



sensennetworks®
Focus on the Relevant

SenPark

A Complete Vehicle Parking Management Solution

Vehicle Movements : Security & Beyond

Post 26/11 Mumbai Taj Attacks, Vehicle surveillance has become an essential part of everyday hotel/private building operations.

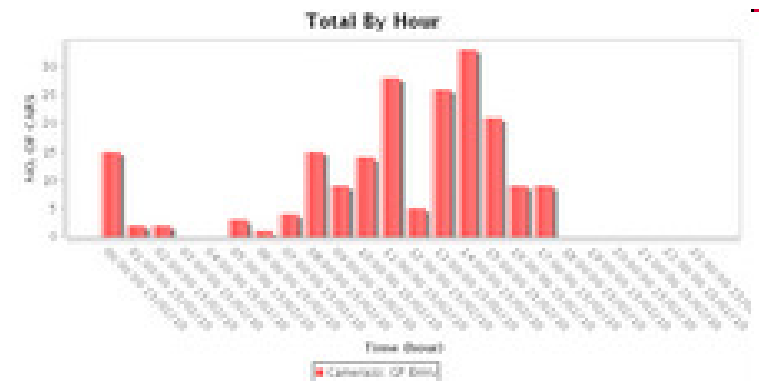
- Several security personnel
 - man the entry and exit of buildings
 - manually record the license plate info
 - manually check the underbelly
 - manually check the boot of vehicles
- While increasing perceived security, the info recorded
 - fails to alert upon arrival of vehicles of interest.
 - is impractical to use for applications beyond
 - e.g. increasing customer loyalty



SenPark Applications



- Enhances security operations by
 - Capturing an image of a vehicle,
 - Locating & cropping the numberplates
 - Converting to alpha-numeric strings
 - Logging them into a DataBase
 - Storing auxiliary video for evidence
- Enables business applications beyond security using information like
 - Count the number of vehicles
 - Parking duration for vehicles
 - Statistics on arrival/dep. rates
 - Identity & Alert for vehicles left behind
 - Search for vehicles of interest (VOI)
 - Real-time arrival/dep. alerts for VOI
 - Deliver alerts as popup, SMS or MMS
 - Efficient Access Control



SenPark Features



- Read over 3000 (<20km/hr) vehicles per hour.
- Operate 24/7 in all weather conditions
- No Need for external triggers/loops.
- Reads
 - using visible light both day and night
 - both retro and non retro-reflective,
 - single and dual line plates
- OCR all English number plates with various
 - colours, fonts, backgrounds and sizes
- Simple to use, web-based, intuitive (GUI).
- Broadcast alerts for vehicles of interest.
- Xml/Sql interfaces for 3rd party integration
- Export data and reports (PDF, CSV).
- Vehicle Tracking for repeat visitors.



SenPark User Interface: Web Browser



Network Video Intelligence

Last Login:

