

## Competitors

### Human Behaviour Detection System (HBEDS)

**Product:** HBEDS is a system that detects violent behavior, such as one person physically assaulting another, in real-time using computer vision and machine learning techniques.

**Market State:** The market for HBEDS is primarily focused on correctional facilities, such as prisons and detention centers, where detecting violent behavior among inmates is crucial for maintaining safety and security.

**Similarities:** Both VigilHeat and HBEDS utilize computer vision and machine learning to analyze surveillance footage and detect specific behaviors. Additionally, both products provide real-time alerts to security personnel to prevent potential incidents.

**Differences:** The primary difference between VigilHeat and HBEDS is their target market and use case. While VigilHeat is designed to provide valuable insights and data to various industries, such as retail stores and manufacturing facilities, HBEDS is primarily focused on detecting violent behavior in correctional facilities.

### Road Accident Detection From Surveillance Videos (RADFSV)

**Product:** RADFSV is a system that detects road accidents in real-time using computer vision and machine learning techniques, enabling immediate response by emergency services.

**Market State:** The market for RADFSV is focused on transportation authorities and organizations responsible for maintaining road safety.

**Similarities:** Both VigilHeat and RADFSV utilize computer vision and machine learning to analyze surveillance footage and detect specific behaviors. Additionally, both products provide real-time alerts to appropriate personnel for immediate response.

**Differences:** The primary difference between VigilHeat and RADFSV is their focus and use case. While VigilHeat is designed to provide valuable insights and data to various industries, such as retail stores and manufacturing facilities, RADFSV is specifically focused on detecting road accidents for immediate emergency response.

## User Hypotheses

Based on the target user groups described for VigilHeat, the following UX Personas can be created:

**Retail Manager Rachel:** Rachel is a retail store manager who is interested in optimizing her store's layout and product displays to increase sales and enhance customer experience. She is in her late 30s, with a background in business management, and has experience in retail sales. Rachel is interested in using VigilHeat to analyze customer behavior and interactions with different products to determine which items are generating the most interest or attention. She values data-driven insights to improve business operations and achieve sales goals.

**Manufacturing Engineer Mark:** Mark is a manufacturing engineer who works in a large production facility. He is in his mid-40s and has a degree in mechanical engineering. Mark is interested in using VigilHeat to analyze worker interactions with equipment, identify potential safety hazards, and inefficiencies in the manufacturing process. He values data-driven insights to optimize workflows, improve employee safety, and increase productivity.

**Condominium Manager Catherine:** Catherine is a condominium manager who is responsible for the safety and security of her residents. She is in her late 40s and has experience in property management. Catherine is interested in using VigilHeat to enhance security in her condominium complex by analyzing footage from surveillance cameras, detecting and alerting security personnel to any suspicious activities such as car theft or unauthorized entry. She values data-driven insights to prevent crimes and provide peace of mind to the residents.

These personas are based on typical users who would benefit from using VigilHeat in their respective industries. By understanding the needs and goals of these personas, VigilHeat can design a user-centered solution that addresses their specific pain points and provides them with valuable insights to optimize their operations and enhance their overall performance.

## Market Position

VigilHeat's market position is one of providing a significantly new and innovative solution for analyzing surveillance camera footage using advanced computer vision and machine learning techniques. While there are existing solutions that provide some level of analysis of surveillance footage, VigilHeat promises to deliver valuable insights and actionable data to various industries, including retail stores, manufacturing facilities, transportation hubs, and condominium complexes.

VigilHeat's advanced HOI models can detect and recognize objects and humans in real-time with high accuracy, providing comprehensive analysis of surveillance footage. Its ability to analyze human-object interactions and provide real-time alerts to security personnel is a significant improvement over existing solutions, which may only provide basic object detection or motion detection.

VigilHeat's market position is further strengthened by its scalability and ease of

integration with existing security systems. It can be easily deployed and used with IP cameras, providing businesses with greater flexibility and ease of use.

Overall, VigilHeat's market position is one of providing a cutting-edge solution that utilizes the latest advancements in computer vision and machine learning to deliver valuable insights and data to various industries, empowering businesses to optimize their operations, improve customer experience, and enhance security measures.

