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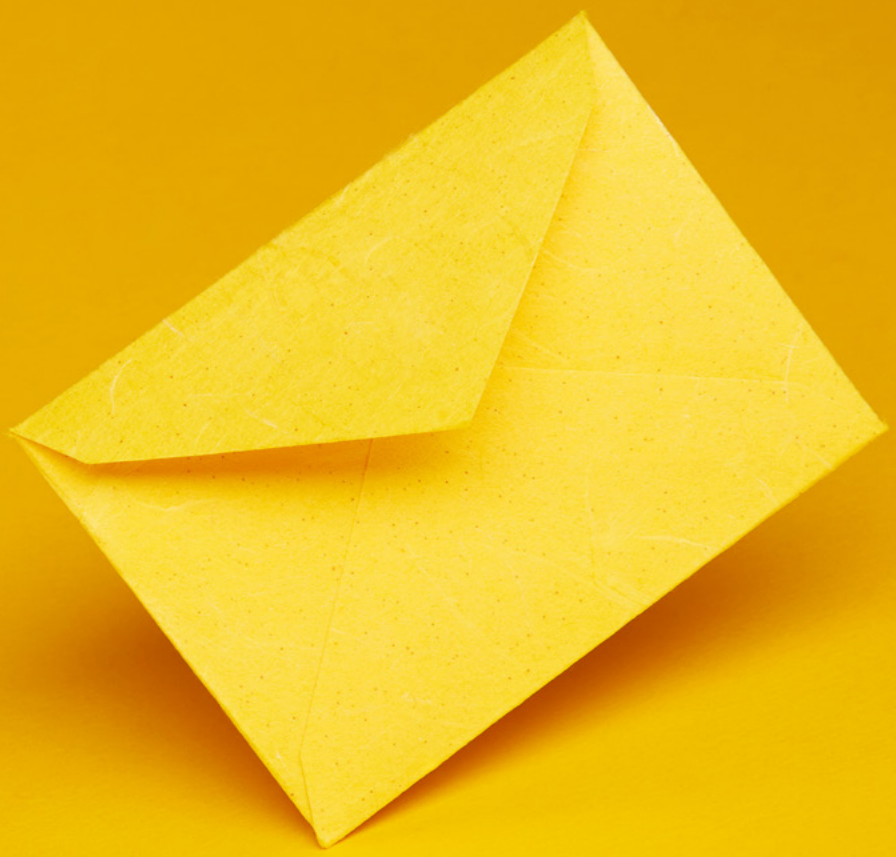

White paper

Innovative age assurance: Email address as the new benchmark for frictionless age estimation

June 2024

www.verifymy.io

Contents

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Executive summary

In the rapidly evolving environment of online interactions, age assurance is becoming a critical component for online platforms looking to maintain their integrity, protect their reputation and safeguard their users. Age assurance encompasses a suite of methods and technologies to verify and estimate users' ages to ensure they meet the minimum age requirements when accessing specific content or making age-restricted purchases online.

Age assurance is undergoing a significant transformation, driven by advancements in technology, evolving regulatory landscapes, and a growing emphasis on user privacy and experience. Businesses are encouraged more than ever to harness technology to introduce proportional age assurance methods that balance ensuring compliance and protection of their brand and revenue stream, with creating a safer, more inclusive and user-friendly online environment for all.

In this white paper, we explore how age assurance has evolved, introduce our latest innovative, robust, and highly accurate method: age estimation using email address, and explore why it's essential that online platforms provide frictionless and privacy-preserving age assurance methods to ensure children have the age-appropriate experiences online that they deserve.

Age estimation using email address internal accuracy testing showed:

2.24%

false positive rate

Out of 847 under-18s tested, we estimated only 19 to be older than they were.

+/-18 threshold

Out of 847 under-18s tested, we estimated only 2 (0.24%) to be over 18 (the most important age for age restrictions).

The maximum error for any one individual is 2 years

Meaning we never overestimated someone to be more than 2 years older than they are.

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What is age assurance?

Understanding age assurance

The UK's Information Commissioner's Office (ICO) defines age assurance as encompassing "a range of techniques for estimating or verifying the ages of children and users". The ICO's Children's Code Age Appropriate Application Standard further outlines expectations for online services likely to be accessed by children using age assurance. They state, "Age assurance plays an important role in keeping children, and their personal information, safe online. It describes tools or approaches that help estimate or assess a child's age and therefore allows services to be tailored to their needs or access to be restricted, where required".

Age assurance has evolved over time and continues to do so at a rapid pace. Many years ago, retailers would have relied on visual assessments to determine an individual's age to sell age-restricted products. The introduction of regulations, such as the establishment of the legal drinking age in the UK via The Intoxicating Liquor Act in 1923 marked the formalisation of age restrictions.

The rise of the internet in the early noughties meant the need for age checks naturally expanded into the online world. Online platforms offering age-restricted products or services or those hosting sensitive content, such as pornography, required a means of identifying whether an online user was of an appropriate age. Initial methods, such as a simple 'yes' or 'no' self-declared tick-box stating whether a user was over 18, for example, were clearly inadequate, ultimately leading to calls for more robust solutions.

Technological advancements and the introduction of AI-driven techniques have meant that safety tech providers can now offer a range of highly accurate, privacy-preserving age assurance methods that protect user privacy, minimise friction, and ensure compliance with ever-evolving regulations.

> *A range of techniques for estimating or verifying the ages of children and users.*
>
> Information Commissioner's Office (ICO)

