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Active Surveillance as a Service (ASaaS)

Andrew Fisher (EE), Robert Marshall (EE), Brahm Powell (ME), Titus Lungu (ME), Mark Heller (CE), Nick White (CE)

Faculty Advisors:
Dr. Pong Chu (ECE) and Dr. Majid Rashidi (ME)

Parker Hannifin

Dr. Joseph Kovach

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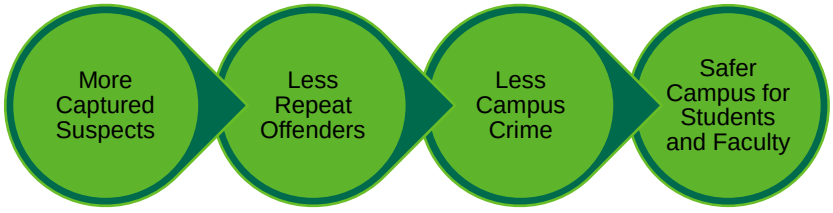
Background



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Design Objectives

Maximize

- Accurate Detections
- Usability
- Utility and Relevance

Minimize

- False Readings
- Network Usage
- Interaction and Setup

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Technical Approach

- Unmet Needs
- Design Concepts
- Selected Design
- Technical Specifications

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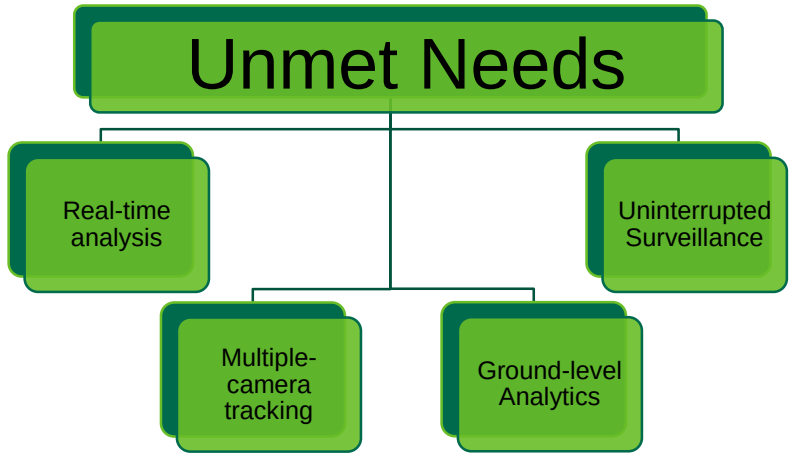

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Technical Approach

- Unmet Needs
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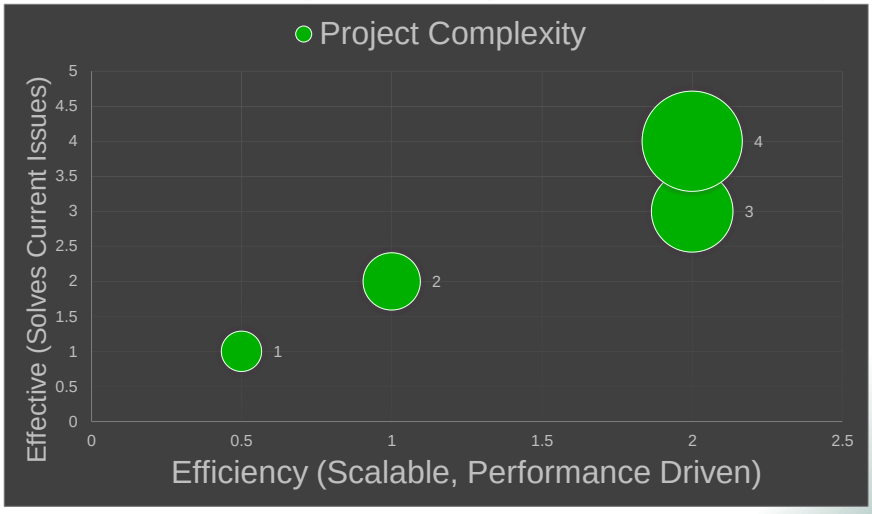
Measuring Design Feasibility