Thursday, October 14, 2010 9:33:29PM

Events Search Cameras Alerts Toggles Admin

Selected Event

Events

Plate Information

AP09BQ4466

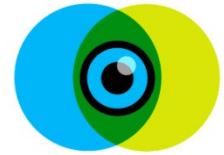
Event Frames



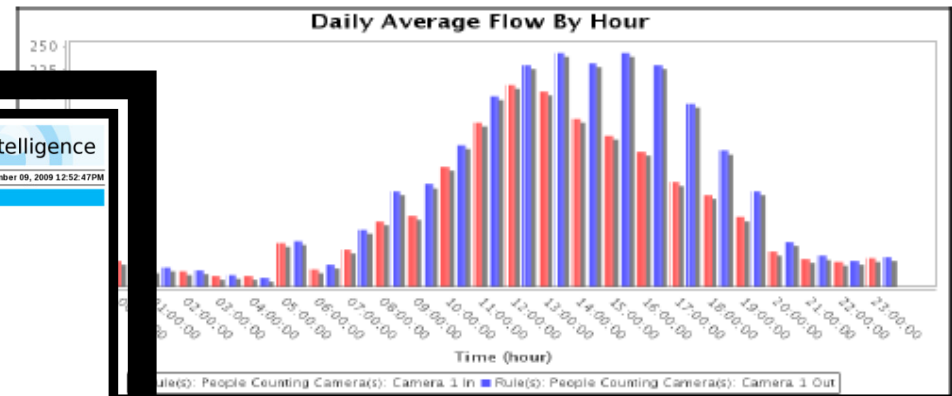
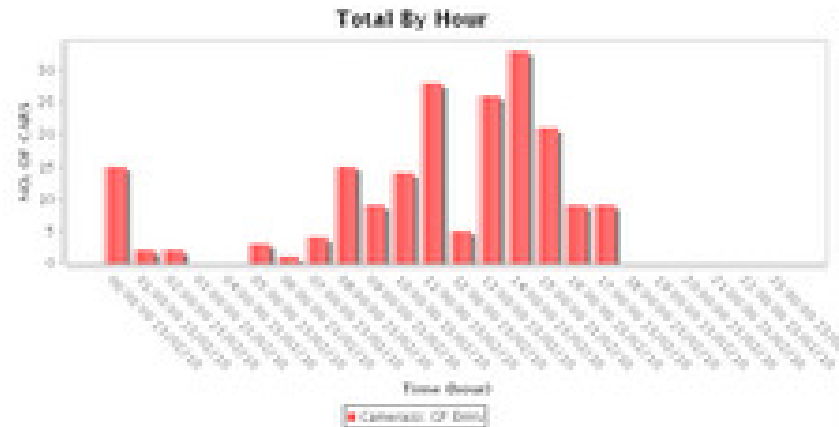
Original 1 of 1

Created	Type	Location	Event Details
2010-10-14 21:32:59	Plate Recognition	Camera 1:localhost	AP09BQ4466
2010-10-14 21:30:17	Plate Recognition	Camera 1:localhost	AP9 BL4118
2010-10-14 21:29:37	Plate Recognition	Camera 1:localhost	AP 36 S 9
2010-10-14 21:29:07	Plate Recognition	Camera 1:localhost	AP11 TV 1164
2010-10-14 21:28:37	Plate Recognition	Camera 1:localhost	AP9 AS 5350
2010-10-14 21:27:44	Plate Recognition	Camera 1:localhost	AP10 AH 0728
2010-10-14 21:27:35	Plate Recognition	Camera 1:localhost	AP-13 M 30-84
2010-10-14 21:27:15	Plate Recognition	Camera 1:localhost	AP16TV 3887
2010-10-14 21:26:53	Plate Recognition	Camera 1:localhost	AP 9P 6150
2010-10-14 21:26:32	Plate Recognition	Camera 1:localhost	AP11 M 427
2010-10-14 21:26:26	Plate Recognition	Camera 1:localhost	AP09BU2383
2010-10-14 21:26:19	Plate Recognition	Camera 1:localhost	AP9 DF 9676
2010-10-14 21:24:58	Plate Recognition	Camera 1:localhost	AP9 TV 2600
2010-10-14 21:24:52	Plate Recognition	Camera 1:localhost	AP 09 - TV 1375
2010-10-14 21:24:20	Plate Recognition	Camera 1:localhost	AP 09 BJ 6758
2010-10-14 21:24:10	Plate Recognition	Camera 1:localhost	AP09 TV 7597
2010-10-14 21:24:04	Plate Recognition	Camera 1:localhost	AP28 DC 3214
2010-10-14 21:23:27	Plate Recognition	Camera 1:localhost	AP9 AN 8638
2010-10-14 21:23:20	Plate Recognition	Camera 1:localhost	AP11 W 7252
2010-10-14 21:22:54	Plate Recognition	Camera 1:localhost	AP09 TV 4121