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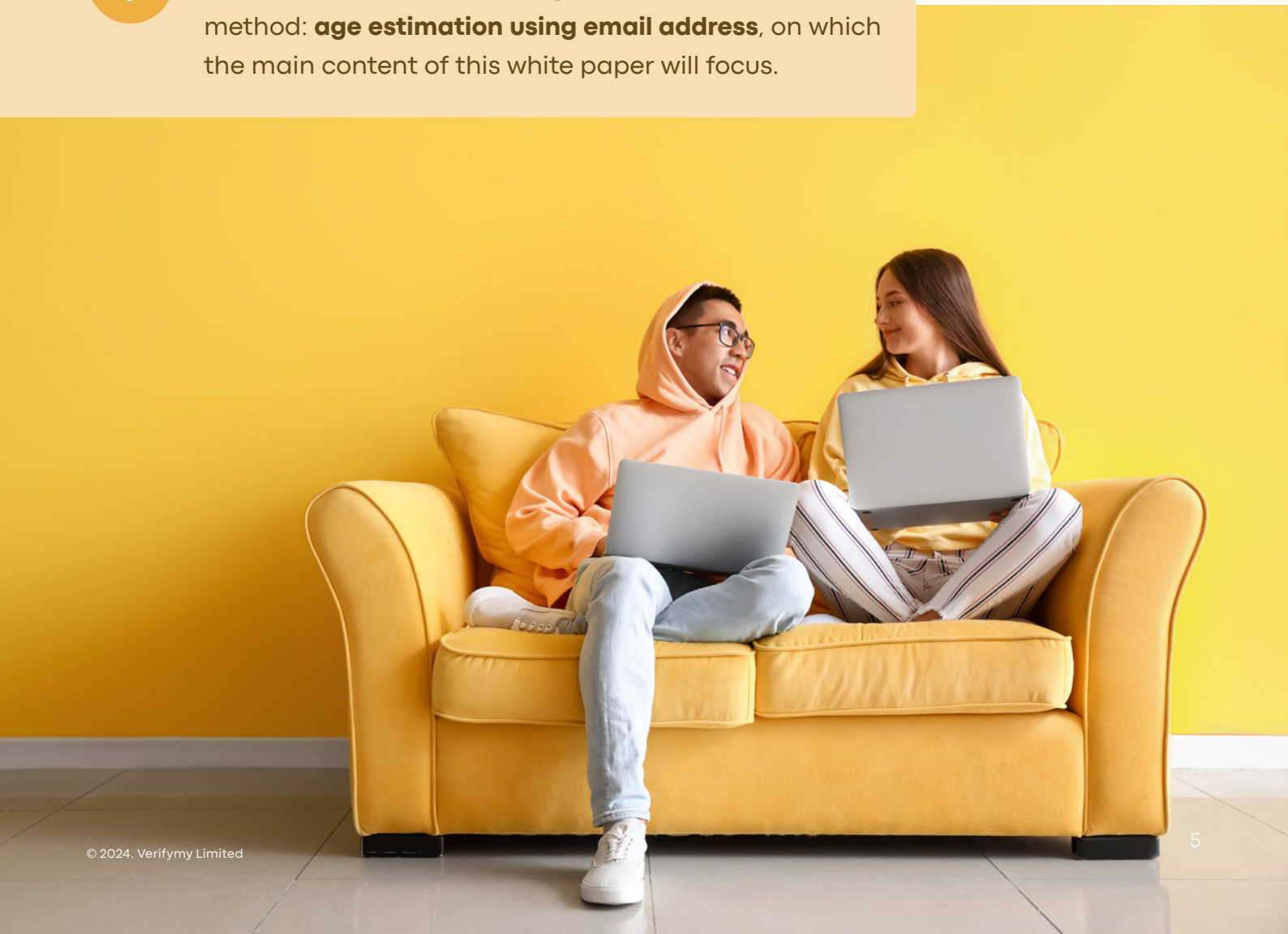
Age estimation vs age verification

Age assurance encompasses both age estimation and age verification methods. While age estimation typically infers or estimates age based on physical features or behavioural characteristics, age verification determines an individual's actual age. Age verification is often carried out by providing official documents (e.g. a passport or other form of ID) to confirm exactly how old someone is by comparing the birthdate on the document to the current date.

Verifymy offers a wide range of age estimation and age verification solutions.

From an age verification perspective, we can determine an individual's age by checking government-issued IDs, name and address records via credit reference bureaus, credit cards, and mobile phone numbers.

Regarding age estimation, we offer facial age estimation and more recently, our latest innovative method: **age estimation using email address**, on which the main content of this white paper will focus.



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Providing solutions proportionate to a platform's risk

The spectrum of identity authentication could be considered to vary from comprehensive Know Your Customer (KYC) measures at one end to self-declared age at the other. KYC checks require increased scrutiny and data processing to achieve higher assurance and mitigate greater risks associated with certain scenarios. These levels of checks are suitable for opening a bank account, for example, where users expect more stringent and intrusive checks due to the sensitive nature of financial transactions.

Age verification and age estimation techniques have evolved greatly since the initial introduction of self-declared age checks and sit nicely in the middle of these two extremes. While age verification methods often use an official document to confirm an individual's exact age, age estimation techniques that leverage an email address or an AI-driven facial analysis offer a low-friction yet highly accurate alternative.

Different platforms have varying levels of risk associated with them, depending on the nature of the services they offer and the potential consequences of underage access. The level of age assurance implemented should, therefore, be proportionate to the platform's associated risk, and different methods can be used across different use cases.

For example, the level of assurance that age estimation using an email address would provide would be proportionate for an adult entertainment site or a social media platform to determine a user's age. From a business perspective, while adult sites do need to have a high level of certainty that a person trying to access their site is not a child, they do not need to prove their identity or require the level of verification a KYC check would offer in order to do this. For the user, this level of age check is beneficial as they're only required to provide a minimal amount of personal data to access their desired site or content.

The key is to balance legal and regulatory compliance with privacy and user experience, ensuring platforms see minimal business disruption and, in turn, protect their revenue. By aligning age assurance solutions with a platform's risk level and user expectations, businesses can protect their revenue and ensure compliance with age-related regulations while also creating a more satisfying and efficient user experience.

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Empowering users with optionality

Currently, when it comes to the age assurance methods offered on the market, there is no one-size-fits-all approach, both online and offline. Therefore, optionality is key, with the market requiring flexible and inclusive options that address individual preferences and mitigate the risks associated with bias and exclusion.

At a user level, it is important that various age verification or estimation methods are provided to accommodate differing individual preferences. What may not be preferable or even possible for one person, could be another person's choice.

For example, in the UK 1 in 6 Londoners are reported to be lacking suitable ID documentation, and similarly, a YouGov poll in the US revealed disparities in age and socio-economic backgrounds with identity document ownership. Furthermore, credit card ownership varies greatly between different countries. According to survey data from the World Bank as published by Statista – which stems from 2021 and released in the summer of 2022 – Canada, Israel, and Iceland were the only countries with credit card ownership higher than 74% at the time. To compare, countries such as Bangladesh and Morocco had a credit card penetration of around 1%.

Additionally, historically, for businesses across multiple sectors, when certain methods such as Facial Age Estimation, ID Scans or Credit Card checks have been offered in isolation, they have been seen to introduce significant friction, resulting in huge drops in traffic.

Therefore, if offered as the only option, these methods are clearly a barrier and will prevent legitimate users from accessing a product or service, leading them to potentially seek less reputable alternatives. With Facial Age Estimation or liveness checks associated with some ID Scans, it's important to remember that not everyone is comfortable using their face for age assurance purposes, whether that be for personal, cultural or any other reason.

These are some of the many data points that truly underscore the importance of offering a range of inclusive age assurance solutions that offer choice while not isolating certain groups.

At Verifymy we recognise the power of optionality and the significance of empowering both businesses and users with choice. If platforms can deploy a range of methods, proportionate to their risk level and those that best suit their particular use case or user journey, they can ensure the highest possible pass rates and minimal business disruption. From a user perspective, we offer the broadest, most comprehensive, inclusive and privacy-protecting range of age assurance methods that cater to individual needs and maximise user choice.

In order to protect pass rates, minimise business disruption and enhance the user journey, low-friction, high-coverage options such as age estimation using an email address are recommended as a primary method while offering alternative methods as backup options to ensure user choice is available.

