

Pvision Electronics



The Team



Mohammad
CEO, ELECTRONICS



Milad
CFO, SYSTEMS



Noah
CTO, COMPUTER

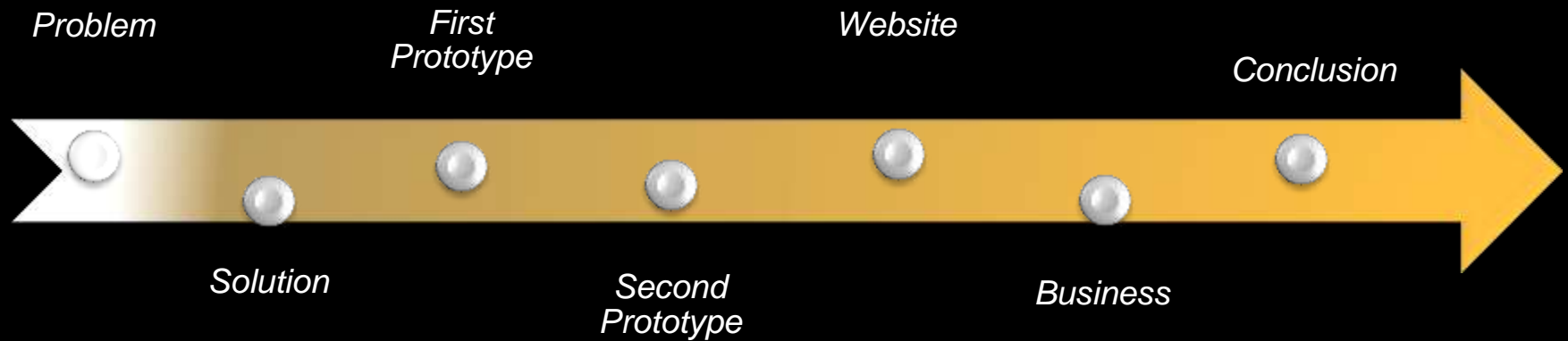


Oshi
COO, BIOMEDICAL

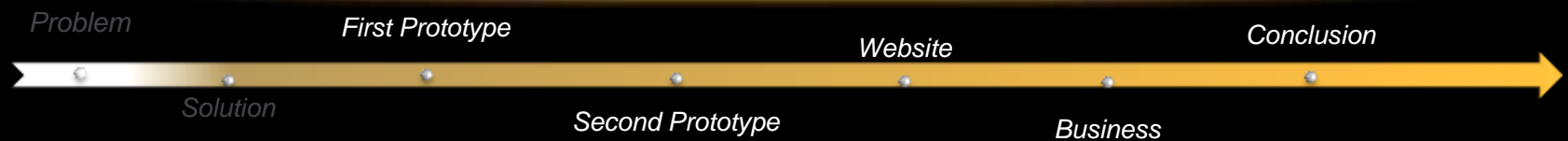


YuJie
CMO, ELECTRONICS

Agenda



Problem

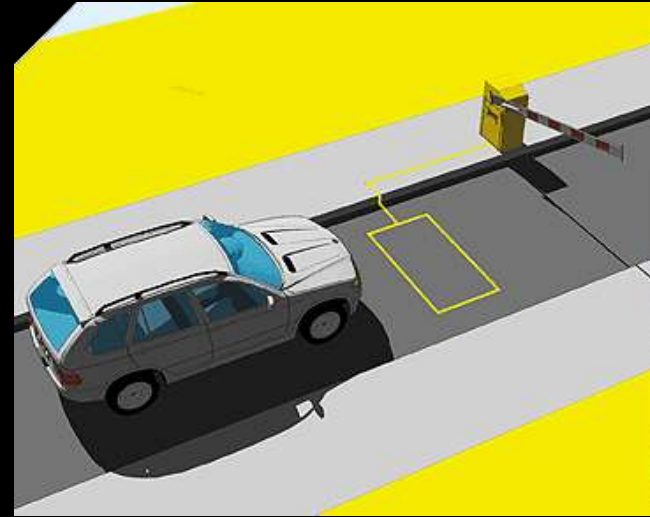


Existing solutions

Counters



Inductive loops



Problem

First Prototype

Website

Conclusion

Solution

Second Prototype

Business

Our Product



Problem

First Prototype

Website

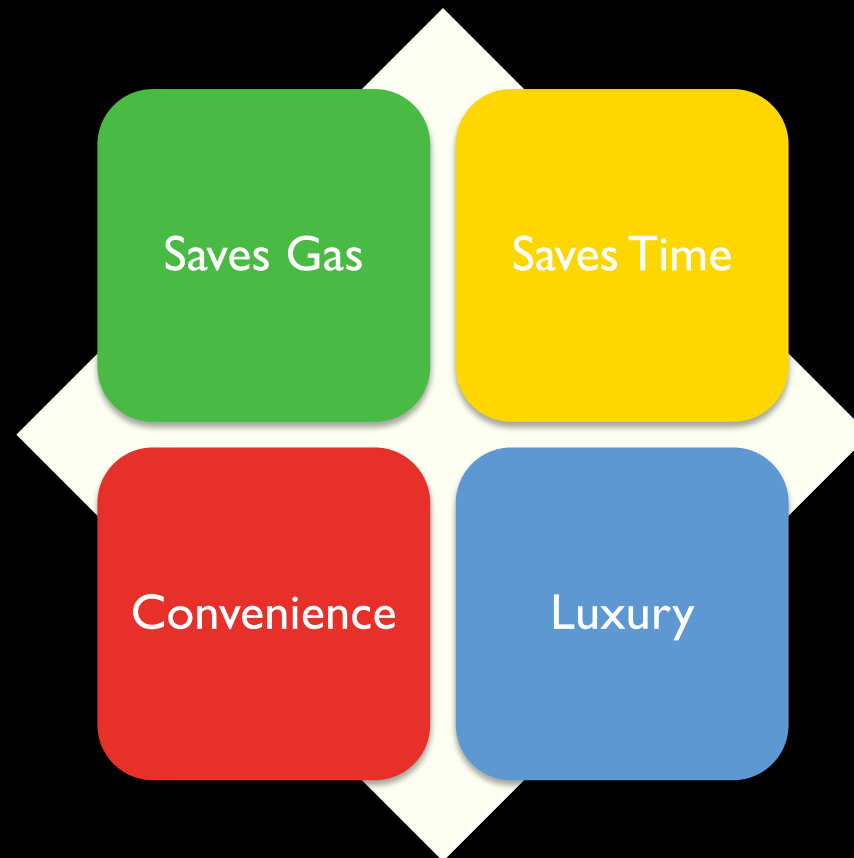
Conclusion

