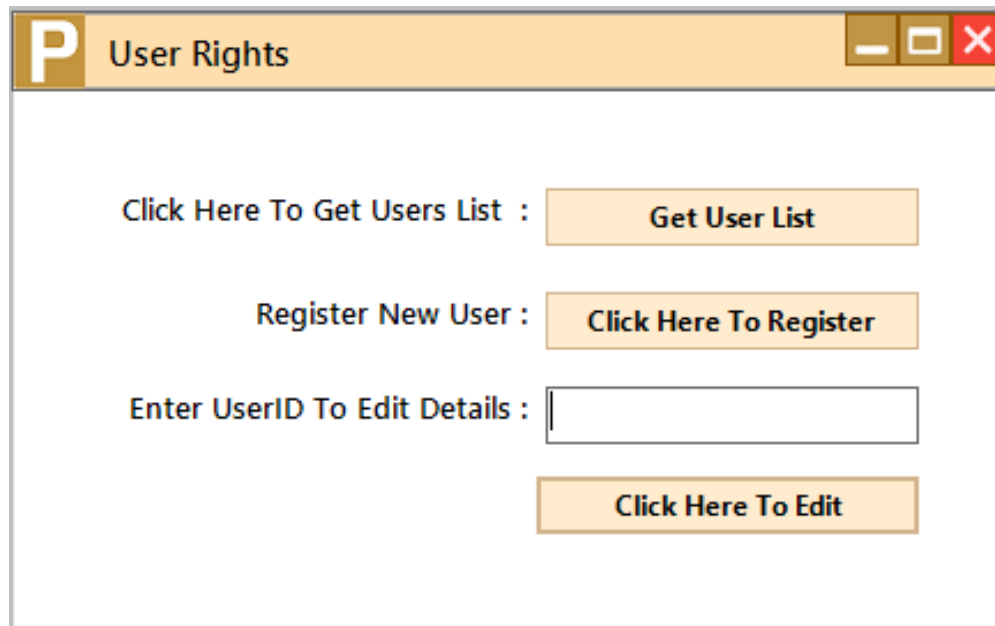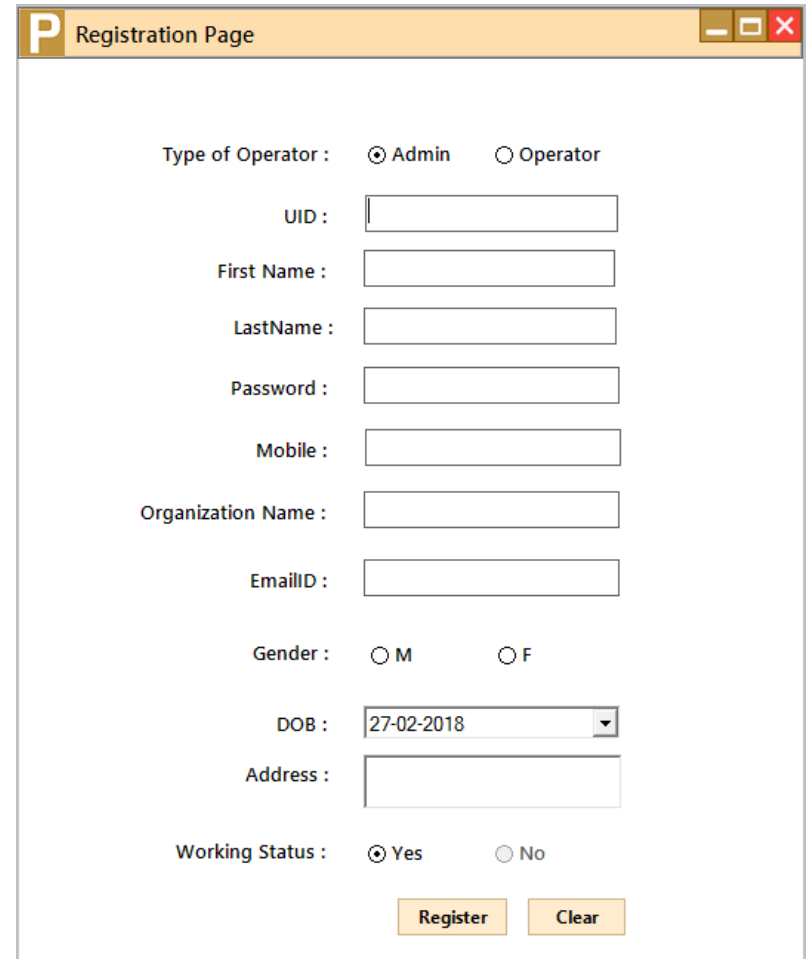
Generated Challan for a Payment Pending vehicle