By embracing optionality, prioritising privacy-centric solutions, and focusing on frictionless user experiences, businesses can create a safer, more inclusive, and user-friendly online environment.

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Navigating the regulatory landscape for age assurance

Age assurance plays a vital role in making the online world safer for all. As regulations continue to develop, we explore an overview of the current state of age assurance regulation across different regions:

United Kingdom

The Online Safety Act (OSA)

Having received Royal Assent in October 2023, the OSA mandates social media platforms and search engines to take action against illegal and harmful content, with a particular focus on protecting children.

This new legislation highlights the convergence of age assurance measures across both the online and offline world, supplementing more mature age-restricted legislation in the UK—such as The Licensing Act (regulating the sale and supply of alcohol), The Offensive Weapons Act (addressing crimes related to acid attacks; knife crime prevention orders; the sale of, delivery and possession of knives and other offensive weapons; and restrictions on firearms), and The European Tobacco Products Directive (placing limits on the sale and merchandising of tobacco and tobacco related products in the EU and UK).

The OSA mandates a “duty of care” for online service providers, particularly those catering to children. This includes protecting them from harmful content, such as violent or self-harm-promoting material. The Act sets out obligations for highly effective age assurance to be implemented for all sites and apps that display or publish pornographic content - they must ensure that children are not able to encounter pornography on their service. Additionally, other user-to-user services that allow pornographic content on their service must also do similar, implementing highly effective age assurance to prevent children from encountering it.

To achieve this, the OSA emphasises robust age assurance measures. Providers must implement age verification or estimation (or both) to ensure children don’t encounter inappropriate content. While the Act allows flexibility in the chosen methods, they must be highly effective at keeping children safe.

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United States

State-by-state approach

No single federal law mandating age assurance exists. However, several US States are taking the initiative, and many require age verification for accessing adult content online. These often involve using government IDs or other third-party verification services.

A shifting landscape

The US regulatory landscape for online safety is in flux and undergoing significant changes. 2024 has seen new federal legislation proposals and discussions around establishing national age verification standards at the forefront, with user privacy and user-friendly methods being key considerations.

The Age Verification Providers Association (AVPA) highlights that while age verification has received little attention in the past, it is now a major focus. Simple checkboxes or self-declared date of birth entries are likely to soon become insufficient, with 144 bills requiring some form of online age assurance requested from State legislatures in 2023.

The Children's Online Privacy Protection Act currently requires verified parental consent to process data for children under 13, with a proposed extension to include children under 16. Furthermore, the Food and Drug Administration now evaluates child protection measures before licensing new vaping products.

European Union

The Digital Services Act (DSA)

Fully in force since early 2024, the DSA aims to create a safer online environment. One key aspect is age assurance, focusing on protecting minors from harmful content. Article 28 of the DSA specifically requires online platforms to implement measures that ensure a high level of data protection and safety for minors. This translates to online platforms needing to develop systems to verify a user's age before granting access to age-restricted content, like pornography. The DSA doesn't dictate specific verification methods but emphasises the importance of these systems being "appropriate and proportionate." This means finding a balance between effective age assurance and protecting user privacy.

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Keeping up with the ever-changing digital landscape

The regulations around age assurance are constantly evolving to keep pace with the ever-changing digital landscape. As technology advances, we can expect to see:

More robust age assurance methods

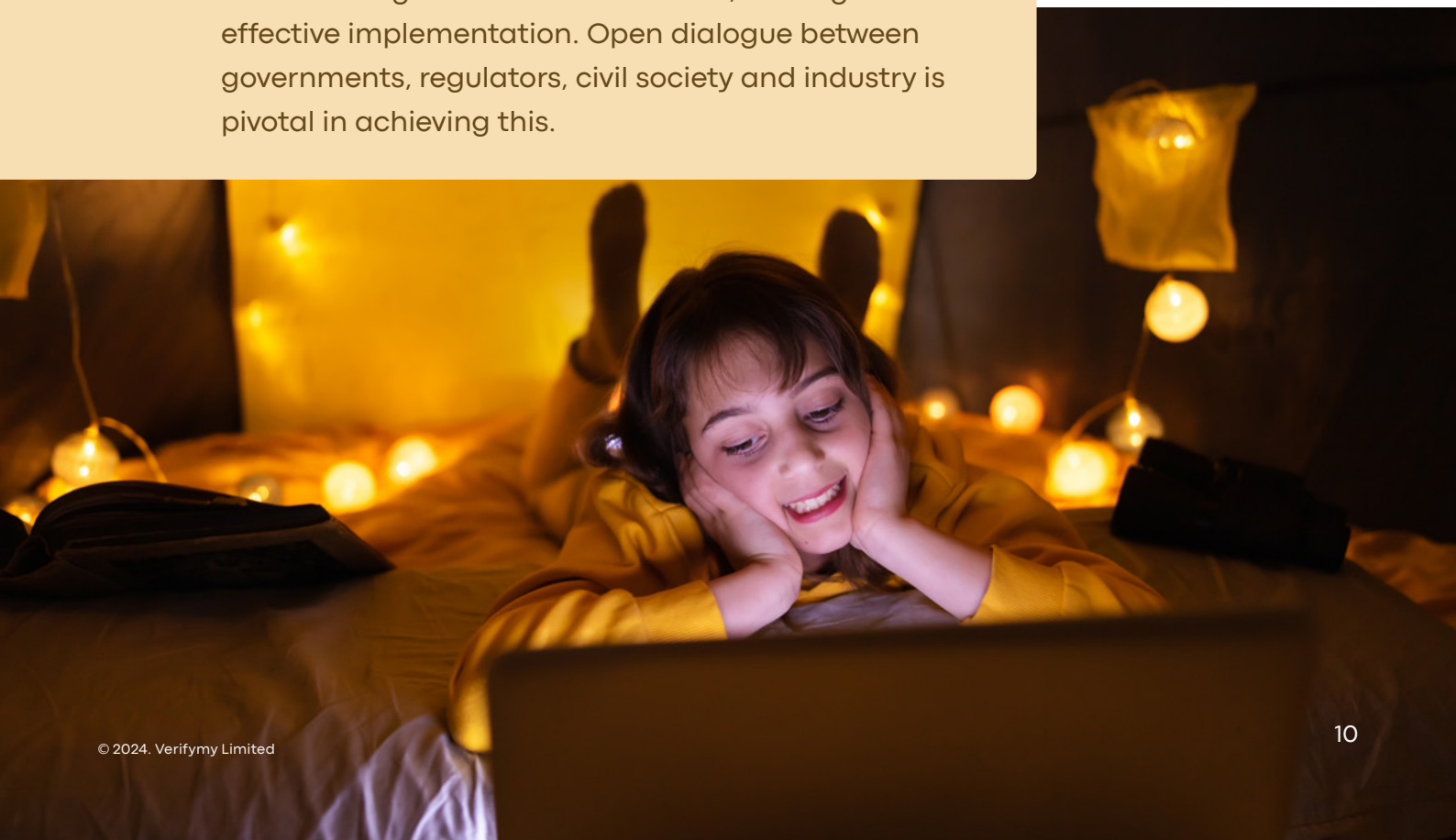
New technologies that offer more accurate ways to verify and estimate age.