Solution

Second Prototype

Business

Benefits



Goals



Our Product

**Input
System**

(IP cameras)

**Embedded
System**

(image processing
algorithms)

**Output
System
(Display)**



Problem

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Our Product



First
Prototype



Second
Prototype



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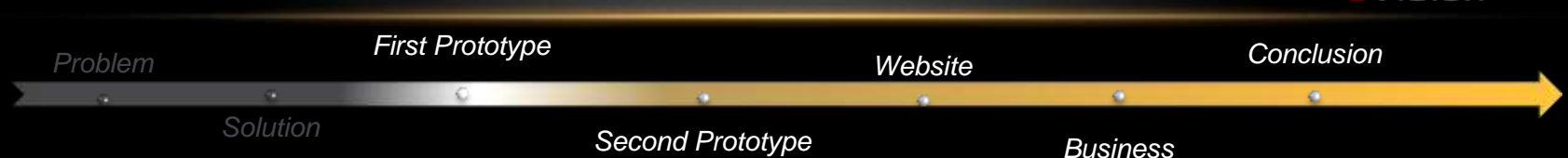
Solution

Second Prototype

Business

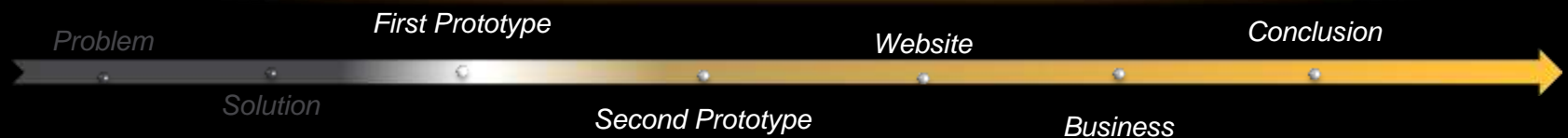
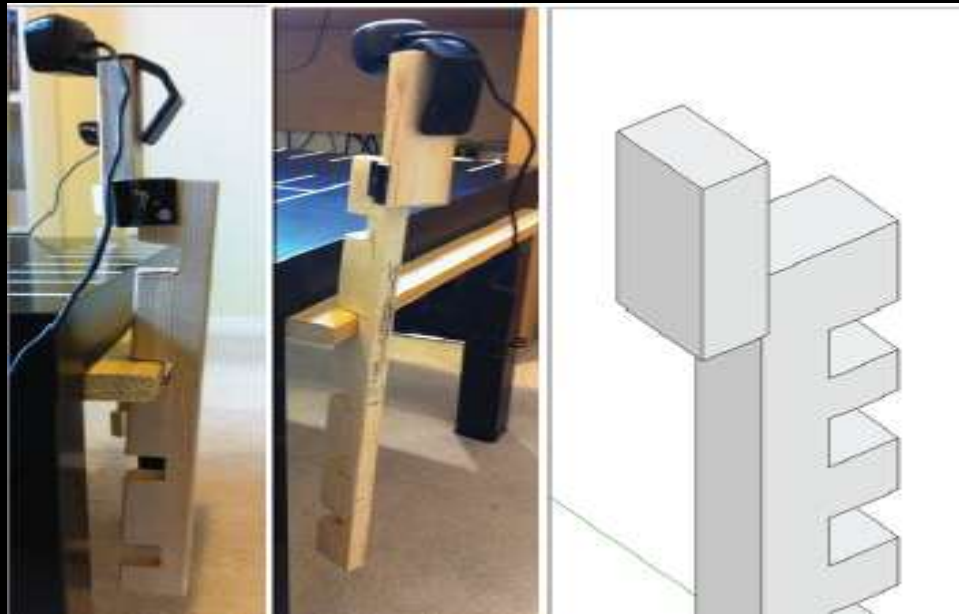
First prototype