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Technical Approach

- Unmet Needs
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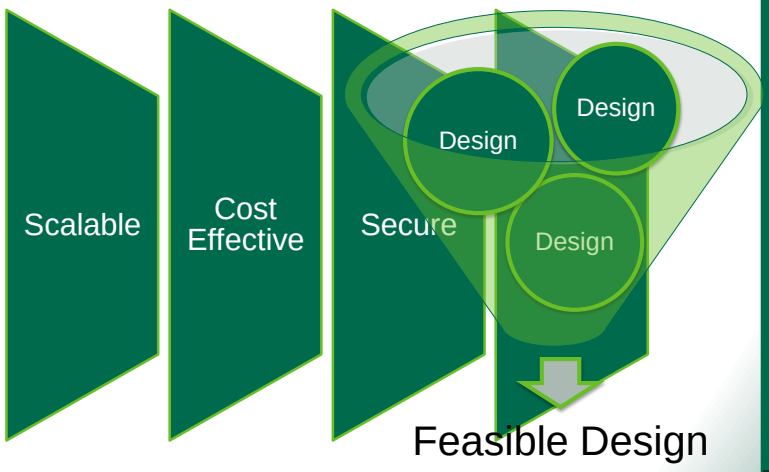
Design Analysis



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Technical Approach

- Unmet Needs
- Design Concepts
- Selected Design
- Technical Specifications

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Technical Specifications

Algorithm Design	Detection
	Tracking
System Architecture	Layered Design
	Scalable
	Effective
Distribution & Maintenance	Software Delivery
	Updates, User Support

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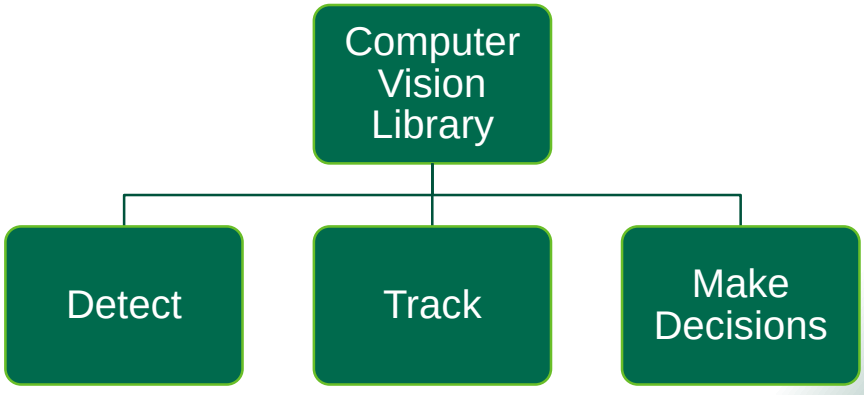
Algorithm Design



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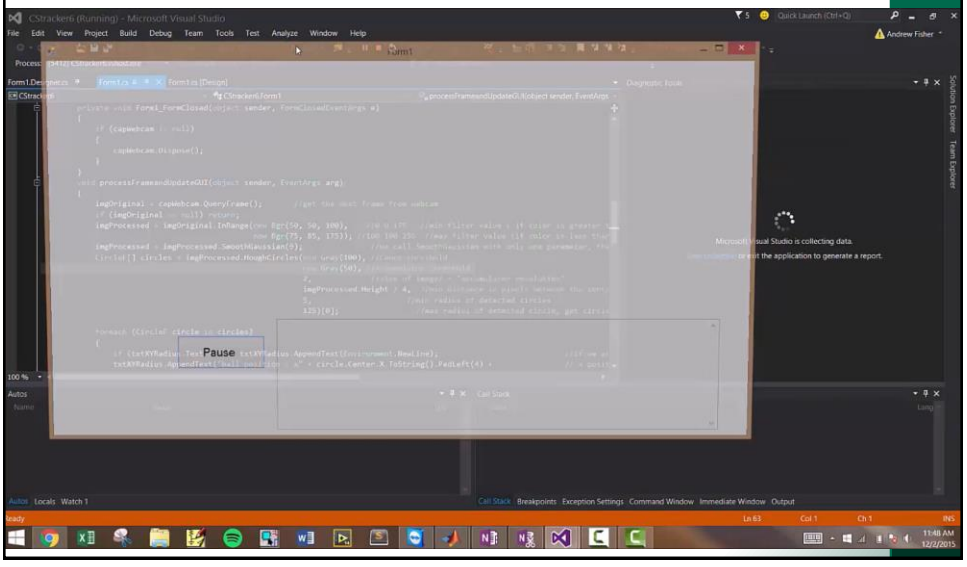
Detect