Focus on user experience

Methods that are increasingly free from friction and respectful of user privacy.

Global collaboration

International cooperation will be crucial in establishing consistent age assurance standards, leading to effective implementation. Open dialogue between governments, regulators, civil society and industry is pivotal in achieving this.



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Introducing age estimation using email address

What is it, and what can it do?

Our proprietary age assurance solution uses just an email address to quickly and accurately estimate a user's age. Built to incorporate data minimisation and privacy-by-design principles, this method is the quickest and easiest way to determine the age of users online. It will typically return a result in as little as 2-3 seconds and can be deployed independently or alongside our range of other highly-accurate age assurance techniques.

The email address method can be deployed **entirely free from friction** in **'stealth'** mode (subject to there being a valid lawful basis for processing the user's data). For example, using data previously collected by a platform as part of an account creation process, without the need for any user interaction whatsoever. Alternatively, it can be deployed in **'non-stealth'** as part of an 'age gate', where an end user can manually input their email address and authenticate it via a time-restricted One-Time Password (OTP) to demonstrate ownership of that particular email account.

It is fully inclusive and can be used by anyone with an email address. It operates without any discernible bias and can be used by anyone irrespective of gender, race, ethnicity, sexuality or any other discriminatory trait. With most online users already having an email address, this method has close to 100% coverage across all web users, and, therefore, it can be highly effective at estimating the age of a large proportion of a website's user base with minimal or even zero disruption to a user journey.

Age Check Certification Scheme

The Age Check Certification Scheme (ACCS) is a UKAS-accredited conformity assessment body and provides independent certification for online age assurance solutions. Our email address age estimation method is certified by the ACCS under PAS 1296:2018 to EAL Level 3, the highest possible level for age estimation. The solution is highly accurate, as demonstrated by the ACCS EAL level 3 test audit, which returned 0 (zero) false positive results at +/-18, meaning no children were incorrectly estimated to be adults. The solution can also be applied to other age thresholds, such as +/-13, offering a reliable and efficient way to determine the age of all users, both adults and children.

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How does it work?

Estimating a user's age using their email address is frictionless, privacy-preserving, and without discernible bias. But how does it work?

An email address can either be submitted by the platform via an API or inputted manually by the user.

For anti-spoofing and fraud prevention measures, we require ownership of the email to be demonstrated.

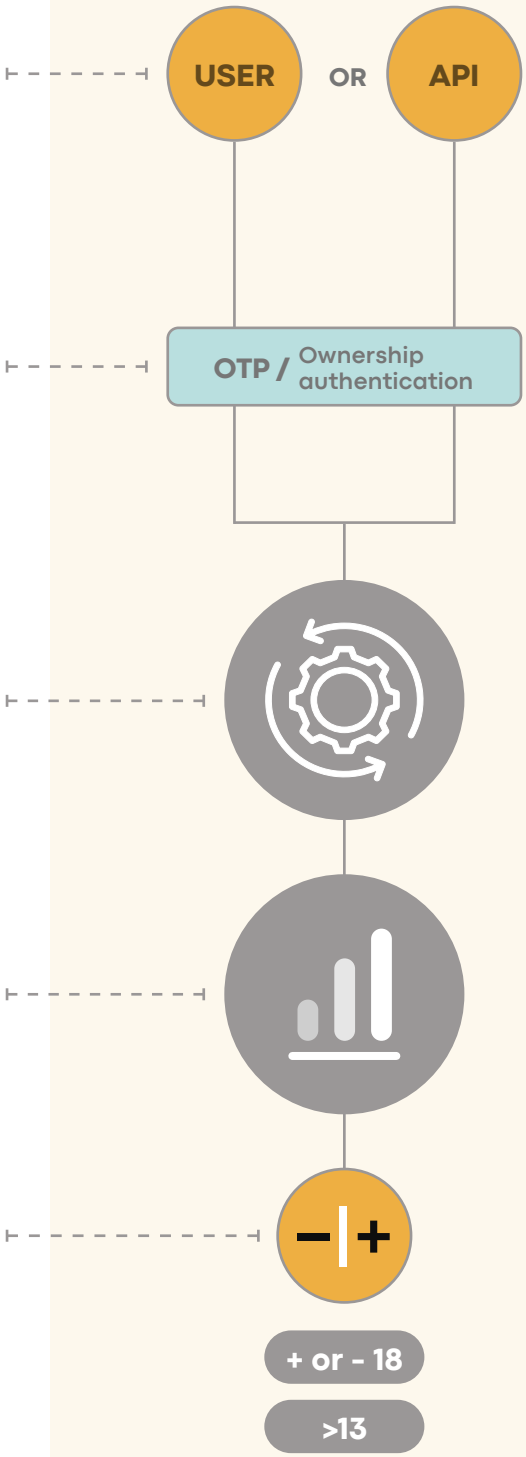
When an email address is submitted manually by the user, a time-restricted OTP will be triggered and must be clicked by the user.

N.B. this is not required if the user is already logged in to the platform and the platform has previously carried out anti-spoofing measures by authenticating ownership of the email address.

The submitted email address is analysed using proprietary algorithms and external data sources. This includes reviewing sites and apps where a user has previously used that email address, such as financial institutions, mortgage lenders or utility providers.

Using this analysis, our proprietary technology builds a detailed digital footprint of the user, and the solution runs statistical analysis on the footprint to build an age profile.

An estimated age of the user is returned. This could be +/-18 or a minimum estimated age, such as >13.



Incorporating data minimisation and privacy-by-design principles, we only collect the minimum data needed to successfully return an estimated age.

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What are the benefits?

Frictionless

Age estimation using an email address can be entirely frictionless. Online users are typically very familiar with sharing their email address in everyday online interactions - for example, when creating an account to purchase items or accessing content online. Coupled with close to 100% coverage amongst web users, the method is highly accessible. An email address can be submitted 'in stealth' directly by a platform via an API, or a user can input it manually. If provided in stealth, checks can be performed seamlessly in the background without any further interaction required from the user, making the solution entirely free of friction. By implementing this way, businesses can undertake age estimation without any impact on the user journey at all. Removing this friction avoids potential drops in conversion and, in turn, minimises business disruption. When inputted manually, the user will also have to click on a time-restricted OTP in order to prove that they are the owner of that email address.

- Online users are typically very familiar with sharing their email address in everyday online interactions.

- With close to 100% coverage amongst web users, the method is highly accessible.

- Checks can be performed seamlessly in the background without any further interaction required from the user, making the solution entirely free of friction.

Inclusive and without discernible bias

Age estimation using an email address is fully accessible and widely available. It can be used by anyone with an active email address, irrespective of gender, race, ethnicity, sexuality or any other discriminatory trait, and it works without any discernible bias.