- Indoor implementation
- Scale down version of parking lot
- Two webcam
- Image Capturing software
- Java- Eclipse
- UI- Processing library



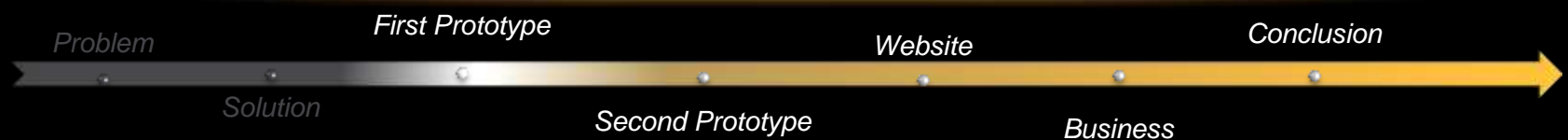
Parking Lot Model

- Scaled down version of Parking lot on Table
- Height Adjustment for Camera



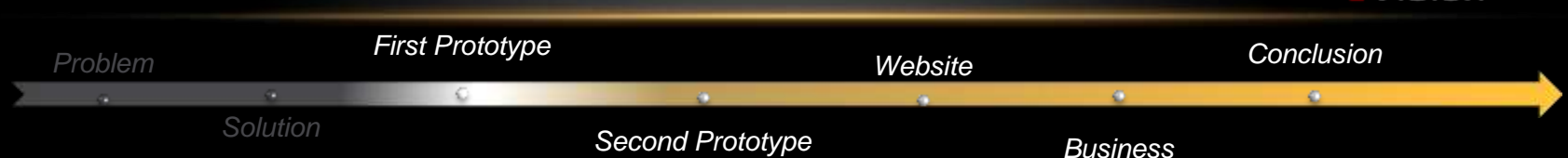
Parking lot Surface

- Reducing the surface reflection



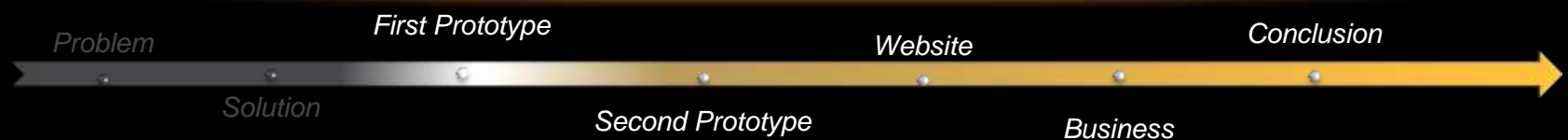
HardwareWebcam

- Webcam
- YawCam – Image Capturing software
- 640 * 480 size JPG file



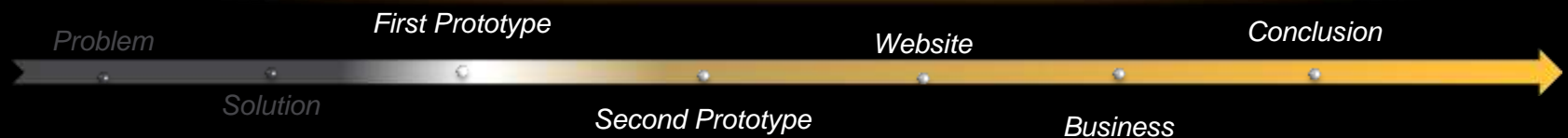
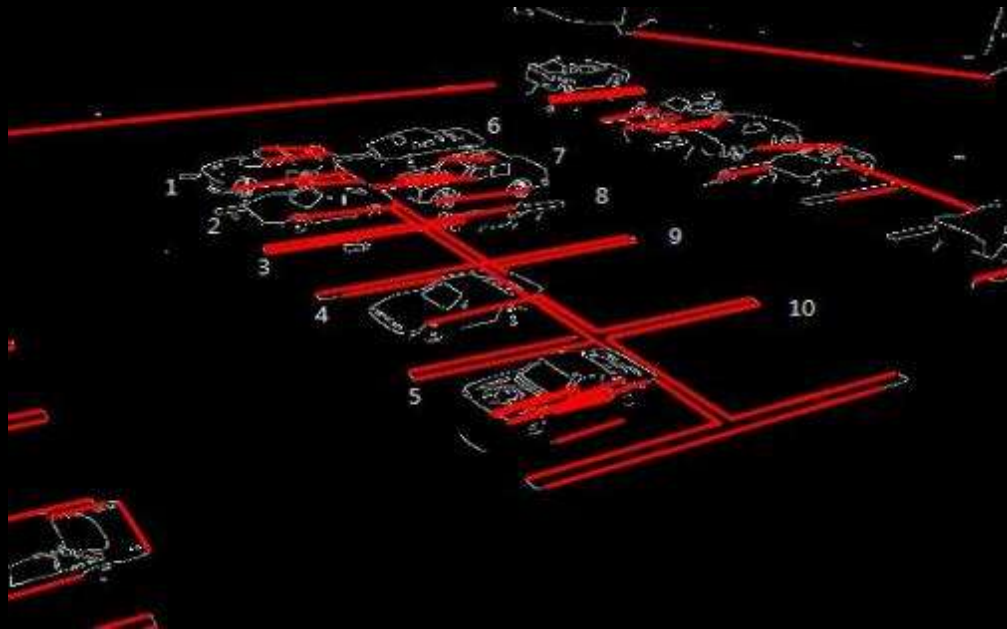
Algorithm

