BUSINESS CASE

PROJECT TITLE	CovaCare
DATE	October 31, 2024
SUBMITTED BY	Brydon Herauf & David Kim

EXECUTIVE SUMMARY

This project focuses on the development of a computer vision-based accident detection system aimed at enhancing safety for the elderly and disabled within residential settings. This system will use advanced computer vision and machine learning technology to detect slips, falls, and prolonged inactivity in real time. Upon detection of an incident, the system will promptly notify designated emergency contacts, ensuring timely intervention and reducing the risk of severe injuries or fatalities.

PROBLEM STATEMENT

According to the Public Health Agency of Canada, falls are the leading cause of injury-related hospitalizations and deaths among individuals aged 65 and older in Canada. Approximately 52% of these falls occur within household residences, and many incidents go unnoticed at first. If there were a way to quickly and reliably notify caregivers after an accident took place, people could get the timely help they need. Current solutions, such as wearable devices, suffer from limitations including user compliance and restricted functionality, highlighting the need for a more reliable and comprehensive monitoring system.

Source: Surveillance report on falls among older adults in Canada – Public Health Agency of Canada, 2020. (Link)

PROPOSED SOLUTION

Our solution utilizes state-of-the-art computer vision and machine learning to perform real-time video analysis for detecting slips, falls and prolonged inactivity based on surveillance in the home. Key features include:

- Real-Time Detection: Continuously process video feeds from cameras to identify incidents as they occur.
- Automated Alerts: Sends immediate notifications via texts, emails, and/or phone calls to designated emergency contacts upon detection of an incident.
- User Customization: Provides a user-friendly application interface that allows individuals to configure emergency contacts and adjust the model to suit personal needs.

COST ANALYSIS

Item	Estimated Cost (CAD)	Details
Machine Learning	$600	- Cloud Services: Up to $500 for approximately 100 hours of GPU usage during development and training. - Storage & Data Transfer: $0 - $100 for storing datasets and data transfer fees.
Hardware	$100	Camera: Up to $100 for high-quality video capture, for demo purposes.
Software and Tools	$25,000	- Commercial Licensing Fee: Annual fee for OpenPose usage in commercial applications. - Open-Source Software: Utilizing free libraries such as OpenCV, TensorFlow, or PyTorch.
Development Time and Labor	$15,000	- Labor Costs: Up to 600 hours of combined effort at $25/hour for both team members.
Total Estimated Cost	$40,700	

BENEFITS AND RETURN ON INVESTMENT

Falls and related incidents occurring in homes are a massive contributor to hospitalizations in Canada. By improving medical response time, our solution will help to reduce the severity of these accidents. As a result, it may have a positive impact on the healthcare system overall.

Considering that customers have different usage needs—ranging from short to long-term access—we believe a subscription model suits this product best. An initial setup fee would be required for installing cameras and hardware, which might be done by a separate company. We could sell our software specifically, at a rate of $30/month.

Assuming a target market of 500 households:

- Revenue= 500 units * $30 * 12 month = $180,000 annually
- Net Profit = $180,000 - $40,700 = $139,300 in the first year, $155,000 in following years.

ROI = ($139,300 / $40,700) * 100% ≈ 342%

RISKS AND MITIGATION

Risk	**Mitigation Strategy**
Privacy Concerns	Ensure data is processed locally where possible.
Training Data Availability	Utilize publicly available datasets and supplement with custom data collection.
False Positives and Negatives	Train models with diverse data to reduce inaccuracies, and experiment with several approaches. Warn users that our system is not %100 accurate and should be used only to enhance safety.
User Errors	Design an intuitive and user-friendly interface.
Developer Availability (e.g., Illness or Incident)	Plan for potential disruptions by maintaining clear project documentation and shared access to code and resources.

IMPLEMENTATION PLAN

Our comprehensive implementation plan is detailed in this Gantt Chart, which outlines activities and timelines for the development, testing, and presentation of this project.