With almost 100% of online users having an active email address, it is no surprise that recent usage data shows that over half (55%) of online users actively chose email address as their primary verification method when presented with multiple methods (including Facial Age Estimation and ID Scan) in situ.

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Privacy-preserving

This method is privacy-preserving and incorporates the principles of data minimisation and privacy-by-design. The solution is highly effective and designed to protect users' identities completely. Therefore, it doesn't generate any information on who a user is; only a yes/no response to determine whether they meet a minimum age threshold, such as 18, or a minimum estimated age.

Our privacy-by-design approach ensures our solutions are developed with the following principles:

Data minimisation

We only process the minimum data needed to fulfil the requirements of our safety tech solutions. In this instance, our age estimation using email address method only processes as much data as is required to successfully complete an age check. We routinely evaluate our data collection policy to ensure we adhere to data minimisation principles.

Data integrity

256-bit encryption is the highest level of encryption possible, maximising the security of all data. Anonymisation via hashing and salting adds an extra layer of security and confirms the integrity of your users' data.

Data retention

All data captured is encrypted, and once verified, Personal Identifiable Information (PII) is deleted or anonymised.

GDPR

Our safety tech solutions are fully compliant with all fundamental principles and requirements of GDPR. GDPR is the European Union's legal framework for protecting personal information.

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Compliance

The regulatory landscape is ever-evolving, and businesses are increasingly expected to keep up with regulatory requirements in their markets. Age estimation using an email address can help businesses comply with global legislative requirements, such as the Online Safety Act (UK), Digital Services Act (EU), various pieces of state legislation across the US and numerous other domestic and international laws related to the sale of age-restricted products such as alcohol and tobacco.

In the UK, as well as being certified by the ACCS under PAS 1296:2018 to EAL 3, the Information Commissioner's Officer (ICO) recognises age estimation using email address as an example of an age estimation method. In updated guidance on age assurance for the Children's Code, published in January 2024, the ICO states:

www.ico.org.uk

3.2 Age estimation
Age estimation is any method designed to estimate the age, or age-range, of a user, often by algorithmic means.

You **could** use age estimation approaches for initial onboarding or account creation, or for ongoing monitoring. These approaches estimate the age of a person, rather than confirming whether someone is a specific age (e.g. through documentary evidence or a trusted third party). As they do not require documentary evidence, you **could** find this is a more privacy-friendly method than using hard identifiers.

Age estimation systems use a mix of methods, including:

A computer vision-based approach - this estimates age from an image of the person. The image may be captured in real time by a mobile device camera or webcam. Facial age estimation has seen significant progress and is now the most widely used age estimation approach. It has high levels of reported accuracy and efficacy, albeit with variances in relation to skin tone, sex and age.
Other biometric approaches - such as voice analysis to estimate a person's age. This area is continuing to develop, with other biometric approaches launched to market recently and achieving accreditation. Whilst the efficacy of these products is improving, currently they tend not to reach the higher levels of accuracy that would make them appropriate for high-risk scenarios.
Analysing account profiling or information - information derived from the person's activity on the platform. This may include analysing their digital footprint, which looks at their interaction or accounts across many different sites. **This may be via a person's email address** or mobile phone number, for example. It can also include analysing on-site behaviour once a person is using a service, such as activities, content choices, or friends that suggest the person is below the minimum age of the terms of service. The efficacy of these methods varies.

> *This may be via a person's email address.*
>
> Information Commissioner's Office (ICO)

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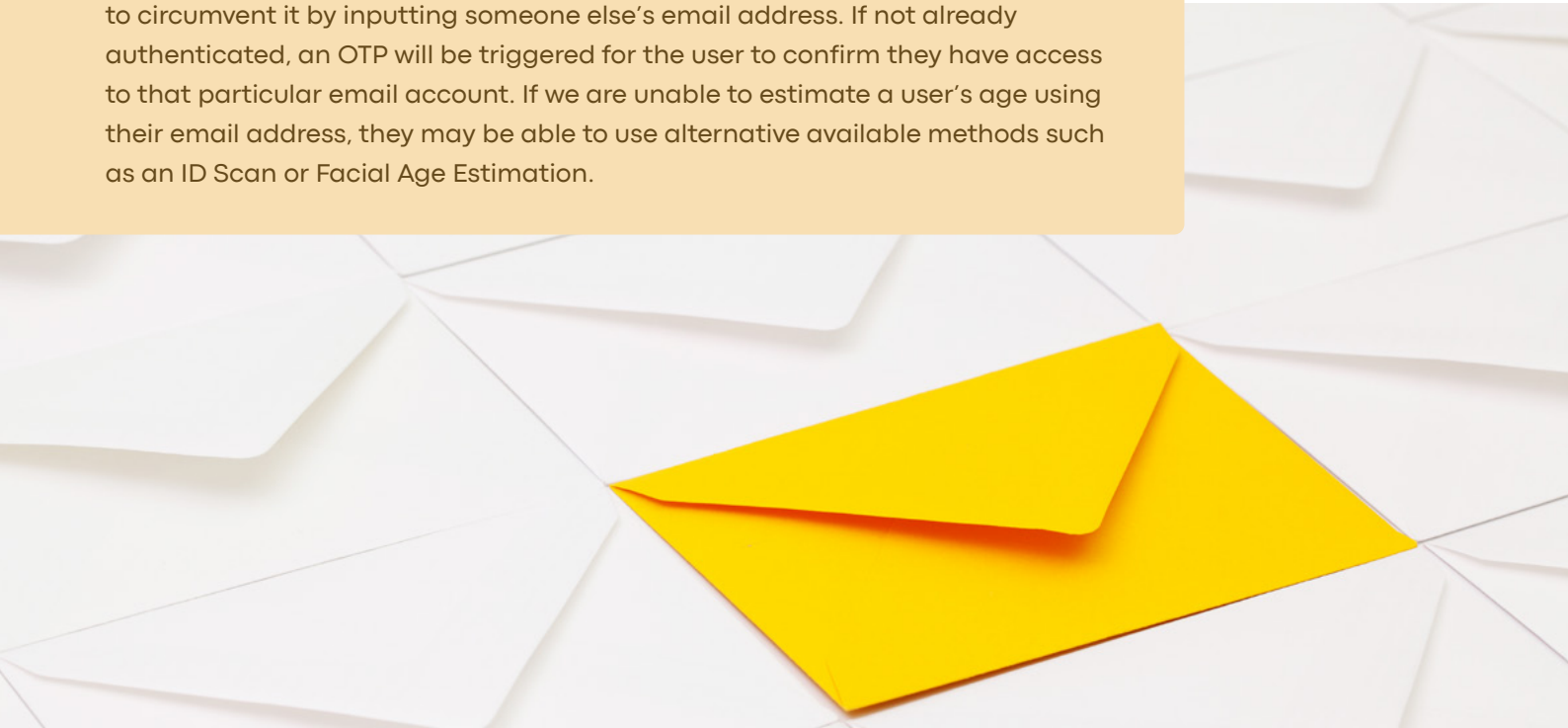
In the US, our email address solution meets numerous US state age verification legislative requirements related to age verification for pornographic content.