Arrival, Departure & Parking Duration Reports, Alerts & Statistics



S No.	Vehicle Number	Date	Time	Snapshot
1	AP9TV9053	2010-02-23	19:34:24	
2	AP9TV6725	2010-02-23	19:35:11	
3	AP09BK3170	2010-02-23	19:35:32	
4	AP29AB5293	2010-02-23	19:35:50	
5	AP9X9745	2010-02-23	19:36:33	
6	AP10AL9084	2010-02-23	19:37:26	
7	AP9BF899	2010-02-23	19:39:06	
8	AP37AU930	2010-02-23	19:41:06	



Alert Details

Alert Details	Vehicle Details
Type: Stolen Vehicle	Model: Commodore
Time: 12:51:59	Make: Holden
Date: 2009-12-09	Year: 2007
Camera: Forward View	Shape: Sedan
	Color 1: Silver
	Color 2:
	State: Victoria

Extra Information

Plate Image:

Plate Read: SFF8333J

Dismiss Dismiss All

2009-12-09
Car Roof

Pop Up Alerts

Accuracy



- In most applications, the requirement is to match a vehicle
 - in the vehicles of interest data base e.g., VIP, Stolen etc and
 - captured at the entry with that at the exits within a specified time period
- Optical Character Recognition
 - Its is a means to the end – not the end in itself.
 - OCR accuracies are partial indicators of over all application accuracies.
- The following captured information is essential for application level accuracy
 - Vehicle & License Plate Images,
 - Colour, Make, Model,
 - OCR,
 - Date, Time, GPS Location, and other context information
- Our 'contextual inference' uses OCR and other meta information to deliver hitherto unprecedented application accuracies.
 - The publicly available evaluation results of our solution are @ <http://www.carsafe.com.au/documents/TrialofNewGenANPRisbnversion.pdf>

ANPR is a mature technology – Is it?



- Most systems tend to work when the number Plates are
 - Retro-reflective & Standardized in both size and fonts and
 - when used in conjunction with external triggers like the induction loops
- Its time consuming integration and installation task leading to
 - an increase in the total cost of ownership and
 - ongoing maintenance costs to the end customer
- Proven Solutions else where do not work in new places because
 - Not all numbers plates are 'camera friendly' i.e., retro-reflective.
 - There are a multitude of variations in
 - fonts, skew, background colour,
 - character & plate size, number of characters etc
 - There are a mixture of Single & Dual line license plates.

SenPark Differentiators



- *SenPark* solution is based on a “*probabilistic multi-hypothesis framework*” specifically designed to cope with
 - uncertainties in number plate detection
 - variations in number plate background colours and
 - how the number plates are stencilled (dual or single line?).
- It is designed to work with
 - standard colour/grey images from standard CCTV cameras – not just specialist ANPR cameras
 - both reflective & non-reflective plates
- Its patented technology allows it to detect license plates from images directly without any external triggers
 - reducing installation & commissioning time
 - disruption to normal activities
 - total cost of ownership

While other vendors are busy controlling the environment
we are busy honing our smarts!

SenPark Solution Works ... Even in Extremely Difficult Environments!

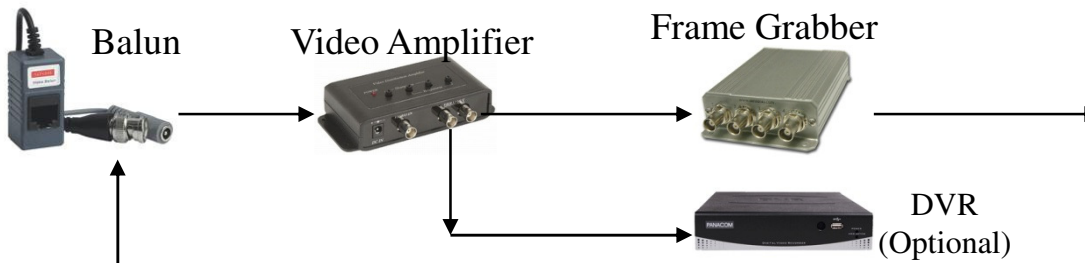
Customer: Green Park Hotel, India



Green Park is using SenPark for security and other business applications including