- Color Comparison Algorithm



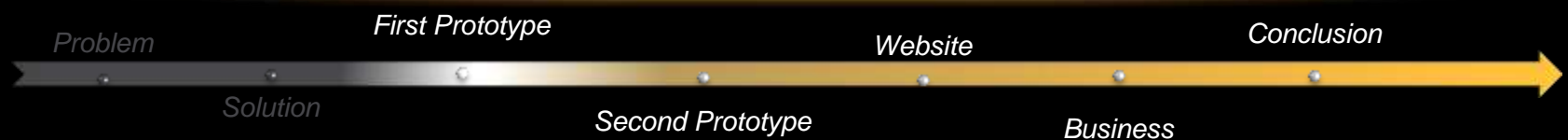
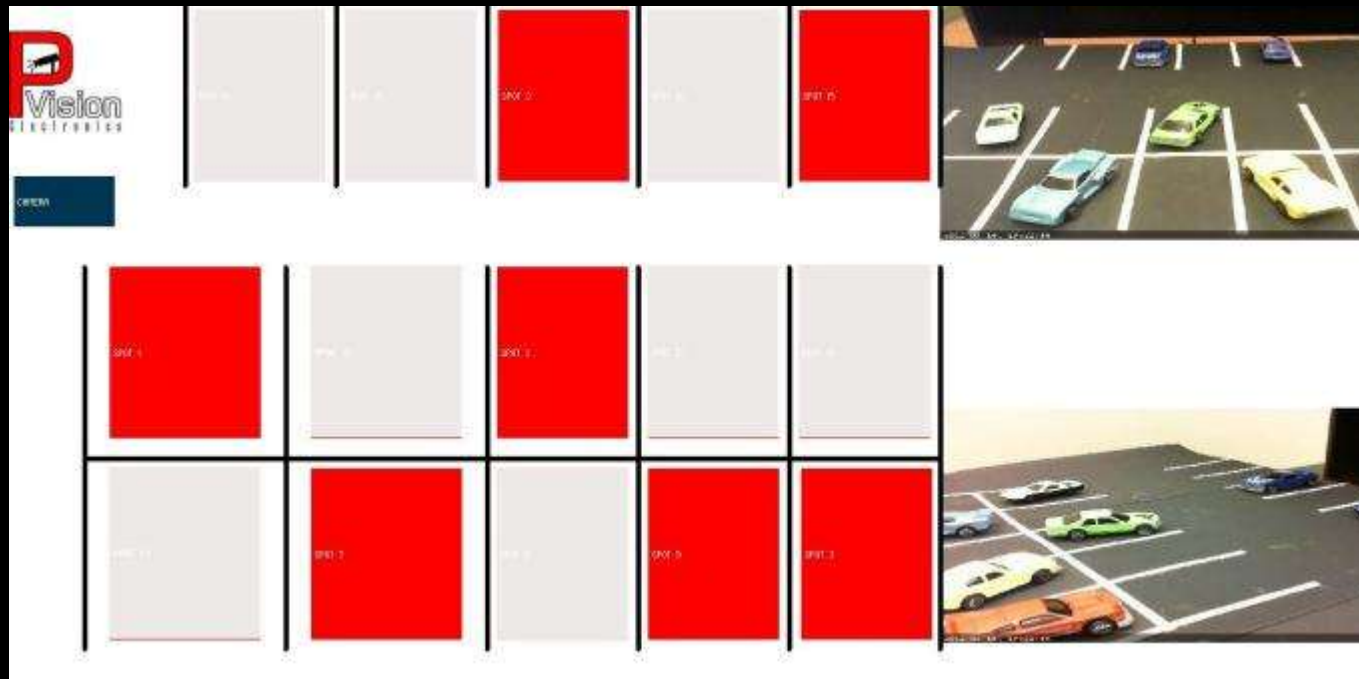
Algorithm

- Edge Detection Algorithm



User Interface

- Processing Library

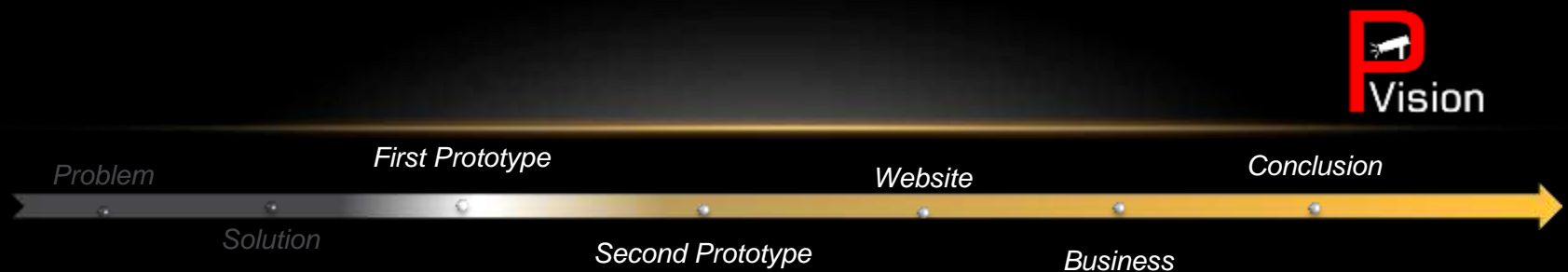


Complications / Limitations

- Webcam software & Java integration Processing time (5sec)
- Image distortion and noise
- C++ -> Java
- Integration with Arduino Board & GPU