Typical legislative requirements	Is it compliant?
Verification through an **independent, third-party verification service that compares** the personal information entered by the individual seeking access to the material to the **information that is available from a commercially available database, or aggregate of databases**, that is regularly used by businesses and government agencies for the purpose of age and identity verification.	✓
Any commercially reasonable method that **relies on public or private transactional data** to verify the age of the person attempting to access the material.	✓
"Transactional data" means a **sequence of information that documents an exchange, agreement, or transfer** between an individual, commercial entity, or third party used for the purpose of satisfying a request or event.	✓
"Transactional data" includes records from **mortgage, education, and employment entities**.	✓
A commercial entity or third party that performs the required age verification shall **not retain** any identifying information of the individual after access has been granted to the material.	✓

Robust

Email address age estimation is robust. It has an anti-spoofing mechanism to confirm ownership of the email account and prevent users from attempting to circumvent it by inputting someone else's email address. If not already authenticated, an OTP will be triggered for the user to confirm they have access to that particular email account. If we are unable to estimate a user's age using their email address, they may be able to use alternative available methods such as an ID Scan or Facial Age Estimation.



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How accurate is age estimation using email address?

Age estimation using an email address is a highly effective age assurance solution.

Certified by the ACCS under PAS 1296:2018 to EAL 3

As previously discussed on page 11 the solution is highly accurate, demonstrated by its ACCS EAL 3 certification. The ACCS testing returned 0% (and 0 in total) false positive results at a +/-18 threshold, meaning zero users under 18 were estimated to be over 18. The testing also resulted in a True Positive Rate of 84% - meaning for every 100 actual adults, the solution successfully determined that 84 were 18+ solely by using their email address.

It is worth noting that the remaining 16% were not incorrectly estimated to be under 18 - we simply did not have enough information to estimate them to be 18+, so users in this instance would be prompted to verify their age by utilising another method.

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Additional testing

The method is designed to be conservative with age estimation and will not return a positive result, e.g. 13+, 16+, 18+, if there is insufficient data to provide a clear picture. Whilst the solution can be applied to any age threshold, its primary use case has been to determine whether users are +/-18.

With that in mind, we conduct testing at scale. The table below shows a snapshot of our test results from January 2024.

Please note that each individual email address in this cohort was processed to estimate whether it belonged to someone +/-18. This is to reflect typical age-restricted use cases such as accessing pornographic websites, buying alcohol or vaping products, or utilising certain functionality or services within social media, video sharing or video gaming platforms.

- Sample size: 102,460
- The test was conducted across email addresses collected from 44 countries (including Europe, the Americas, Asia, Africa, and Australia), with a split of approximately 50/50 males and females and distributed across age ranges from 6 to 60+. 100 fake email addresses were also added to the testing set

VerifyMy Testing Results for +/-18 Threshold using Email Address Age Estimation

	Sample size			False Positive Rate		True Positive Rate		Unable to estimate as 18+		
Age	Female	Male	N/A	Female	Male	Female	Male	Female	Male	Unknown or N/A
Invalid Email Address	0	0	100	0.00%	0.00%	N/A	N/A	N/A	N/A	100.00%
6-12	77	63	0	0.00%	0.00%	N/A	N/A	100.00%	100.00%	N/A
13-17	358	349	0	0.28%	0.29%	N/A	N/A	99.72%	99.71%	N/A
18-24	9,605	8,253	0	N/A	N/A	82.35%	88.89%	17.65%	11.11%	N/A
25-29	10,090	10,233	0	N/A	N/A	76.54%	75.50%	23.46%	24.50%	N/A
30-39	9,635	10,205	0	N/A	N/A	81.73%	81.28%	18.27%	18.72%	N/A
40-49	8,334	9,396	0	N/A	N/A	77.30%	74.33%	22.70%	25.67%	N/A
50-59	6,386	7,548	0	N/A	N/A	81.06%	74.35%	18.94%	25.65%	N/A
60+	5,527	6,301	0	N/A	N/A	74.37%	78.01%	25.63%	21.99%	N/A

FALSE POSITIVE RATE: the percentage of children incorrectly estimated to be an adult.
TRUE POSITIVE RATE: the percentage of adults correctly estimated to be an adult.
UNABLE TO ESTIMATE: the percentage of individuals for whom there was insufficient data to estimate their age as over 18.

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Summary:

- No children under 13 were estimated to be an adult (18+)
- Out of 707 children aged between 13-17, only 2 were estimated to be an adult (18+)
- Across 101,513 adults, there was an average True Positive rate of 78.91%. Put simply, for every 100 adults, 79 were able to be correctly estimated as 18+ by our email address solution. N.B. The remaining 21 were not incorrectly estimated to be under 18, rather we did not have enough information to return a 18+ result
- There was no discernable bias in the results by gender or across adult age brackets

Our email address method can also be used to return minimum age estimations for children, as well as the commonly used +/-18 threshold. There are an increasing number of use cases for this, including +/-13 to create a social media account or various other age brackets under 18 to allow platforms to provide age-appropriate experiences for people of all ages.

The table below shows age estimation accuracy results for 847 email addresses belonging to individuals all under the age of 18. This is a subset of the larger data set above.

In this instance, the solution has calculated the **estimated minimum age**, as shown on the Y-axis of the table.

To note, this **estimated minimum age** is not an actual age or an age bracket. For analysis purposes, we have compared this with the actual age of the user to whom the email address belongs, as seen on the X-axis.

VerifyMy Testing Results for Under-18 Estimated Minimum Age using Email Address

		Actual age												
		6	7	8	9	10	11	12	13	14	15	16	17	Total
Estimated minimum age	insufficient data	6	5	8	3	3	2	5	10	17	15	28	23	125
	7	1	1	1	1	1	0	0	0	0	0	0	1	6
	8	0	0	3	6	5	5	4	6	8	0	3	2	42
	9	0	0	1	4	6	6	2	8	4	1	4	3	39
	10	0	0	0	0	6	4	7	14	10	1	3	2	47
	11	0	0	0	1	1	9	16	16	11	13	3	4	74
	12	0	0	0	0	0	0	15	23	16	15	3	0	72
	13	0	0	0	0	0	0	1	19	22	13	15	12	82
	14	0	0	0	0	0	0	1	2	26	63	23	7	122
	15	0	0	0	0	0	0	0	0	2	15	47	18	82
	16	0	0	0	0	0	0	0	0	1	1	40	64	106
	17	0	0	0	0	0	0	0	0	0	2	3	43	48
	18+	0	0	0	0	0	0	0	0	0	0	1	1	2
	Total	7	6	13	15	22	26	51	98	117	139	173	180	847

False positive: estimated minimum age exceeded actual age (red figures).
True positive: estimated minimum age did not exceed actual age (green figures) - therefore, restricting access to something the user shouldn't be able to access.
Insufficient data: where we do not have enough data to provide a meaningful response or reliably estimate the user's minimum age. This can be due to the email address being newly created, invalid or rarely used, for example.

