

# Disruptive Technologies Innovation Fund (DTIF)

## Video Intelligent Search Platform (VISP)

Kinesense Ltd, Overcast HQ Ltd and Trinity College Dublin (TCD)

The [Disruptive Technologies Innovation Fund \(DTIF\)](#) is a €500 million challenge-based fund established under Project Ireland 2040.

**Location:** Dublin

**Responsible:** The Department of Enterprise, Trade and Employment

**Approved:** Call 2 (2019)

**DTIF Amount Awarded:** €1.5 million

**Current Status:** Complete

**Outputs:** Collaborative research; Video exploitation using artificial intelligence (AI); Novel Cloud Optimisation Techniques; Resulted in several novel AI technologies; High potential for the criminal justice market; Winner of multiple AI awards; 12 Papers published

## Overview

The oldest known video is the Roundhay Garden Scene, filmed on 14 October 1888. Since then, technological advancements have significantly transformed the way we record and consume video. As a tool, it has served various purposes from disseminating misinformation, to documenting significant historical events such as WW2 or the Tiananmen Square protests. It has been used to monitor and control people's movements and behaviour but also for fighting injustices, fostering creativity, enhancing education, and contributing to a safe and secure society. Video's integration into mobile phones has transformed the way we communicate, access information, and connect with others. Society as a whole is inundated with video content, generating billions of hours of video per year. This is supplemented by drones, smartphones and body cameras. It is estimated that over 200,000 petabytes (equivalent to 200 billion gigabytes) of raw video will be recorded in 2024 with this figure expecting to rise as technology continues to advance and allowing for the production of higher resolution video content.

Kinesense Ltd, Overcast HQ and Trinity College Dublin (TCD) have developed an innovative, intelligent, cloud-based digital platform that has incorporated artificial intelligence (AI) to exploit video as a resource, providing new insights and new market opportunities. Building on previous research and early-stage prototyping, the consortium developed a platform that will enable the transcoding, analysis and distribution of video using AI analytics and cloud-based processing technologies. The platform has won multiple awards and has huge potential to exploit video for the criminal justice system, media, and entertainment markets. The platform continues to receive global recognition from large multinationals.

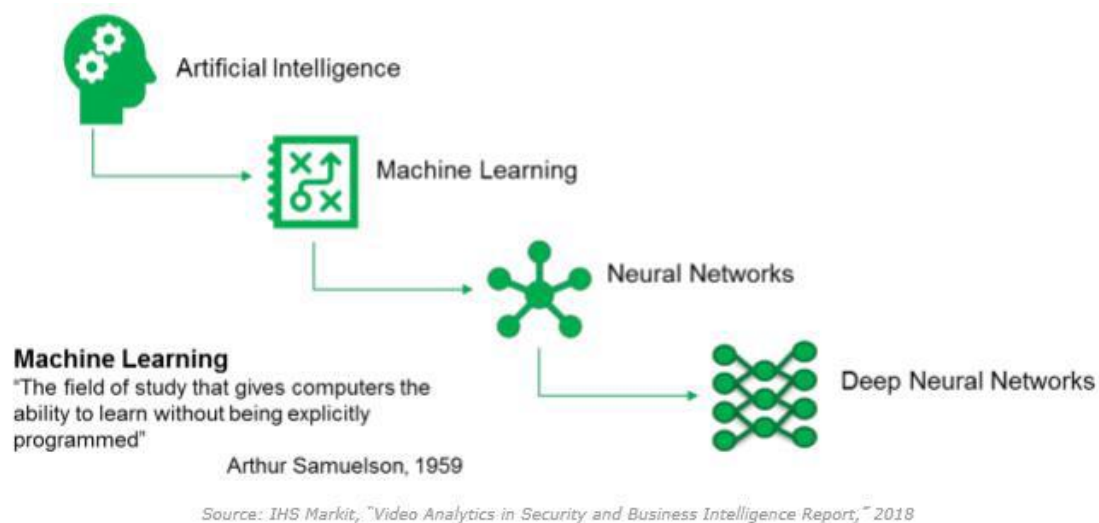
## Inputs

Over the course of the project 18 jobs were created. Kinesense Ltd created two full time positions and sustained a third. TCD created 11 and sustained two, and Overcast HQ hired 5 new developers. It is expected that these numbers will increase as the VISP platform is commercialised through a vigorous sales and marketing campaign.

The VISP project was awarded €1.5 million in funding. Both Kinesense and Overcast HQ were eligible for pre-finance, giving them an instant financial injection of funds. The prefinance was important to the success of the project as it facilitated the procurement of staff and materials shortly after award announcement.

## Activities

VISP is built on existing research to develop and enhance the workflow platform technology in application scenarios. Using artificial intelligence video analytics and cloud-based processing technologies with a machine learning or rule-based approach, Kinesense, in conjunction with Overcast and Trinity College Dublin, sought to develop a deep learning neural network capable of identifying certain characteristics in a video or image of the most likely match rather than an extensive and time-consuming review of thousands of matches. Accomplishing this required each consortium partner to participate in the development of advanced algorithms. These were then applied to the application programming interface (API), designed and developed by Overcast HQ.



While traditional machine learning can identify basic characteristic for example dog or cat, deep neural algorithms can identify characteristics on a significantly higher level of detail. For example, they can differentiate between different breeds, colours, and other meaningful details. These capabilities extend to the person attribute recognition which can identify features like gender, clothing style or accessories such as a hat, glasses and so on.

The disruptive potential of this project is apparent as it can be applied to various sectors and scenarios. It aims to significantly impact major incidents and combat organised crime by simplifying video processing with search technologies.

