

WHITEPAPER

The Business Case for Face Recognition

By Ben Virdee-Chapman, CDO, Kairos

The Business Case for Face Recognition

Introduction

Kairos is a Human Analytics platform, using computer vision algorithms to measure faces in images, videos, and the real-world. Through face recognition and machine learning, we're giving businesses the building blocks to integrate the benefits of face analysis into any product, app or service.

“People are the fundamental interface of all businesses. If machines can know who a person is, and how they feel, incredible experiences can be unlocked”

- Ben Virdee-Chapman, CDO, Kairos

Face recognition the market

The global face recognition market is booming. With a compound annual growth rate of 27.7% from 2013 to 2018, the market will grow to an estimated \$6.5 billion by 2018. Major forces of growth behind the market are the evolving surveillance market and government expenditures in the arena of biometric technologies; yet, the use of face recognition has much to contribute in other areas such as payroll administration, advertising, automotive, media, digital out of home, tourism, and even in the medical field.

Originally more science fiction than reality, it lacked precision and scalability; that is no longer the case. Some of the world's largest companies have acquired and implemented face recognition technology in recent years. It's now become the heart of many modern businesses and continues to impact across multiple industries. Face recognition has come a long way since its inception in the 1960s.

Today, face recognition match rates continue to increase every year. Moreover, while a lack of controlled environment for images previously made face recognition near useless, current technology has exponentially improved accuracy and performance. Face recognition technology continues to develop now using deep learning models to maintain high accuracy when accommodating for an uncontrolled facial pose.

These developments have helped transition facial recognition from mostly specialized technology into a commercialized innovation.

Kairos' Solution

Face recognition, machine learning, cognitive computing - these are all technical terms that can get confusing at times. With Kairos you don't have to be an expert, we've done all the hard work for you. Kairos removes the complexity of using face analysis with simple to integrate APIs and SDKs, that any developer can use.

This white paper will explain our technology so when you use our tools you will see that they have been designed to be simple and flexible to suit diverse use cases.

Face recognition: breaking it down

The human face is the most accessible way in which we are able to understand who someone is and how they might be feeling. And how someone might feel can give us clues to how they might behave. Data about the face is key to this understanding.

Being able to recognize individual faces or reading someone's emotional reaction is often crucial to a business' operation. Recognition must be quick and accurate, regardless of whether it is to prevent unauthorized persons from entering a restricted area or to determine customer's feelings about a new product. So far, this has primarily been an assignment for security, marketing staff, etc.

An automated process for face recognition, based on specially developed software analyzing video streams, from network cameras, not only allows for a faster and more flexible and distributed system but will also improve overall service for a business and customers.

In brief Kairos face recognition:

- Auto-corrects for pose and optimizes images for low-light environments.
- Is unsusceptible to facial hair, weight change or accessories like glasses.
- Tracks faces based on the features captured in the first image, without the need to recapture the image each additional time the face shows up.
- Algorithmically learns about a person's face over time, and adapts to each person's unique features and expressions.

Kairos face recognition and why it's better

We believe we are the best all round face recognition provider on the market. Our fanatical support, enterprise expertise, and industry leadership means you're in safe hands. Kairos removes the stress of integrating a complex software so you can get on with what you do best - running your business.

The majority of face recognition companies on the market use face recognition algorithms that are suited to controlled or constrained images e.g., straight on, portrait style photos. Yet when a person changes their appearance, stands in bad light or doesn't pose directly towards a camera it can throw performance out the window. In other words, they are not designed for how people *actually* behave in the real world.

Conditions such as lighting, pose or face accessories won't affect our results; in fact, it helps our system learn.

KAIROS ADVANTAGES

- Proprietary face analysis and machine learning algorithms.
- Multiple delivery options (Cloud APIs and Offline SDKs).
- Long form video analysis & large size image processing.
- Incredibly small facial templates.
- Unlimited face galleries.
- Lightning fast results.
- Facial feature tracking (this outperforms traditional face detection tracking).
- Deeply focused on face analysis.
- Privacy and security assured.
- Designed to simplify and streamline face recognition for developers.
- Innovative business model; free to test and tiered to scale with customer growth.
- Round the clock support; rapid response times; integration experts.