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Key headlines

True positive rate was 97.76%, meaning we correctly estimated the minimum age of 828 / 847 of the testing set.

Out of 847 individuals tested, we estimated only 19 to be older than they were (**2.24% false positive rate of the testing set**).

The maximum error for any one individual is 2 years, meaning we never overestimated someone to be more than 2 years older than they are.

The mean absolute error across all 847 email addresses is **3.16 years**, while **the average margin of error across 19 false positives is 1.32 years.**

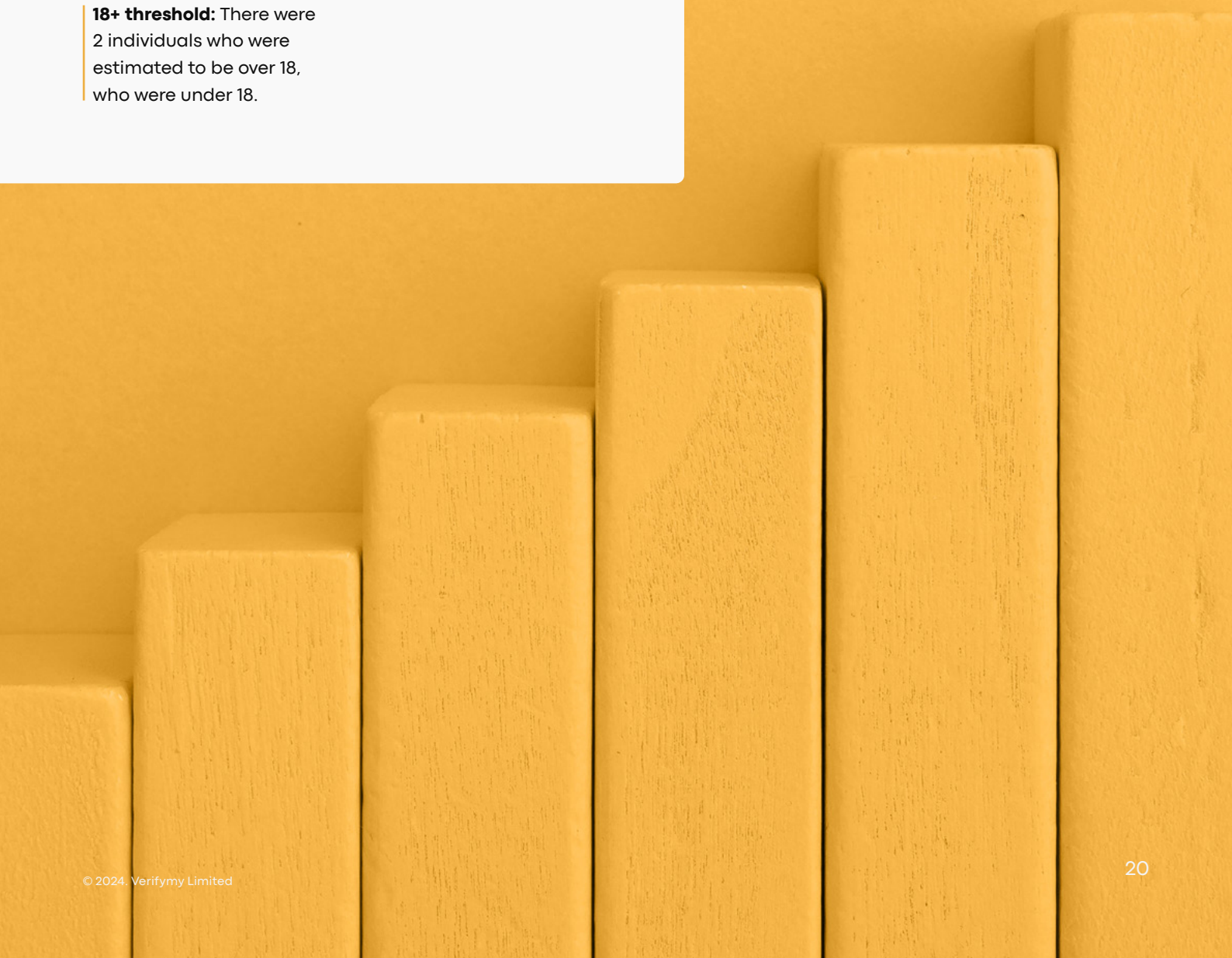
13+ threshold: There were 2 individuals who were estimated to be over 13, who were under 13.

16+ threshold: There were 4 individuals who were estimated to be over 16, who were under 16.

18+ threshold: There were 2 individuals who were estimated to be over 18, who were under 18.

N.B. we are already collecting larger data sets to allow more comprehensive testing as we improve the efficacy of our email address solution. We expect to complete our next comprehensive test in early 2025.

If you would like to hear more about these results, please get in touch.



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Use cases

Verifymy's age estimation using email address solution caters to the diverse requirements of online platforms, products, and services. Whether complying with ever-evolving regulations or ensuring age-appropriate experiences, we offer frictionless, privacy-preserving, and trustworthy solutions, ensuring the highest pass rates possible with minimal business disruption.

Regulatory compliance

We ensure businesses comply with local and global legislative requirements.

Age-gating: Restricting access to content, products, or services based on a user's age. This is commonly seen in various industries, such as alcohol, tobacco, and adult entertainment.

Age-appropriate experiences: Creating online environments with activities, content, or products suitable for specific age groups, as well as restricting communication between certain age brackets. This is often seen on social media, video sharing, and online video gaming platforms.

Sector-specific examples

Adult entertainment: Preventing minors from accessing adult content and adhering to evolving regulations to prevent children from encountering inappropriate websites and services.
Social media: Ensuring age-appropriate experiences and preventing minors from encountering illegal, inappropriate and harmful material.
Online video gaming: Ensuring users meet minimum age requirements for mature-rated video games and user-to-user functionality.
Retail: Verifying the age of users purchasing age-restricted items, such as alcohol, tobacco, vaping and bladed items.
Online dating: Verifying the age of users to prevent access to inappropriate content, catfishing and fraud.
Healthcare services: Verifying the age of patients accessing health services or purchasing prescription medications online.

Database enrichment

Enhancing or scanning existing user base to:

- Improved advertising targeting for +/- 18, +/- 13 (or other age thresholds) to increase ROI and enhance personalised customer experiences.
- Ensure compliance with advertising and data privacy legislation.