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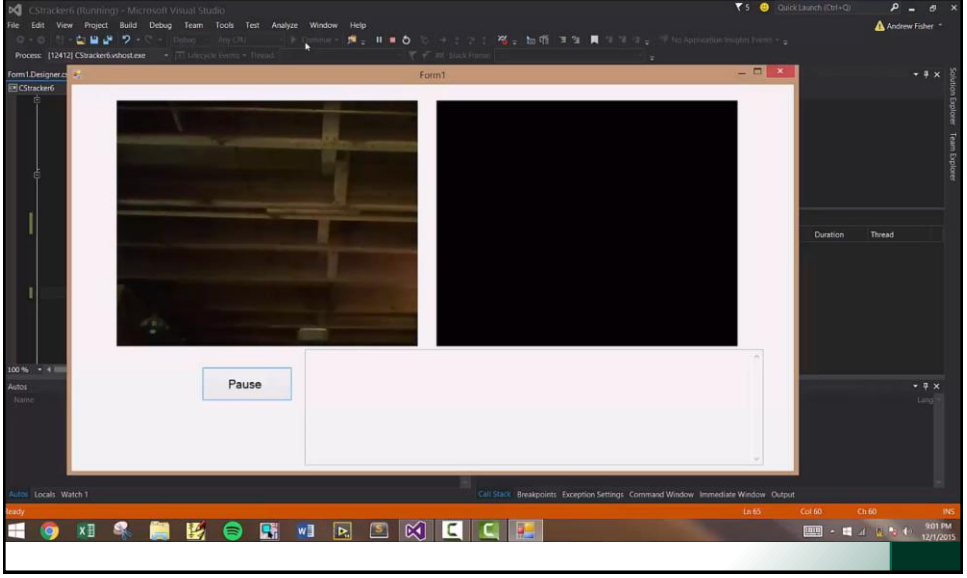

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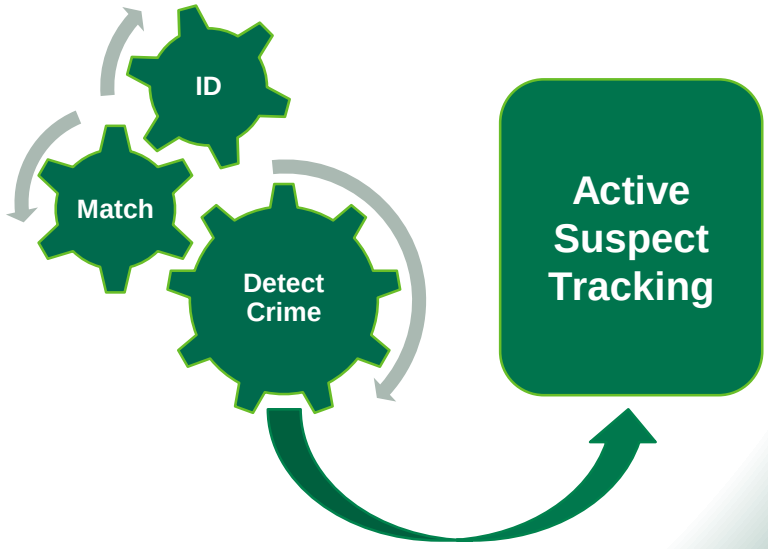
Make Decisions



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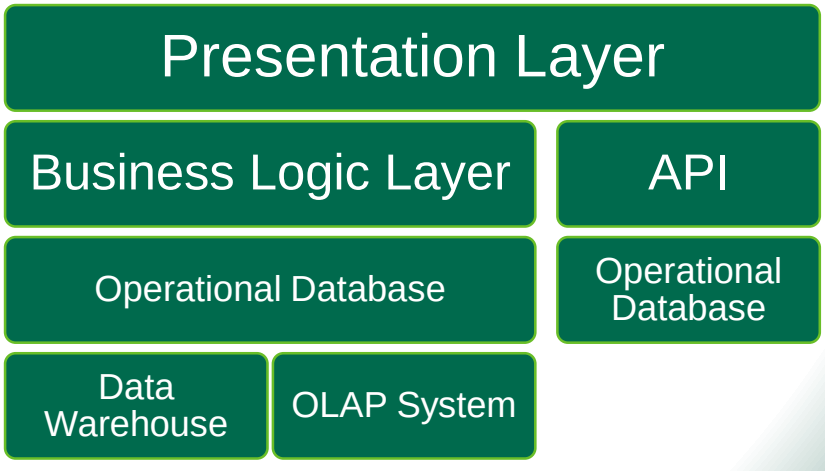
System Architecture