- **Identify and reward frequent visitors to their premises**
- **Send appropriate staff to meet & greet the VIP guests**
- **Calculate various statistics**
- **Enable informed parking space management decisions.**
- **Identify vehicles involved in parking abuses.**
- **Identify and alert ‘orphans’ i.e., cars that entered but never left**

SenPARK System Deployment, Connectivity and Components



Balun



Camera



Selected Event

Plate Information

AP09BQ 4466

Event Frames



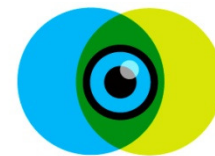
ANPR Software



Netgear N300

To LAN

SenPARK Component Specifications



1. **Camera Specs**
 - Resolution: 520 TV Lines, Lens: 16 mm, 1/3" Sony chip
 - Input: 12V DC, 500 mA current, IP68 standard, Waterproof, Colour Night vision
2. **Balun Specs – BNC to Cat 5 Converter, joint power & video transmission on cat 5, passive device (no power needed)**
3. **Cat 5 Cable**
4. **Video Amplifier Specs**
 - 12V DC Input, 1Vp-p output, 75 ohms
 - 10Hz to 10 MHz bandwidth, Power on indicator, BNC Video connectors
5. **DVR Specs**
 - All standard features of a 4 channel DVR with, H.264 Compression, SATA HDD (500 GB), 4 BNC female connectors at the rear, Archiving via USB drive, Motion Detection based video recording
6. **USB Frame Grabber Specs**
 - Inputs : 2255 - 4 composite (BNC), 2 S-Video, Input Video Formats : NTSC (M), PAL (BDGHIMN)
 - Output Resolution : NTSC: 640 x 480, 320 x 240, 640 x 240., PAL: 704 x 576, 352 x 288, 704 x 288
 - USB Current Draw : 400 mA, Weight : 2255S (with Enclosure) 0.58 lbs
7. **Video Processing Unit Specs**
 - Processor: Intel Core 2 Duo 2.93 GHz, RAM: 2 GB, Hard drive: 500 GB SATA, OS: Fedora core 10 distro
8. **Pole Mount**
 - Pole Make : MS (MILD STEEL), Color : Silver color powder coating,
 - Pole Size : 3 Meter Height, Dia Meter 63mm, Bottom Plate : Round base disk Dia 380
9. **Illumination Specs**
 - RADIUM LAMP DAY LIGHT, PHILLIPS COMPANY, 220V/50-60VZ CHOKE, LAMP : 400WATTS
10. **Router – Any Standard Router, we have shown Netgear Router with the following specs**
 - IEEE 802.11n version, IEEE 802.11g, IEEE 802.11b, 2.4 GHz WAN (ADSL): ITU 992.1 (G.dmt) Annex A, ITU 992.2 (G.lite), ITU 992.3 ADSL2 (G.dmt.bis), ITU 992.5 ADSL2+
 - Dimensions: 177.5 x 130 x 31 mm (7 x 5.1 x 1.22 in) Weight: 265 kg (.584 lbs)
11. **Software**
 - Reads over 3000 Cars per hour travelling @ 20K/hr or less
 - Accuracy
 - For License Plate Capture > 98%
 - Searching > 95%
 - Parking Duration > 95%
 - Vehicle In – Out Discrepancy > 90%
 - Searching, Alerting & Triggering for VIP Vehicles >95%

Contact Information



Australia

Phone: +61 3 9852 0448

Fax: +61 3 9852 0449

Mobile: +61 44 760 8388

India

Mobile: +91 9866120007

USA

Tel: +1 510 299 3862, + 1 510 972 4831

E-mail: info@sensennetworks.com

sales@sensennetworks.com

Web: www.sensennetworks.com