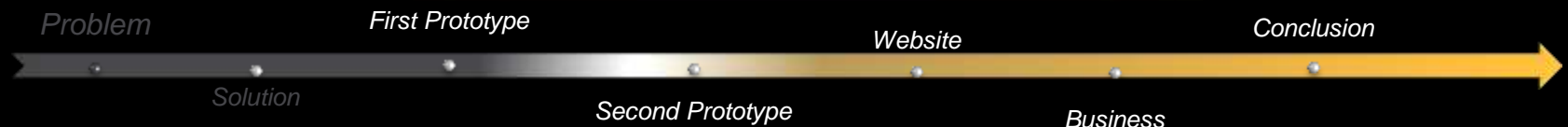


Video – Small scale prototype



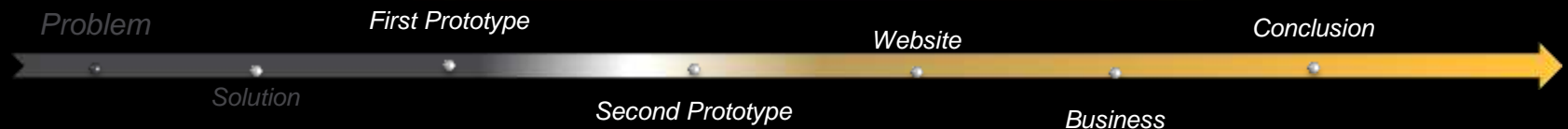
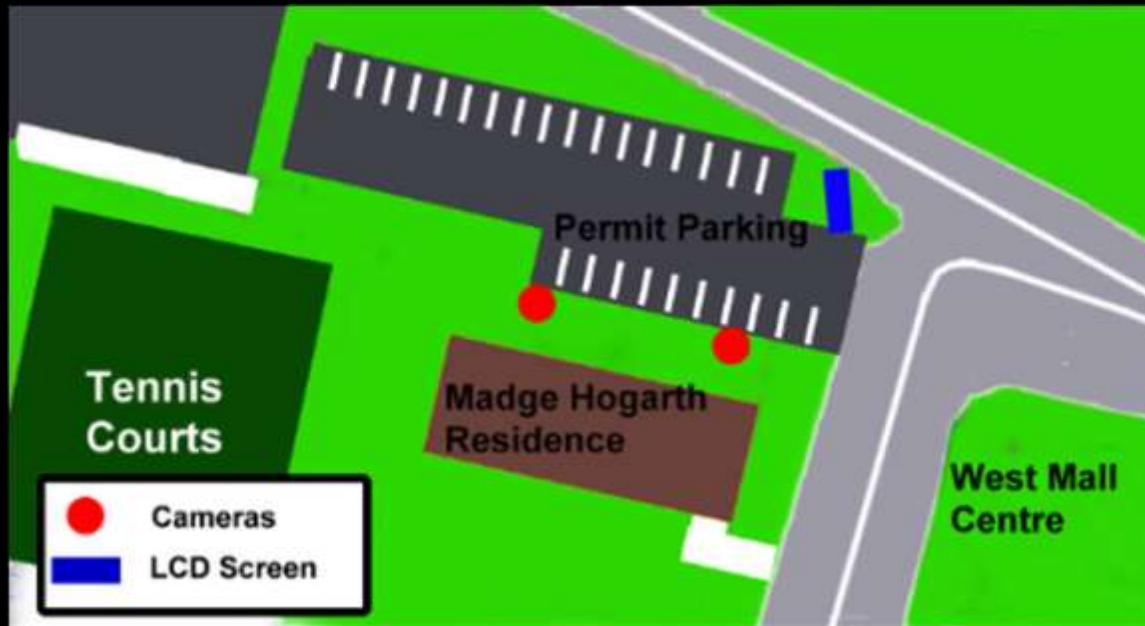
Second prototype

- Outdoor implementation
- Real Parking lot
- Two IP cameras
- POE switch
- Image Capturing software
- Java- Eclipse
- UI- Processing library
- LCD display