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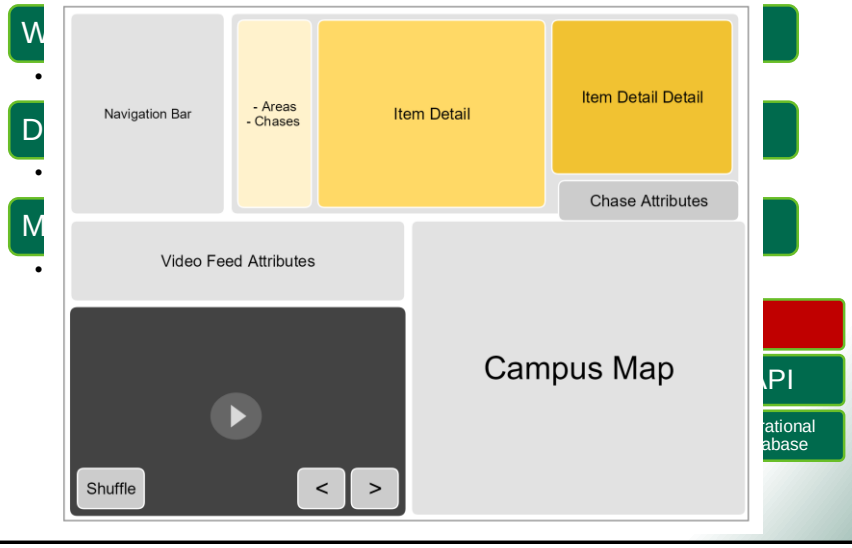
Presentation Layer



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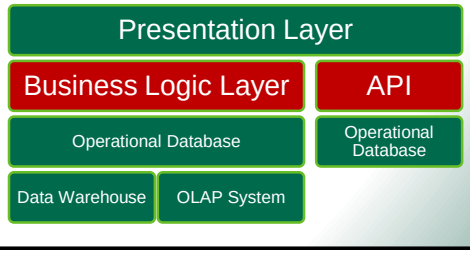
Business Logic Layer

Independent

- Logic remains unchanged

Controller

- Holds algorithm and data access logic



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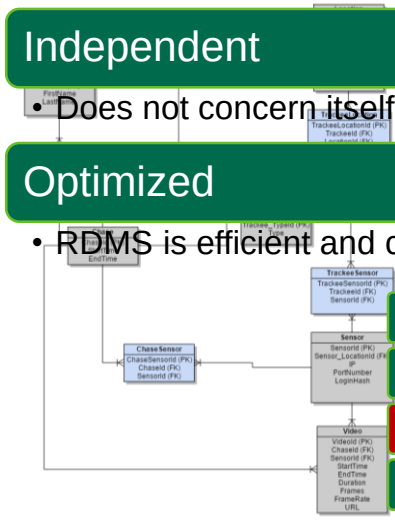
Database Layer

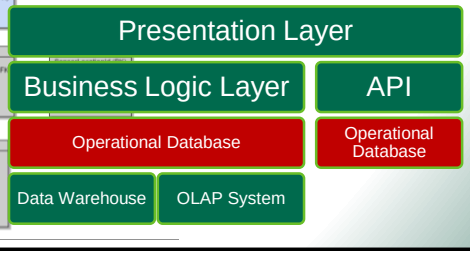
Independent

- Does not concern itself with logic layer details

Optimized

- RDMS is efficient and capacity is near limitless





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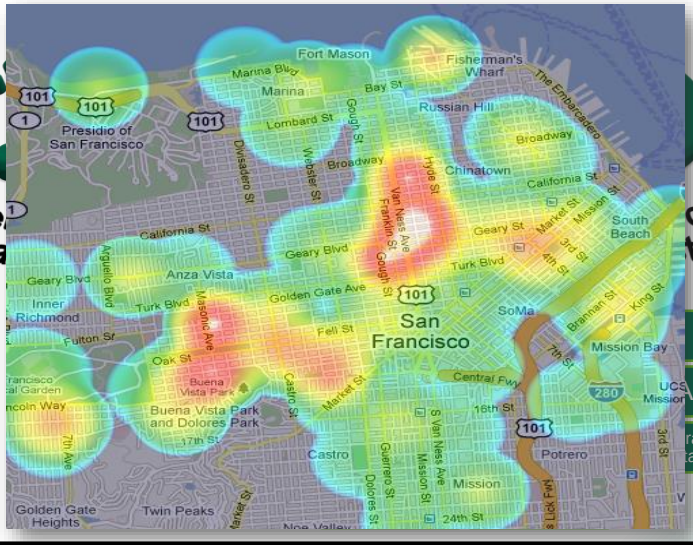
Big Data Analytics