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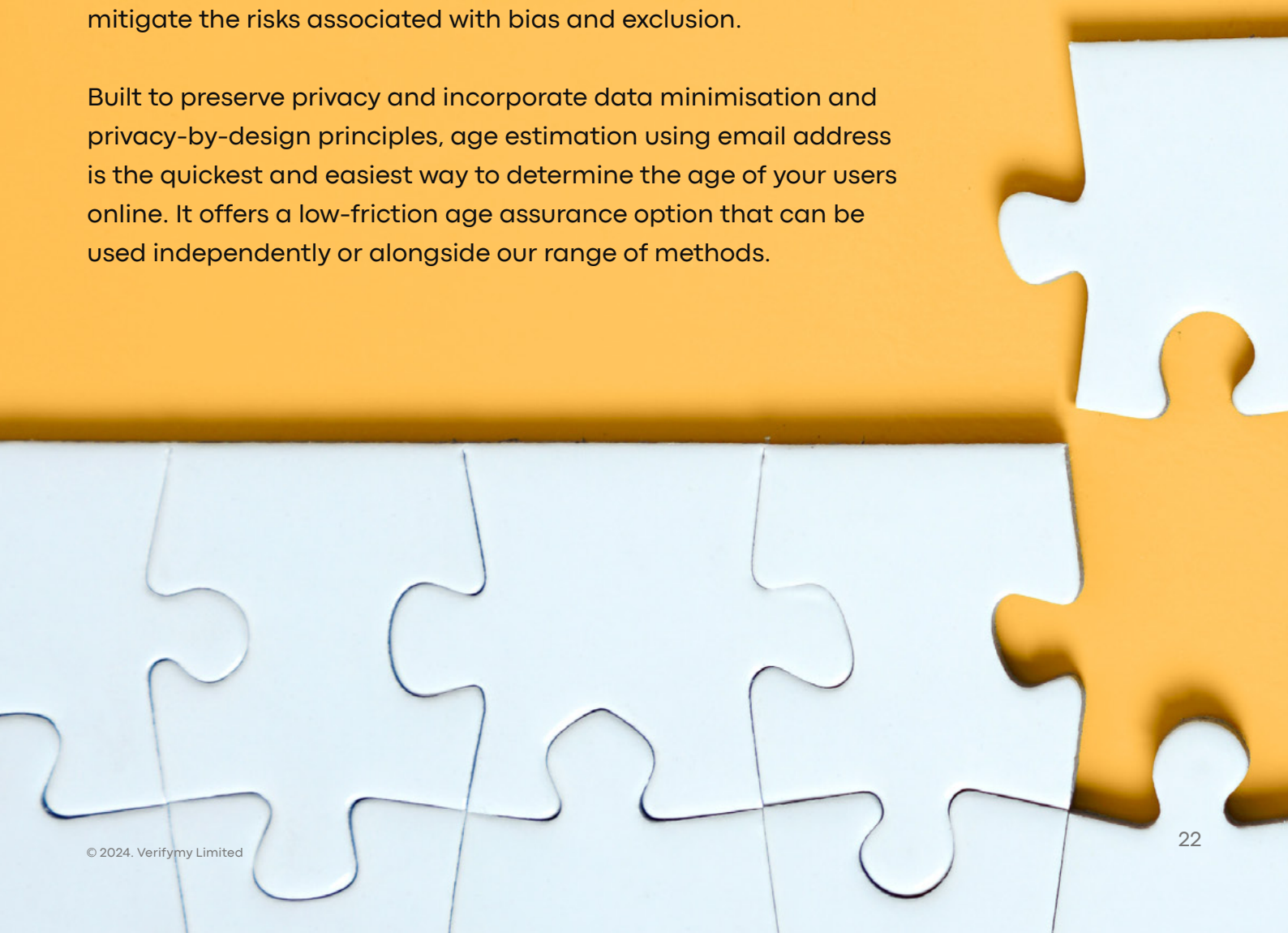
Conclusion

Age assurance is undergoing a significant transformation, driven by advancements in technology, evolving regulatory landscapes, and a growing emphasis on user privacy and experience.

Online platforms must strike a balance between the level of data required for an age check and the user's expectations and tolerance for friction. Innovative age estimation techniques, such as using email address, are becoming increasingly important for businesses as they offer a less intrusive yet highly effective way to determine a user's age.

Proportionality is key. By integrating methods that are proportionate to a platform's risk level and user expectations, businesses can significantly enhance the user experience and protect their commercial interests. Additionally, businesses should empower their users with optionality. The market requires flexible and inclusive options that address individual preferences and mitigate the risks associated with bias and exclusion.

Built to preserve privacy and incorporate data minimisation and privacy-by-design principles, age estimation using email address is the quickest and easiest way to determine the age of your users online. It offers a low-friction age assurance option that can be used independently or alongside our range of methods.



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Myth-busting!

Let's talk about some of the common misunderstandings of age estimation using email address.

Does the age of the email address equal the estimated age of a user?

No! The method is not related to the age of the email address. Rather, analysis is done regarding sites and apps that the email address has previously been used with, such as financial institutions, mortgage lenders or utility providers.

Can't a child just use a parent or caregiver's email address?

No! We have anti-spoofing measures in place that ensure that we bind the email address to the user going through an age check via a time-sensitive OTP, which prevents users from entering someone else's details. If not previously authenticated, we will send an OTP directly to the provided email address. This must be opened and clicked for the check to be complete.

Can I just set up a new email account to pass the age check?

No! Age estimation is based on an analysis of a comprehensive and continuous digital footprint, and therefore, newly created email addresses will not provide a positive result.

Can you read emails or access personal information?

No! Absolutely not. Neither Verifymy nor the website we are completing an age estimation check for, have any access whatsoever to the email account itself or the emails within it. The solution has nothing to do with reading or scanning actual emails; we simply run analysis on the email address itself.

If a user is of age (e.g. 18) but fails the age check using their email address, does that mean they can't access the site?

No! If we are unable to estimate an age using their email address, users may be able to use alternative methods offered by the site, such as an ID Scan or Facial Age Estimation. It would always be our recommendation to offer alternative methods as a back up.

Can older users pass on their email account log-in details to younger individuals?

To successfully pass an age estimation check using an email address, it must have been used for a variety of online purposes, typically related to financial institutions, utility companies, credit providers or similar. The user completing the age check would need to access the email account to obtain the time-restricted OTP. Given the highly sensitive usage outlined above, it is inconceivable that someone would consider providing access to said email account - the risk of fraud would simply be too high. This risk of fraud would, for example, include the ability to trigger multiple password reset flows into the email account owner's inbox.

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About Verifymy

Our mission is to provide frictionless, trustworthy solutions for online platforms to maintain their integrity, protect their reputation and safeguard their users.

Age assurance

An age assurance solution for any online product, service or business, featuring the widest range of age verification and age estimation methods to ensure the highest pass rates possible with minimal business disruption.

Identity verification
Content moderation

A complete end-to-end identity verification and content moderation solution to prevent uploaders from publishing illegal content on user-generated content platforms, ensuring a safe, trustworthy, and compliant online experience for everyone.

verifymy

Follow Verifymy to keep up to date with the latest safety tech and regulatory developments.

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