## User KPI Definition

**For the VigilHeat project, several user KPIs can be defined to measure its effectiveness:**

1. **Detection Accuracy:** This KPI measures the accuracy of VigilHeat's HOI models in detecting human-object interactions in surveillance footage. It can be calculated by comparing the number of correctly detected interactions to the total number of interactions in a given timeframe. This KPI can be measured and presented through performance reports that show the number of correct detections, false positives, and false negatives over time.
2. **Detection frequency:** This KPI measures the response time of VigilHeat in detecting human movement and human-object interactions. It can be calculated by measuring the number of video frames that the product can process in a second. This KPI can be measured and presented through performance reports that show the average detection frequency over a given timeframe.
3. **Efficiency:** This KPI measures the efficiency of VigilHeat in detecting and analyzing surveillance footage. It can be calculated by measuring the number of surveillance footage streams that VigilHeat can analyze simultaneously. This KPI can be measured and presented through performance reports that show the number of streams analyzed simultaneously over a given timeframe.
4. **User Satisfaction:** This KPI measures the satisfaction level of VigilHeat's users. It can be calculated by conducting user surveys and measuring user satisfaction scores. This KPI can be measured and presented through user satisfaction reports that show the average satisfaction score over a given timeframe.

These KPIs can be calculated and measured through the use of performance monitoring and analysis tools. Performance reports and user satisfaction reports can be generated to present the KPIs in a provable way. For example, performance reports can show graphs and charts that illustrate the number of correct detections, false positives, and false negatives over time. User satisfaction reports can show graphs and charts that illustrate user satisfaction scores over time. These reports can be shared with stakeholders to demonstrate the

effectiveness of VigilHeat in achieving its goals and objectives.

**From the users' perspective, the effectiveness of VigilHeat can also be measured by specific KPIs:**

For Retail Manager Rachel, a possible user KPI could be the average sales conversion rate per customer. This can be calculated by dividing the total number of sales by the total number of customers, measured over a period of time (e.g. a day, a week, a month). This KPI can be measured by comparing the conversion rate before and after implementing VigilHeat's insights on product displays and layout optimization.

For Manufacturing Engineer Mark, a possible user KPI could be the average time taken to complete a production cycle. This can be calculated by measuring the time taken to complete a full production cycle, from start to finish, and averaging it over multiple cycles. This KPI can be measured by comparing the production cycle time before and after implementing VigilHeat's insights on workflow optimization and safety hazard identification.

For Condominium Manager Catherine, a possible user KPI could be the number of reported security incidents per month. This can be calculated by tracking the number of security incidents reported each month, such as car theft or unauthorized entry, and comparing it before and after implementing VigilHeat's real-time alert system. The KPI can be presented in a provable way by showing the decrease in the number of reported incidents after implementing VigilHeat's real-time alert system.

While these user KPIs are basic, they can be used to measure the effectiveness of VigilHeat's insights and its impact on the users' business operations.

## Target User KPI

For the VigilHeat project, the target user KPIs will depend on the specific needs and goals of each user persona. However, some possible targets for the user KPIs could be:

- Retail Manager Rachel: Increase sales conversion rate by 5% within 3 months of implementing VigilHeat's insights on product displays and layout optimization.
- Manufacturing Engineer Mark: Reduce production cycle time by 10% within 6 months of implementing VigilHeat's insights on workflow optimization and safety hazard identification.
- Condominium Manager Catherine: Reduce the number of reported security incidents by 20% within 3 months of implementing VigilHeat's real-time alert system.

It is important to note that these target user KPIs are not guaranteed and may not be achievable in all cases. They are simply intended as realistic goals for

the users to work towards with the help of VigilHeat's insights and data-driven recommendations. The actual results may vary depending on various factors such as the user's current business operations, market conditions, and external factors beyond VigilHeat's control. Nonetheless, by setting these targets and working towards achieving them, the users can strive to improve their operations, increase productivity, and enhance security measures with the help of VigilHeat's advanced computer vision and machine learning capabilities.

## The scope of the MVP

In the context of Advanced Software Technology development, **our scope has to be narrower than described above**. For the end of the semester, our goal is to deliver the MVP for the **retail store use-case**, focusing on only analyzing the duration of people's stays in given places seen by the cameras.

**Our Target User KPIs for the end of the semester are:**

- Detection accuracy of at least 75%.
- Detection frequency of at least 10 frames per second.