Library Smart View Project

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Background

TP Smart Campus Initiative
Library’s Smart Initiatives

- Ambience Monitoring
- Patron Analytics
- Crowd Monitoring

To monitor noise level in the Library and send email alert to staff if noise threshold exceeds for a specified duration.
Library’s Smart Initiatives

- Ambience Monitoring
- Patron Analytics
- Crowd Monitoring

Consolidate patron data from gantries and systems for analytics of patron profile and library usage.
Crowd Monitoring – People Counting

- Objectives
  - Provide “real-time” information on crowd status in Library
  - Analytics
People Counting with Motion Sensors

Inaccurate counts
- Groups of people
- Inanimate objects
- Complex algorithm

Sensor technology not suitable

Is this the end?
TP Smart Campus Platform

Video Analytics
Video Analytics Functions

Object Introduced
- Abandoned Packages
- Parked Vehicle

Snapshot & Compare
- Detection of Vandalism, Object trapped between gates

Enter Zone / Loitering

Smoke
- Video Smoke Detection

Crowd Density
Measure density and heat map

People Counting
People Counting

- Total 16 cameras
- Ceiling/wall mounted
- Zone defined for people counting
Loitering Detection

- Total 4 cameras
- Wall mounted
- Zone defined for loitering
Project Status

- Planned for implementation by end Aug 2016
- Still undergoing UAT for better count accuracy
Smart View Dashboard
Smart View Dashboard

TP Smart Campus Platform

Last Hour People Count - L7 (Quiet Zone)
- Highest: 27, 51/192
- Average: 20, 39/192
- Lowest: 15, 28/192

People Count Trend - L7 (Quiet Zone)

Library Occupancy Status
- Total: 190, Occupancy: 20%
- L8 (Quiet Zone): 21, Occupancy: 29%
- L7 (Quiet Zone): 50, Occupancy: 20%
- L6 (Quiet Zone): 25, Occupancy: 16%
- L5 (Collaboration): 37, Occupancy: 13%
- L4 (Collaboration): 47, Occupancy: 24%

Map
- L7 (Quiet Zone)
- Total: 50 (25%)

Event
- 10:2: People... L8 (Qui... PeopleCount...
- 10:2: People... L8 (Qui... PeopleCount...
- ...

Alarm
- 20:50... Loiter... IPCA... Loitering...
- 19:52... Loiter... IPCA... Loitering...
- 18:44... Loiter... IPCA... Loitering...
### Library Occupancy Status

<table>
<thead>
<tr>
<th>Library Name</th>
<th>People Count</th>
<th>Occupancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>193</td>
<td>20%</td>
</tr>
<tr>
<td>L8 (Quiet Zone)</td>
<td>21</td>
<td>29%</td>
</tr>
<tr>
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</tr>
<tr>
<td>L4 (Collaboration)</td>
<td>47</td>
<td>24%</td>
</tr>
<tr>
<td>L3 (Makerspace)</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Legend**

- **Not Crowded**
- **Crowded**
- **Very Crowded**
Smart View Dashboard
Smart View Dashboard

TP Smart Campus Platform

Last Hour People Count - L7 (Quiet Zone)

People Count Trend - L7 (Quiet Zone)

Library Occupancy Status

Map

Event

Alarm
Loitering Video
Learning Points

- Use of new/emerging technology to enhance user experience
  - Limitations
  - Comprehensive testing - POC
- Appropriate location for counting/monitoring devices
- Threshold of accuracy
- Collaborations with internal and external parties for expertise and synergy
- Missed out on internal linking staircase within a particular zone
Future Plan

- For Smart View System to connect to Library’s existing CCTV cameras to extend the coverage
- Develop mobile version of crowd monitoring
- Explore other video analytic functions e.g. intrusion detection, crowd density, tracking, etc.
Thank You 😊