By leveraging a cloud-based platform, the transfer of evidence will be instantaneous, accelerating evidence handling but also underscores the platforms operational efficiencies.

Algorithms require large quantities of video data to train the models capable of identifying multiple attributes.

## Challenges

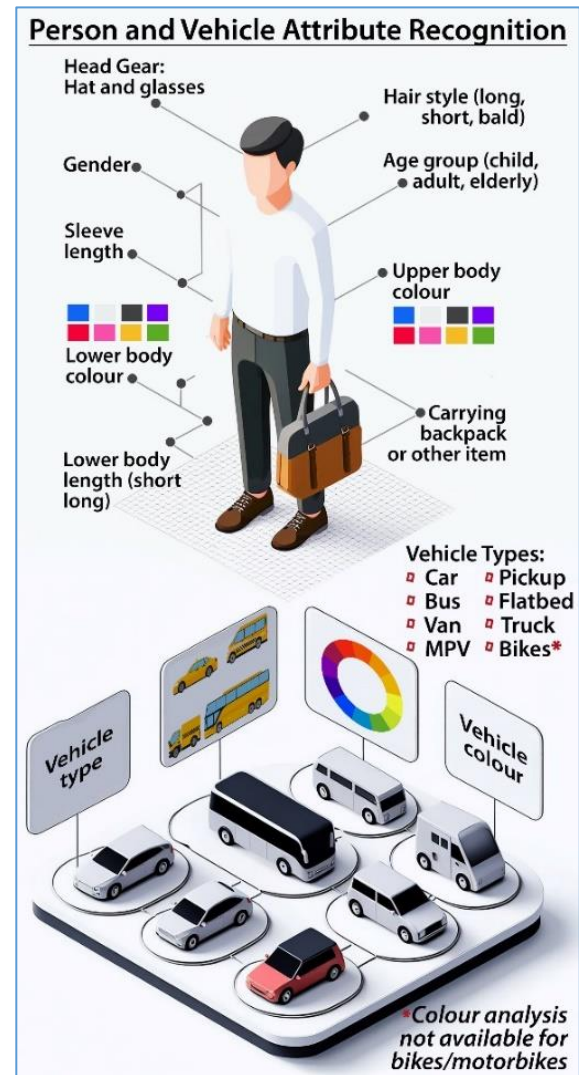
Open-source imagery and video data sets would not have been suitable for this project. The data used in this project was obtained from CCTV recordings, with the consent of the appropriate governing authority. Consequently, protecting the privacy of individuals whose identities could be verified from this footage was a primary challenge.

Data that is capable of identifying someone's individuality must be used, accessed and stored in strict compliance with the general data compliance regulation (GDPR).

To mitigate any breach in the use of surveillance data, the material used to 'train' the neural network was collected and retained only for the duration necessary to fulfil the project objectives. Excessive retention of personal information could lead to serious legal and ethical implications.

Another challenge in the development of the project was ensuring that the application was accessible and usable to all. Many users are not likely to have a technical background. To accommodate for this, AI models were converted to a universal format that works across different platforms, and crucially, did not require users to install or configure complicated drivers and tools. This allowed users to leverage GPU acceleration that works seamlessly without dealing with technical setup hassles.

It was necessary to maintain the satisfactory levels of communication both externally and internally however this proved particularly challenging during the COVID-19 pandemic. The projects partners were required to adapt to uncertain work environments and market changes.



## Lessons learned

One of the main challenges was to design and develop a platform that is easy to install, easy to use, user interface with a focus on user experience. Easy installation of software and training of AI models. Platform has the potential to significantly reduce workload and make gathering of evidence obtained from CCTV and other video recording devices seamless and almost instantaneous. Using a cloud-based digital platform will remove the use of physical media.

Beta clients evaluated the cloud evidence and case management software. This gave the consortium a better understanding of the industry needs system has been on trial with those in the criminal sector.

All project partners collaborated closely from the outset. With regular meetings, they built a strong consortium providing each other with advice on technological improvements while discussing industry needs and perspectives.

## Outcomes

This project has received strong end-user feedback, specifically those in the criminal justice market. It is the recipient of multiple awards including “best use of AI in an SME” and more recently the “2024 SME of the year” from Analytics Institute Ireland. As a result, VISP has gained significant recognition which led to its application to a high-profile case in the UK. Over 150,000 hours of CCTV surveillance was obtained for evidence. This amount of video would have taken considerable time and manpower to accurately examine and compile. The video was inputted into the VISP software and extracted the evidence within a short amount of time. It saved 95% of the resources typically used to extract such information. This level of efficiency saved a considerable amount of resources which almost guarantees a quick return on investment, eliminating the costly physical transfer of assets and evidence.



Looking at next steps, The Project is now ready for commercialisation as Kinesense’s Digital Evidence and Asset Management (DEAM) solution will make the management and sharing of assets and evidence much easier with its cloud platform. This ensures that evidence is shared and removes and risks associated with the transportation of physical media storage, for example DVDs and USBs.

There were several IPs developed during this project, as follows:

- Automatic Video Codec Identifier
- Accelerated Video Processing Using Compressed Domain Features
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- Optimised Transcoding using ML (Adaptive Lagrange Multiplier)
- Robust Person-Redaction
- Video Algorithm deployment at scale

## Testimonials

The project was met with a number of challenges, namely COVID, as it required the project partners to adapt to new work and market conditions. Despite these challenges it was noted that “The Fund was at all times supportive”.

## Further information

DTIF submission video: [DTIF Kinesense - YouTube](#)

Project overview video: [Kinesense LE Overview - YouTube](#)