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

Background

More Captured Suspects → Less Repeat Offenders → Less Campus Crime → Safer Campus for Students and Faculty
Design Objectives

Maximize

- Accurate Detections
- Usability
- Utility and Relevance

Minimize

- False Readings
- Network Usage
- Interaction and Setup

Technical Approach

Unmet Needs
Design Concepts
Selected Design
Technical Specifications
Unmet Needs

Real-time analysis

Multiple-camera tracking

Uninterrupted Surveillance

Ground-level Analytics

Technical Approach

Unmet Needs

Design Concepts

Selected Design

Technical Specifications
Measuring Design Feasibility

Effective (Solves Current Issues) vs. Efficiency (Scalable, Performance Driven)

Technical Approach

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

- Scalable
- Cost Effective
- Secure
- Flexible

Feasible Design

---

**Technical Approach**

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

Algorithm Design

Detection
Tracking

System Architecture

Layered Design
Scalable
Effective

Distribution & Maintenance

Software Delivery
Updates, User Support

Algorithm Design

Computer Vision Library

Detect
Track
Make Decisions
Detect

[Image of a computer screen showing a software application with a code editor and a window displaying a video feed with a 'Pause' button.]
Make Decisions

- ID
- Match
- Detect Crime

Active Suspect Tracking

System Architecture

Presentation Layer

Business Logic Layer

API

Operational Database

Operational Database

Data Warehouse

OLAP System
Presentation Layer

- Navigation Bar
- Areas
  - Chases
- Item Detail
- Item Detail Details
- Chase Attributes
- Video Feed Attributes
- Campus Map
  - Shuffle
  - < >

Business Logic Layer

Independent
- Logic remains unchanged

Controller
- Holds algorithm and data access logic
Database Layer

Independent
- Does not concern itself with logic layer details

Optimized
- RDMS is efficient and capacity is near limitless

Operational Entity-Relationship Diagram

- Presentation Layer
- Business Logic Layer
- Operational Database
- API
- Operational Database
- Data Warehouse
- OLAP System

Big Data Analytics

Operational Entity-Relationship Diagram

- Presentation Layer
- Business Logic Layer
- Operational Database
- API
- Operational Database
- Data Warehouse
- OLAP System
Project Management

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
Budget

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

Communication & Planning

Development Strategy
• Agile Approach

Version Control
• Visual Studio Online (Git based)

Communication & Task Management
• Visual Studio Online (Scrum Manager)
Market Potential

In 2013
- Video surveillance - $14.98 billion
- VSaaS - $1.94 billion

In 2020
- Video surveillance - $48.32 billion
- VSaaS - $6.28 billion

Our Estimation
- 10 million cameras
- $10 per camera per month
- $100 million per month
- $1.2 billion per year and growing
### Questions

**Design Objectives**

**Technical Approach**

**Project Management**

**Deliverables**

**Budget**

**Communication & Planning**

**Market Potential**

**Timeline**