Location

- Madge Hogarth Building Reserve Parking lot



Location

Camera 1



Camera 2



Problem

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Website

Conclusion

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Second Prototype

Business

Hardware

IP Camera



POE switch



Problem

First Prototype

Website

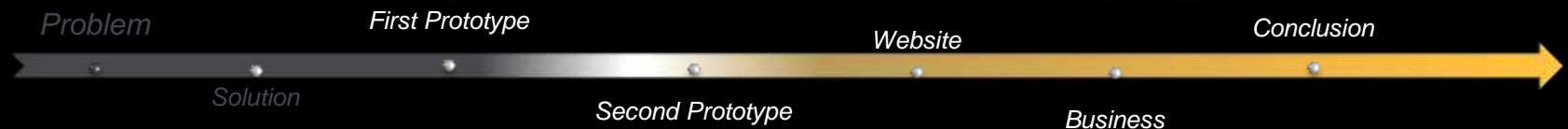
Conclusion

Solution

Second Prototype

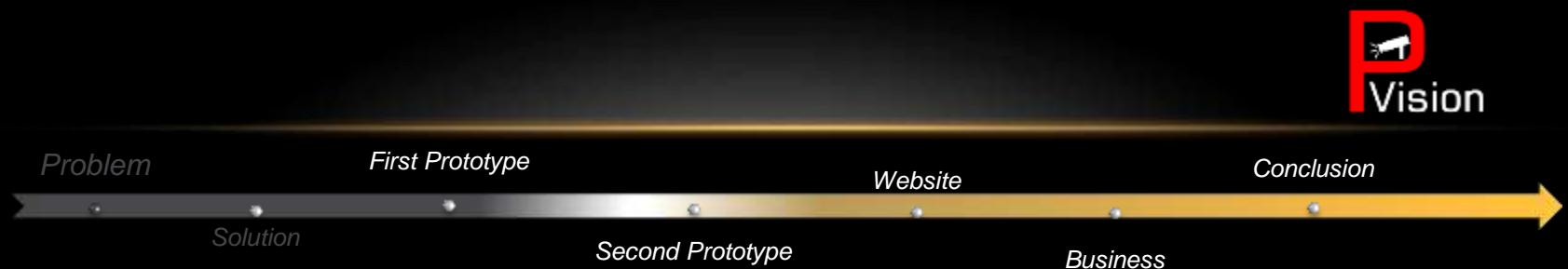
Business

Hardware Network



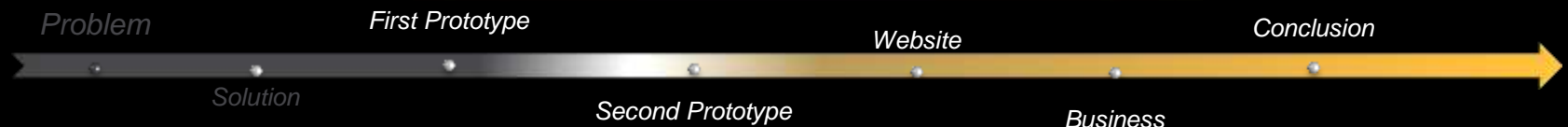
Software

- Same as indoor algorithms
(Color Comparison & Edge detection)
- Tolerance adjustment for individual parking spot
- Trees between cameras and parking lot

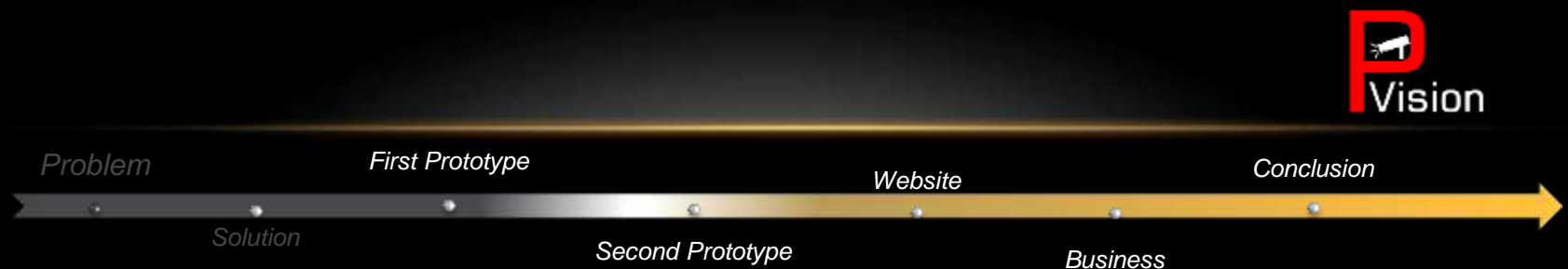


Complications / Limitations

- IP camera video streaming
- Wireless internet signal
- HDMI cable
- Limited time



Video – Large scale prototype



Website

- Why did we develop a website?
- What features does the website offer to users?



Mobile Phones

- Adjustable Width For Different Devices and Screen Sizes
 - Smart phones

- Laptops/Computers



Live Reload

- No refresh required
- Update recent time which is the time the parking has been occupied or free recently



Problem

First Prototype

Website

Conclusion

Solution

Second Prototype

Business

MySQL Integration

- Database \leftrightarrow Image Processing

		lotnumber	occupancy	freetime	occupytime	recenttime
<input type="checkbox"/>	Edit Inline Edit Copy Delete	1	1	0	1539	1538
<input type="checkbox"/>	Edit Inline Edit Copy Delete	2	1	0	1539	1538
<input type="checkbox"/>	Edit Inline Edit Copy Delete	3	1	0	1539	1538
<input type="checkbox"/>	Edit Inline Edit Copy Delete	4	1	54	1485	1475
<input type="checkbox"/>	Edit Inline Edit Copy Delete	5	1	54	1485	1475
<input type="checkbox"/>	Edit Inline Edit Copy Delete	6	1	0	1539	1538
<input type="checkbox"/>	Edit Inline Edit Copy Delete	7	1	0	1539	1538
<input type="checkbox"/>	Edit Inline Edit Copy Delete	8	1	54	1485	1475
<input type="checkbox"/>	Edit Inline Edit Copy Delete	9	1	0	1539	1538
<input type="checkbox"/>	Edit Inline Edit Copy Delete	10	1	0	1539	1538
<input type="checkbox"/>	Edit Inline Edit Copy Delete	11	1	0	1539	1538
<input type="checkbox"/>	Edit Inline Edit Copy Delete	12	1	0	1539	1538
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<input type="checkbox"/>	Edit Inline Edit Copy Delete	14	1	54	1485	1475
<input type="checkbox"/>	Edit Inline Edit Copy Delete	15	1	0	1539	1538