Comparing Kairos

To help you decide if Kairos is the right choice for you, we've put together a side-by-side comparison of the best face recognition services on the market. At first glance it may be surprising to see that Kairos offers more than larger household names in technology:

	Kairos	Amazon	Google	Microsoft	IBM Watson	Affectiva	OpenCV
Face Detection	✓	✓	✓	✓	✓	✓	✓
Face Recognition (Image)	✓	✓	✗	✓	✗	✗	✓
Face Recognition (Video)	✓	✗	✗	✗	✗	✗	✓
Emotional Depth (%)	✓	✗	✗	✓	✗	✓	✗
Emotions Present (Y/N)	✓	✓	✓	✓	✗	✓	✗
Age & Gender	✓	✓	✗	✓	✓	✓	✗
Multi-face Tracking	✓	✓	✓	✓	✓	✓	✓
SDK	✓	✗	✗	✗	✗	✓	✓
API	✓	✓	✓	✓	✓	✓	✗
Ethnicity	✓	✗	✗	✗	✗	✓	✗

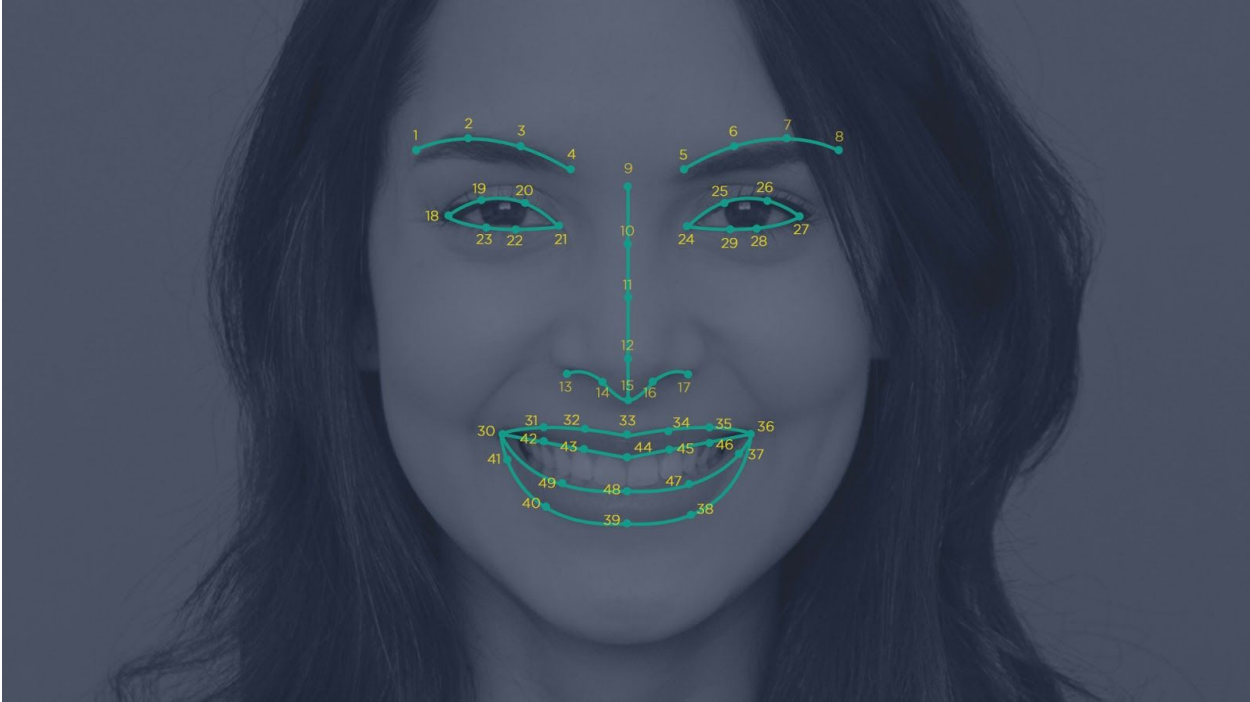
For a more comprehensive review of the best face recognition providers on the market, check out this article we wrote: [Face Recognition: Kairos vs Microsoft vs Google vs Amazon vs OpenCV](#)

