TECH OFFER

Accelerating Vision-Based Artificial Intelligence Development With Pre-Trained Models

KEY INFORMATION

TECHNOLOGY CATEGORY:
Infocomm - Artificial Intelligence
Infocomm - Video/Image Analysis & Computer Vision
Infocomm - Video/Image Processing

TECHNOLOGY READINESS LEVEL (TRL): TRL7
COUNTRY: SINGAPORE
ID NUMBER: TO174731

OVERVIEW

Vision-based Artificial Intelligence (AI) models require substantial time to train, fine-tune and deploy in production. After production, this process is still required when performance degrades and re-training on a new dataset becomes necessary; this maintenance process exists throughout the model's lifetime to ensure optimal performance. Rather than embarking on the time-consuming and painful process of collecting/acquiring data to train and tune the AI model, many organisations have turned to the use of pre-trained models to accelerate the AI model development process.

This technology consists of a suite of pre-trained models that are intended to detect food, human behaviours, facial features and count people. These AI models are operable on video footage and static images obtained from cameras. Models are tuned and trained on various use-cases and are accessible via API calls or embedded within software as a Software Development Kit (SDK) library.

These models can be deployed as AI as a Service on Microservices platform providing customer data protection with blockchain technology. With customer protection enhanced with blockchain technology, AI Model performance can further be enhanced to meet customer requirement.

TECHNOLOGY FEATURES & SPECIFICATIONS

The technology consists of a suite of pre-trained AI models that provide high accuracy (over 80%) and can be further customised to improve accuracy and adapted to different use-case scenarios. Models can be integrated in the following ways:

1. Installed library package embedded within software on-device/on-premise
2. HTTP-based Application Programming Interface (API) calls with video/image data to cloud-installed library package

The following are the features for various AI models:

Abnormal Behaviour Recognition

- Continuous monitoring and detection of abnormal human behaviours e.g. fighting, loitering

Event Detection

- Recognises a variety of subjects and events e.g. sports day, graduation, wedding, festival, Christmas, from video footage
- Optimised for lightweight compute capability (Intel OpenVino)

Food (Fresh and Packaged) Recognition

- Real-time detection of fresh and packaged foods
- Detects abnormal fresh food or defective packaged food
- Classifies food types e.g. lotus, spinach, cucumber, radish etc.
- Optimised for low compute capability

Privacy-Preserving Person Recognition

- Privacy preserved people detection, counting and human activity recognition
- Images are blurred to preserve private information that can lead to personal identification (irreversible)
- Optimised for lightweight edge computing

Free (Empty) Space Recognition

- Semantic segmentation to identify empty spaces
- Customisable for any free-space detection scenario
- High accuracy in night scenes

Safety Monitoring

- Object detection with prohibited and allowed zones (e.g. person or forklift)
- Detects and identifies safety risks associated with safety distances
- Enables audible alarm systems of abnormal situations

Wellbeing and Safety Detection

- Automatically detects and classifies nudity images from images
- Enables alerts to be delivered to parent/caregiver's device
- Customisable to detect new categories of inappropriate content

POTENTIAL APPLICATIONS

This technology offer comprises a suite of AI models for the following applications:

Abnormal Behaviour Recognition

- Public areas or areas where social order needs to be maintained e.g. food & beverage, entertainment establishments

Event Detection

- Automatic creation and/or organisation of media content i.e. photo classification
- Automated adjustment of device hardware parameters e.g. audio, colour, brightness when displaying specific types of content e.g. sports

Food (Fresh and Packaged) Recognition

- Food stock level detection, food inventory management
- Automatic detection of fresh/packaged goods within a constrained area

Privacy-Preserving Person Recognition

- Privacy protection of visual information, in high traffic areas, without deterioration of video quality

Free (Empty) Space Recognition

- Vehicle position localisation on roads
- Navigation (free-space localisation) in partial/fully self-driving automotive vehicles
- Identification of free storage spaces in the logistics industry

Safety Monitoring

- Automated compliance checks
- Workplace safety analysis and tracking

Wellbeing and Safety Detection

- Parental control in browsers, smartphones or other image storage devices e.g. Network Attached Storage (NAS), Solid State Drives (SSD)

UNIQUE VALUE PROPOSITION

AI Models were rigorously tested in the fields of different scenarios. The microservice platform where AI Model ingest the visual data streams offers a secure customer data protection and privacy using blockchain technology. Making this Microservice

platform capable of tracking customer's data usage and thus ensure privacy when AI model operating on the platform are simultaneously improved using unique customer data captured on customer's premise.

- Accelerate AI development - eliminate the need for dataset creation, annotation, tuning and testing
- Customisable AI models - fine-tuned to environment and condition
- Operational support to continuously improve AI accuracy from newly collected data