Check All / Uncheck All With selected:

Show : row(s) starting from row # in mode



Problem

First Prototype

Website

Conclusion

Solution

Second Prototype

Business

Statistics

- The data collected for one day
- Total number of hours a space has been free or occupied



Problem

First Prototype

Website

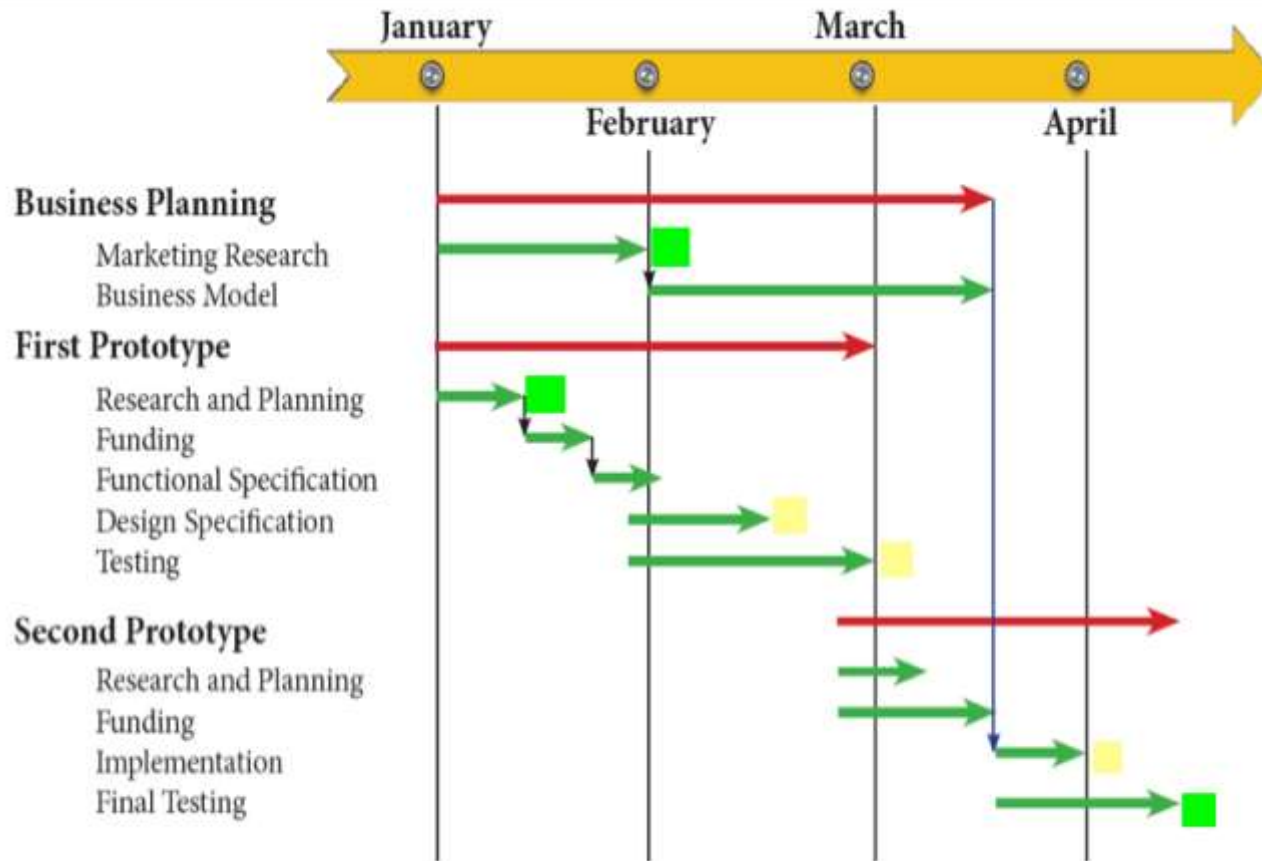
Conclusion

Solution

Second Prototype

Business

Timeline

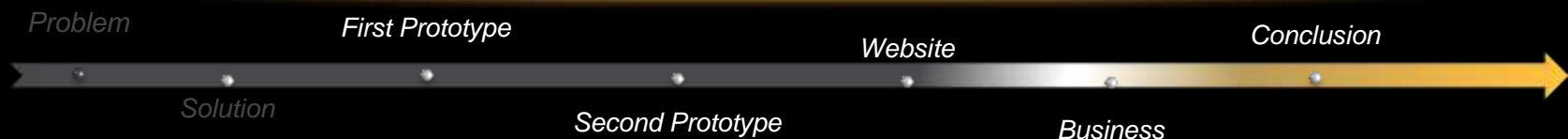


Early Research and Planning

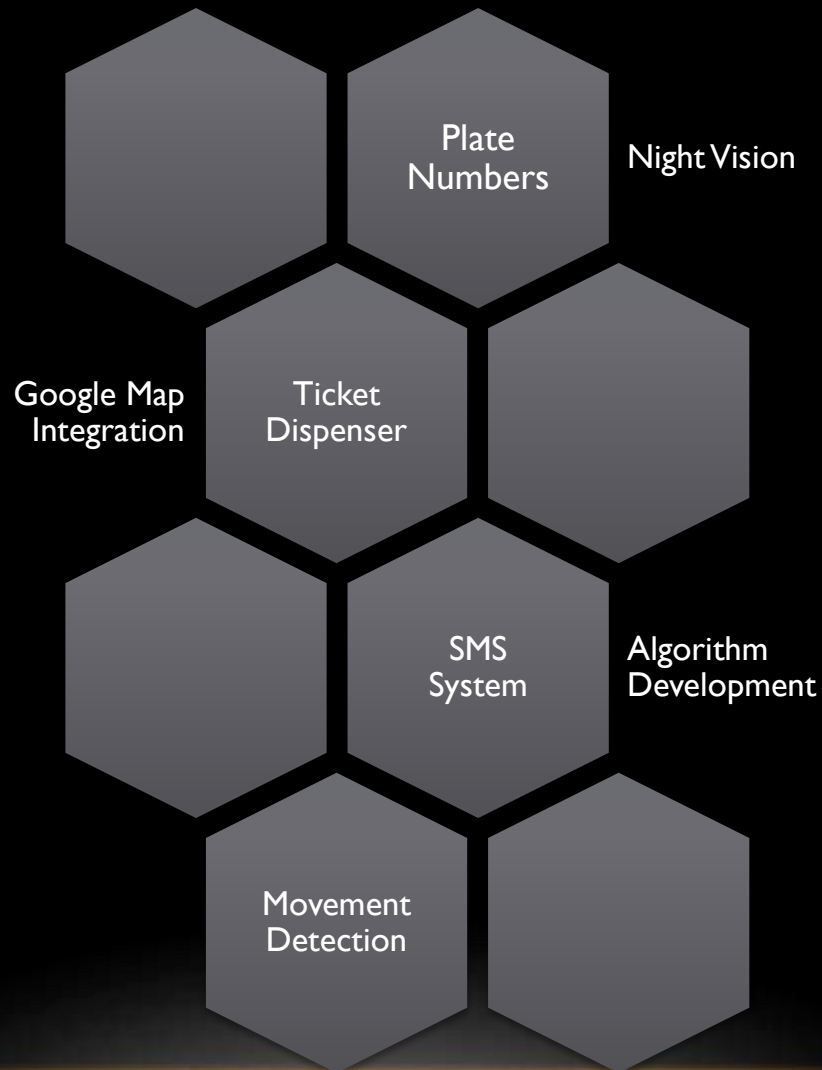
- Delays (GPU, Cameras)

Programming Blues C++ → Java

- Early success – Second prototype



Future Development



Night Vision

Google Map
Integration

Ticket
Dispenser

SMS