KAIROS CORE FEATURES

- Face detection.
- Face identification.
- Face verification.
- Emotion analysis (joy, surprise, sadness, fear, anger, and disgust).
- Demographics (age, gender, ethnicity, attention, dwell, glances, blinks, facial features, glasses).
- Multi-face detection and tracking.

We call the above features 'Human Analytics'. Traditional observation of human behavior generally requires a one-to-one or a one-to-many design. The common tie being that there is technically only "one" observer. Adding technology to the observation task allows for an amplification and scaling of the process.

Incorporating technology as a means to capture human behavior facilitates deeper analysis and the collection of meaningful data about people.



Insights from Human Analytics

Kairos as a platform, where customers utilize multiple capabilities, results in answering more questions about your users and your business. These 'Human Metrics' are derived from Human Analytics. They're measured human responses that we capture for analysis.

Here's some examples of Human Metrics:

Sentiment How do people feel?	Presence How many people are there?
Reach Are you reaching the right people?	Engagement Are people interested?

Going one step further, and combining these metrics, results in computational insights:

- Reach + Sentiment = **Preference** (What do people want?)
- Sentiment + Engagement = **Selection** (Which [X] should we use?)
- Presence + Engagement = **Loyalty** (Do people come back?)
- Presence + Reach = **Identification** (Is this the right person?)

How Kairos face recognition works

Kairos integrates with your existing services so you don't have to do anything differently. Our developer tools (APIs and SDKs) are designed to be easy to use. Kairos can even read faces from the simplest smartphone or tablet camera, all this with just a few lines of code. Getting started with our face recognition is pain-free and we have broken it down into three general uses:

Find faces

Identify, recognize or verify people.

Analyze faces

Identify people's features and demographic.

Understand faces

Identify how people feel and behave.

Our research is based on two key areas: human-to-human and human-to-machine analysis. In simple terms this means our algorithms are designed, and trained, on the way people behave in the real world.

We have studied, and found, that facial expressions are more subtle when interacting with a screen (such as watching a commercial) and more exaggerated when they happen face-to-face (such as a video chat or even an in-person conversation). It's important to understand this when analyzing facial data.

The way Kairos categorizes facial expressions also goes beyond the outdated Facial Action Coding System (FACS) developed by Paul Ekman. This is a common standard on which systems have traditionally been built. Evidential testing strongly supports that FACS puts too much emphasis on 'passive' observable taxonomies. In reality, 'perception' of facial expressions are a better judge of sentiment (e.g., emotional states) and this is also an inherently human trait. For instance people find it hard to distinguish between "anger" and "disgust".

Overcoming business objections to facial recognition

One of the largest challenges that both business leaders and developers face when they wish to try anything new is convincing the decision makers at the top of the organization that they should take a risk on something unproven.

We work with people who are advocates of face recognition and have seen even the most passionate people fail at getting their companies to adopt innovations that would help the business achieve competitive advantages.

What can be done to help convince risk-averse managers to take a chance on your new ideas? In the following section, we describe and solve some of the challenges business leaders must overcome if their companies are to adopt face recognition successfully. Whilst this isn't a definitive list, it is based on the most frequent customer feedback we have gathered from over 5 years of being in business:

Sharing personally identifiable information with a 3rd party

Tokenization and encryption is used by our more sophisticated Enterprise customers, and they are still able to get the results they are looking for; the service lives in their infrastructure further protecting the most sensitive of data.