Software Users Management

Software users management i.e. Admin & Operators

Registration Page for software users

Manual Check-In & Check-Out

Manual check-in of vehicle entering into the parking Zone

Manual check-out of vehicle leaving from the parking Zone

Vehicles Transaction History

History of all vehicles used the Parking Zone.
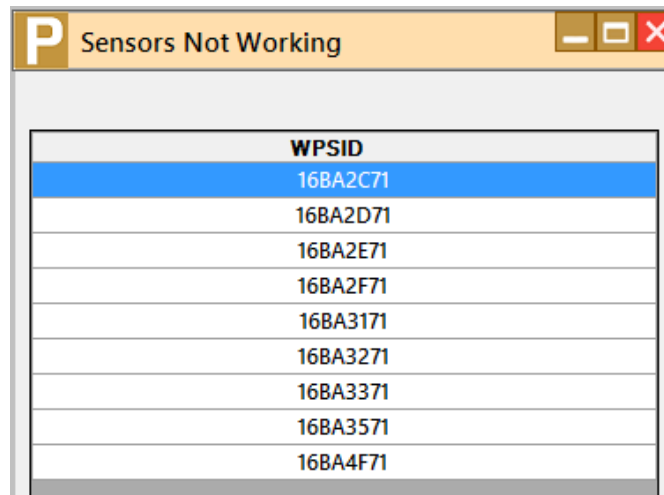
Sensor details at Parking lot

WPSID	WDCID	SWVer	HWVer	RSSI	DeviceName	HBPeriod	Battery	Status	GatewayID	SlotNo	Direction	SlotName	TimeStatus
16BA2C71	16BA6731	v1.02	v1.1	-89	WPSD-340S8	5	3.7V	0	GW-1	3	Left	Dondaparthy	23-01-2018 18:53
16BA2D71	16BA6731	v1.02	v1.1	-89	WPSD-340S8	5	3.7V	0	GW-1	28	Right	Dondaparthy	23-01-2018 18:52
16BA2E71	16BA6731	v1.02	v1.1	-95	WPSD-340S8	5	3.6V	0	GW-1	2	Left	Dondaparthy	23-01-2018 18:53
16BA2F71	16BA6731	v1.02	v1.1	-73	WPSD-340S8	5	3.7V	0	GW-1	1	Left	Dondaparthy	23-01-2018 18:53
16BA3171	16BA6731	v1.02	v1.1	-88	WPSD-340S8	5	3.7V	1	GW-1	29	Right	Dondaparthy	23-01-2018 18:51
16BA3271	16BA6731	v1.02	v1.1	-93	WPSD-340S8	5	3.7V	1	GW-1	27	Right	Dondaparthy	23-01-2018 18:50
16BA3371	16BA6731	v1.02	v1.1	-86	WPSD-340S8	5	3.7V	1	GW-1	4	Left	Dondaparthy	23-01-2018 18:50
16BA3571	16BA6731	v1.02	v1.1	-81	WPSD-340S8	5	3.7V	1	GW-1	5	Left	Dondaparthy	23-01-2018 18:52
16BA4F71	16BA6731	v1.02	v1.1	-87	WPSD-340S8	5	3.7V	1	GW-1	26	Right	Dondaparthy	23-01-2018 18:49

Installed Sensor details monitored through the Parking Software

Sensors Not Working

WPSID
16BA2C71
16BA2D71
16BA2E71
16BA2F71
16BA3171
16BA3271
16BA3371
16BA3571
16BA4F71

List of sensors not working, list generated based on real-time information

Report Generation through Software

Generated Excel reports of pending payments, history of payments

Surveillance

➢ There will be surveillance cameras (Visible & Infrared based) with Zoom Capability situated at entry and exit points to monitor the parking zone.