System

Algorithm
Development

Movement
Detection



Problem

First Prototype

Website

Conclusion

Solution

Second Prototype

Business

Finances

Budget

\$750 Funding from the
ESSS

Personal Expenses

Re-sale of items bought

Cost

Cameras:

- First Prototype = \$210
- Second Prototype = \$550

SmartGPU = \$110



Product

Objective

Position

Conclusion

Market

Analysis

Recommendations

Business Model

Market



Problem

First Prototype

Website

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Second Prototype

Business

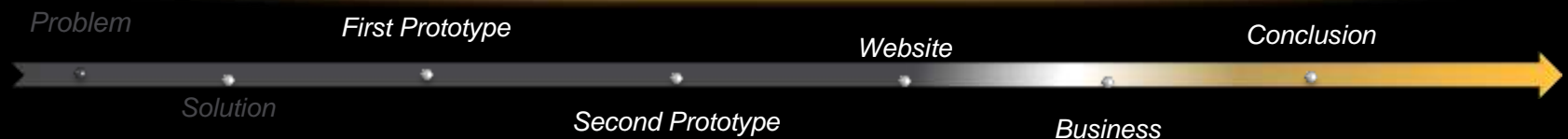
Business Model

Sales

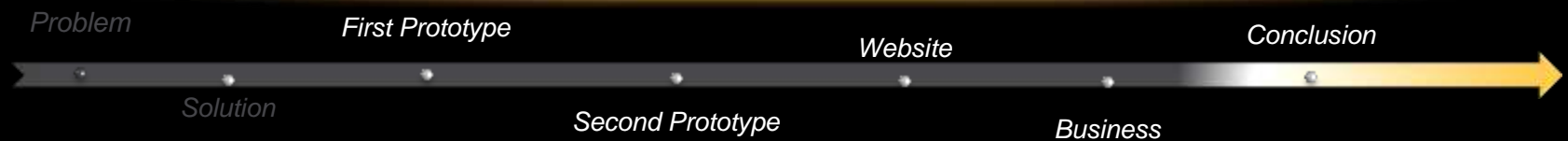


Profit Sharing

Direct charges



Conclusion



Questions?