Using the Cloud

Kairos is built and hosted on Amazon Web Services (AWS), who undergo regular SSAE 16 SOC audits. With SSL Encryption, our endpoint ensures that all data passed between the web server and browsers remain private and integral. *We also make ALL of our face analysis features available via offline and embeddable SDKs. Even when the Cloud isn't an option, we've got you covered.*

Processing large volumes of images or videos

We process many millions of images each month, and experience no crashes due to traffic volume. At times we process tens-of-thousands of images per hour with no disruption to service.

Buying from a Startup

Kairos is designed for the Enterprise. Get peace of mind with SLAs, 24/7 technical support, dedicated integration services, and customized Business Interruption Insurance (a.k.a. Escrow). We are trusted by some of the biggest companies in the world, and our strategic offices cover critical time zones/geographies.

Reselling of data

We do not share or re-sell customer data with any 3rd parties.

Keeping data in your geography

Our Enterprise customers leave their data in their chosen region with AWS or Google Cloud Services.

Accuracy and performance

You can track and match faces at lightning speed. Kairos' face templates are now up to 97% smaller than other providers on the market - you'll really feel the difference. Our patented science and research ensure high match rates in real world scenarios and it performs well in low lighting, and partial face view. With over 500 years of collective experience, Kairos is dedicated to understanding the human face. This means we are able to yield the fastest and most accurate results for any scenario.

Price

We believe our pricing is the most intelligent and adaptable on the market - and we are not afraid to publish those prices. We offer a fully functioning free trial to help you fall in love; we know there is often a test, growth and major expansion phase, even within the maturest of companies. And we ask, what is worth the most to you; the highest quality, the best service, or the cheapest option - why would you trust your investment on a company that does not value its *own* product?

Timing

Integrating a product like face recognition with your core resource will only improve your efficiencies. Your competitors are already reaping the benefits face recognition technology.

Let's not forget, cash is king

We can give you multi-year deals, so you can still get your deductions. Taking the lower amount month-in, month-out means you have more cash for your other business objectives. In today's uncertain times, the cash you will protect could stave off a market downturn.

Addressing the privacy question

At Kairos our vision is clear, we want to make the world a better place by serving humanity with our Human Analytics software. And that isn't just hollow marketing talk - this is a deeply rooted belief that Kairos can have a lasting, positive impact on people's lives. It's a daily mission to listen, support and empower our customers to create experiences that go beyond the nuts and bolts of a product. Together we are creating the future. And with that comes a great responsibility.

This is why we work with companies like [Helping Faceless](#) and encourage [younger generations](#) to use Kairos to positively impact the world.

“Thank you Brian Brackeen! [CEO of Kairos] It's really good to know there are thoughtful companies like Kairos that draw these lines.”

- Alvaro Bedoya, Director, Georgetown Law Center on Privacy & Technology

We have made it a point to keep your information secure, safe, and anonymous. We are hosted at Amazon Web Services (AWS) and are a Standard Technology Partner of AWS. We offer 2048 bit SSL encryption for all data in transit and our backups. For more information on AWS, visit their [compliance page](#).

We also do not store any personal identifiable information and any face template data we create cannot be reverse engineered. Your image classification in Kairos only needs to make sense to you. That means you can use anonymous or tokenized identifiers instead of personal data, such as employee numbers. For example, one of our customers in the healthcare industry assigns randomized numbers to their photographs that they can reverse to actual patient IDs on the client side.

Transform your business with face recognition

Businesses from every industry are using face recognition to add additional value, from increased revenue to smarter data reporting to improved customer experience.

Kairos' Human Analytics platform is the only solution that allows Enterprises to truly enrich the experience between their products and their users. With a single provider you can now design, build and deploy your face recognition projects. With our innovative business model, it's easy to begin testing and scale as you grow.

For more information about integrating with Kairos, visit our [developer](#) section.

Alternatively, if you have questions or need assistance, just send us a message to hello@kairos.com and we'll get you started - we'd love to help you bring the innovation of face recognition to your company.



Kairos' mission is to make it easy for any business to benefit from face analysis, enriching the experience between humans and machines, and being the go-to partner for anything to do with facial recognition.