➢ Any unauthorized vehicle entry which is not going through the Number Plate Recognition can be easily verified by the Operator through the Surveillance Monitor.

➢ Surveillance video is separately stored in NAS Storage, and can be accessed remotely.

Mobile Application

➤ Public (Users) can check the availability of the parking zone through Mobile App installed in their mobiles

➤ Mobile App also shows the real time occupancy of the Parking Zones to the Users

Welcome Screen
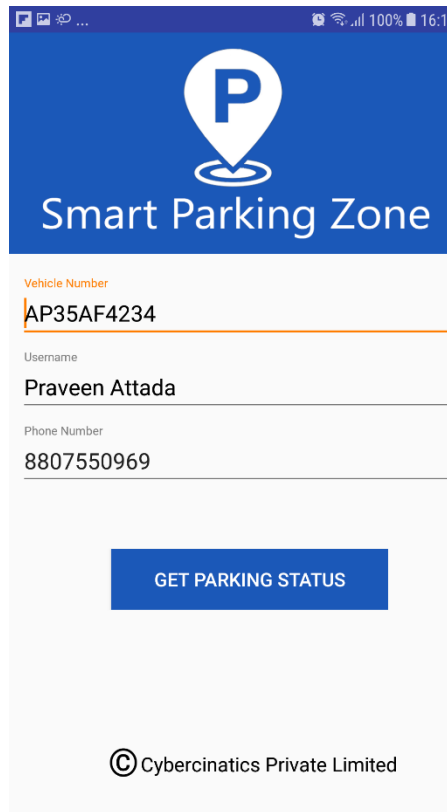
App Registration

Parking Zone List

Mobile Application

Parking Availability List

Navigation to Parking Zone

Payment Process

Web Portal – Login and Home Screen

➢ Admin or officials can know the status of the Parking Lots through the portal

➢ Operators can complaint an Issue about the hardware or software of Parking Lot & also track the details of resolved Issues.

SMART PARKING MANAGEMENT PORTAL

Login Page

Unique ID:

Password:

Sign in
Or
Register

Login Screen

CLICK BELOW TO PERFORM ACTIONS

Report an Issue
Resolve an Issue
Verify the resolved Issue
List of open Issues
Payment Pending Details
Payment History Details

Parking Zone Name : Dondaparthy

SMART PARKING VEHICLE STATUS

SlotID	SensorID	Status	Direction
1	16BA2F71	Vacant	L
2	16BA2E71	Vacant	L
3	16BA2C71	Occupied	L
4	16BA3371	Vacant	L
5	16BA3571	Occupied	L
6	16BA3572	Occupied	L
7	16BA3573	Vacant	L
8	16BA2F72	Occupied	L

Total Payment Pending : 120 ₹

Total Payment History : 340 ₹

Total Transactions Done : 9

Web Portal with the Issue report details, issue resolve, payment pending etc.

Web Portal – Issue Report & Resolve

Issue Reporting about a Parking Lot

Update the resolved Issue details

Web Portal – Issue Verify & Open Issues List

VERIFY THE RESOLVED ISSUES

Open Issue :
-- Select Issue --

Ticket ID :
-- Select Ticket ID --

Location Name :
-- Select Location --

Issue :

Assigned To :
-- Select Operator --

Resolved By :
-- Select Staff --

Resolved Time :
dd-mm-yyyy

Resolve Notes :

Verified By :
-- Select Operator --

Save

Verification of Resolved Issues

LIST OF OPEN ISSUES FROM - 2018-03-02 'To' 2018-04-19

Back

Ticket_ID	Ticket_Status	Issue	LocationName	Reporting_Time	Assigned_By	Assigned_To	Issue_Notes	Resolved_By	Resolved_T
636570604269356163	2	Camera_Issue	AKKAYYAPALEM	19-03-2018 00:00:00	ADMIN	UID13	Entry cam not working	UID13	19-03-2018 00:00:00