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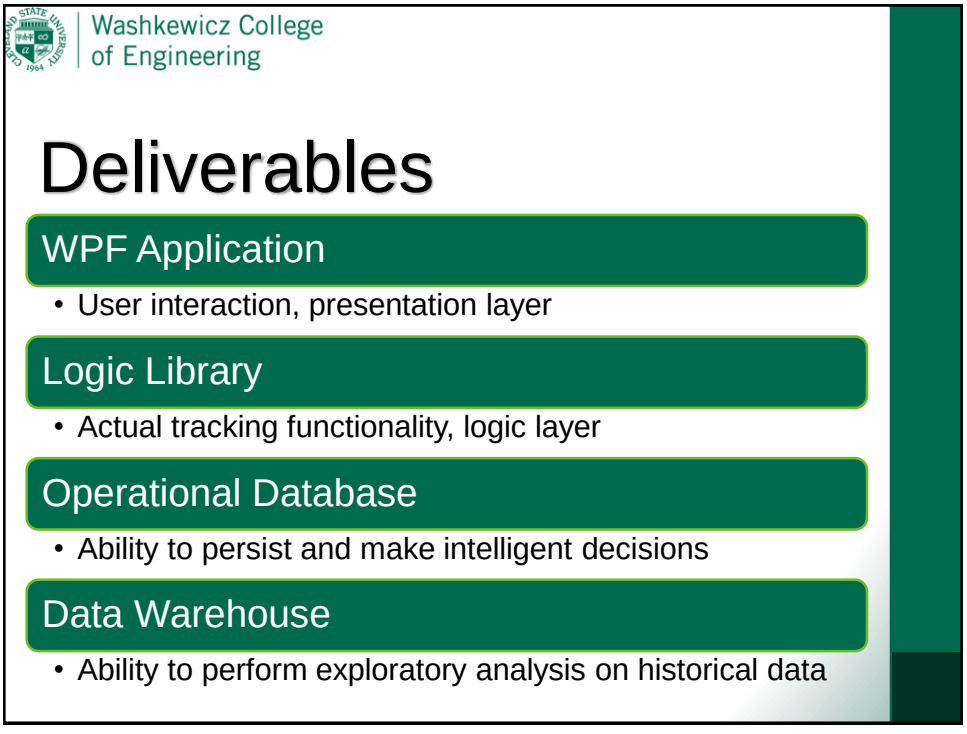
Project Management
Deliverables
Budget
Communication
& Planning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Deliverables
WPF Application
• User interaction, presentation layer
Logic Library
• Actual tracking functionality, logic layer
Operational Database
• Ability to persist and make intelligent decisions
Data Warehouse
• Ability to perform exploratory analysis on historical data

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Budget

Cloud Processing	•$0
Camera Implementation	•$0
Software Licenses	•$0

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Communication & Planning

Development Strategy

- Agile Approach

Version Control

- Visual Studio Online (Git based)

Communication & Task Management

- Visual Studio Online (Scrum Manager)

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Market Potential

In 2013

- Video surveillance - $14.98 billion
- VSaaS - $1.94 billion

In 2020

- Video surveillance - $48.32 billion
- VSaaS - $6.28 billion

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Our Estimation

- 10 million cameras
- $10 per camera per month
- $100 million per month
- $1.2 billion per year and growing

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Timeline

Task Name	Start Date	End Date	Duration	% Complete
Section 1 - Research	**10/02/15**	**12/04/15**	**46d**	**59%**
Sub-task1 - Research and Learn Computer Vision Techniques	10/02/15	10/16/15	11d	100%
Learn OpenCV API	10/16/15	10/22/15	5d	25%
Research tracking methods algorithm design				
Section 2 - Development				
Develop CV Tracking Algorithm				
Develop serverside logic and database schema	12/25/15	02/22/16	42d	
Develop clientside application	12/25/15	02/22/16	42d	
Develop RESTFUL API for easier maintenance	12/25/15	02/22/16	42d	
Section 3 - Implementation	**02/23/16**	**05/02/16**	**50d**	
Spin-up a server with serverside logic	02/23/16	04/25/16	45d	
Deploy client application to DigitalOcean	02/23/16	04/25/16	45d	
Unit and System Testing	03/01/16	05/02/16	45d	
Create tests	03/01/16	05/02/16	45d	
Perform tests until success	03/01/16	05/02/16	45d	

Design

- Architecture Diagrams
- Process Flow Diagrams

Fall 2015

Spring 2016

Development

- Logic and Algorithm Development
- System Architecture Development

Gantt Chart Representation

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Questions

- Design Objectives
- Technical Approach
- Project Management
- Deliverables
- Budget
- Communication & Planning
- Market Potential
- Timeline