Open Issues List between the selected dates

Web Portal – Payment Pending & History

PAYMENT PENDING DETAILS

Back

CarNumber	UniqueID	ExitCamID	EntryCamID	Amount	CheckOutTime	CheckInTime	Mobile	ImageID
AP31AF4234	28022018180120	001157006	001157006	40	2018.05.09 12:38:08.718	2018.05.09 11:28:08.718	9985899899	1509639067306
IND78UP1122	11052018172659	001157006	001157006	20	1970.01.02 2:14:21.757	1970.01.02 0:14:21.757	0011223344	1511757962811
APTRYUUIUIU	100001	1001	10001	20	2018.05.08 12:23:333	2018.05.08 02:23:333	100000001	100000000001
AP31CY7009	123411122222	001157006	001157006	40	2018.05.15 12:10:111	2018.05.15 10:10:111	9998999990	1511757962811

List of Payment Pending vehicles

PAYMENT HISTORY DETAILS FROM - 2018-05-01 'To' 2018-05-17

Back

CarNumber	Payment_ID	Amount	Receipt_No	Unique_ID	Created_At	Mobile	CheckInTime	CheckOutTime	EntryCamID	ExitCamID
APTR9882222	10000000003	40		28022018180120	2018.05.03 02:23:333	9985899899	2018.05.09 11:28:08.718	2018.05.09 12:38:08.718	001157006	001157006
APGY324SVVF	10000000002	40		28022018180120	2018.05.04 02:23:333	9985899899	2018.05.09 11:28:08.718	2018.05.09 12:38:08.718	001157006	001157006
APTR9881111	10000000003	40		28022018180120	2018.05.05 02:23:333	9985899899	2018.05.09 11:28:08.718	2018.05.09 12:38:08.718	001157006	001157006
APHU0723333	10000000002	40		28022018180120	2018.05.06 02:23:333	9985899899	2018.05.09 11:28:08.718	2018.05.09 12:38:08.718	001157006	001157006
APKUU888222	10000000002	40		28022018180120	2018.05.07 02:23:333	9985899899	2018.05.09 11:28:08.718	2018.05.09 12:38:08.718	001157006	001157006

History of all vehicles used Parking Lot

Advantages

- Scalable Enterprise Architecture.

- Database Synchronization with Central Server.

- Highly customizable to any type of parking lot.

- ANPR Camera Detection works for vehicles travelling at high speed as well.

- Entire Parking and billing can be automated from customer's perspective.

- Dedicated Surveillance system which can store the video data of 2 months duration.

- Longest battery life of 3 yrs for the Wireless vehicle detection sensors.

- Less man-power to maintain the parking zone.

- Works in almost all weather conditions.

- Manual operation is possible incase of failure of network, hardware etc.

Limitations

- The Automated Number Plate Recognition algorithms and software detection efficiency is 97% in practice. i.e. 3 number plates data may be corrected by the operator for every 100 Cars under normal operating conditions.

- Operator should verify every car number even if the automatic number detection is correct.

- It is network dependant; A network failure will interrupt the functioning of the system. A Fall back connection should be used, Offline mode is possible with local server.

- Extreme weather conditions like heavy rain may decrease the detection efficiency of the cameras.

Project Development

- Cybercinatics will design, develop and deploy a customized Smart parking system as proposed here.

- Cybercinatics supplies the hardware, software and manpower to implement the system.

- Provides initial training to the operators and maintaining staff of the parking zone one time after integrating the whole system.

- Supports the System after Go-Live as per the project requirement.

- Follows required standards in every stage of the project.

- Total Time of Project Completion: 3 to 6 months

References

- ANPR Camera

https://www.youtube.com/watch?v=LBrmElQinTc

- ANPR Night Mode

https://www.youtube.com/watch?v=IP0v2JggJOk

- ANPR Benchmark Comparison

https://www.youtube.com/watch?v=j50K51Lu_lI

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