Wolt

Algorithmic Transparency Report

2024

Wolt's Algorithmic Transparency Report

About Wolt

Wolt is a Helsinki-based technology company that provides an online platform for consumers, merchants and couriers. It connects people looking to order food and other goods with people interested in selling and delivering them. To enable this, Wolt develops a wide range of technologies from local logistics to retail software and financial solutions – as well as operating its own grocery stores under the Wolt Market brand.

On top of the consumer-facing Wolt App, Courier Partner App and Merchant App, Wolt's products include Wolt+ (subscription service for customers), Wolt for Work (meal benefits and office deliveries for companies), Wolt Drive (fast last-mile deliveries for merchants) and Wolt Self-Delivery (service for merchant partners with their own delivery staff).

Wolt's mission is to make cities better by empowering and growing local communities. Wolt was founded in 2014 and joined forces with DoorDash in 2022. DoorDash operates in more than 30 countries today, 27 of which are with the Wolt product and brand.

Introduction

Testing, testing, one, two, three. And we're back again with yet another edition of the Wolt Algorithmic Transparency Report. This report marks the third annual release since its inception in 2022. In the fast-paced world of tech, we're excited to bring you another comprehensive report, packed with insights into how the products and algorithms that drive our platform operate.

What's new this time?

As always, we have made sure the report covers all the updates to our algorithms and products since the last report. This time, we have also added a short section about our Support team and the products they rely on.

Technology develops fast, and since our last report, generative AI has become top of mind for many, including us. We have therefore included a new section on what we think about this new technology and how we use it at Wolt.

Algorithmic transparency is gaining more attention, especially as a new type of tool for enforcing digital laws. In March 2024, the world's first comprehensive law on AI – the EU AI Act – was approved. It regulates all types of AI systems based on their risk of threat and includes algorithmic transparency as a way to help mitigate those risks. To tell us more about why algorithmic transparency matters, we have invited Dr. Johann Laux of the Oxford Internet Institute to present an overview on the topic in a guest article.

Scope of report

At Wolt, we mainly use algorithms and artificial intelligence (AI) as a way to increase efficiency and simplify processes. For us, algorithmic transparency means being open about why and how we use AI and algorithms at Wolt. For example, detailing what they do, why they are used, what data they use, and how our teams oversee the systems. But before we get into all that, let's make sure we're on the same page about what exactly algorithms and AI are.

Algorithms are essentially mathematical processes used to solve problems by following a sequence of steps. On the other hand, AI can be described as sets of algorithms. To put it plainly, we follow the legal definition of an AI system as outlined in the recently passed EU AI Act:

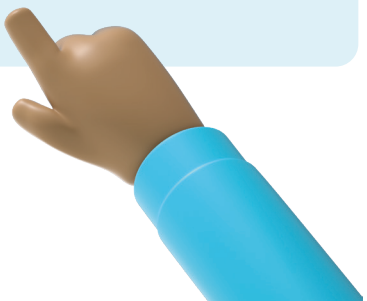
> *An AI system is a machine-based system designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments.*

The information on Wolt's products and algorithms in this report are based on our operations as of February 2024 in Austria, Azerbaijan, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Georgia, Greece, Hungary, Iceland, Israel, Japan, Kazakhstan, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Serbia, Slovakia, Slovenia, Sweden.

You can find the previous editions of the reports here:

Wolt Algorithmic Transparency Report 2022

Wolt Algorithmic Transparency Report 2023



Why Do We Care about Algorithmic Transparency?

by Dr Johann Laux, Oxford Internet Institute

The following text is written by a guest author. His views are his own and are not necessarily the same as Wolt's. But we believe these topics should be vigorously debated, and we welcome the opportunity for readers to consider this perspective while reviewing this report.

Humans once believed that ocean life could not exist below depths of 550m. This so-called Abyssus Theory was the result of scientific excavations in the Mediterranean Sea in the 19th century. Improved technology soon refuted the theory. Modern deep-sea exploration revealed a rich diversity of life even 10,000m below sea level. The drive to invent new tools to discover formerly inaccessible areas and thus increase our knowledge is firmly rooted in human nature. Today, underneath the surface of our social world, an ever-growing technological underbelly is slowly being made accessible. New tools and practices dive into the formerly hidden reality of algorithmic systems.

Algorithms are nothing but a set of instructions for a computational task. Yet, they curate our news, predict our ability to repay a loan, and recommend our next song. Recently, generative artificial intelligence (AI) showed us that algorithms can also write and draw. These systems long operated out of sight for most of us. Their creators did provide only little information about how they function and what they are being used for. To be fair, algorithms can be highly complex. We still need to find more comprehensible ways of talking about algorithms to give everyone a chance to understand their huge impact on our lives. Much of it has been positive. For example, they help to optimise delivery routes and thus to reduce emissions; and algorithms can take over boring tasks such as filling data into a spreadsheet. However, algorithms are human creations. They share some of the faults of their creators and execute them tirelessly.

2016 may well be regarded as the historical moment when society at large began its deep-sea exploration into the inner workings of algorithms. That year, scholars found a bigger audience for their warnings of the harms caused by these computational systems. A report on an algorithmic tool used by U.S. courts to assess the likelihood of a defendant committing crimes again in the future made headlines. The tool was found to be biased: black defendants were almost twice as likely to be falsely flagged as future criminals than white defendants. Algorithms' potential to discriminate and reinforce existing inequalities had been brought to everyone's attention.

Also in 2016, the General Data Protection Regulation (GDPR) entered into force. The GDPR requires that if an algorithm uses an EU citizen's personal data such as their name, location, or gender to render a decision that affects them, the citizen must be informed, and the logic of the algorithmic system must be explained to them.

These efforts to shine a light on otherwise hidden computational processes are commonly summarised under the term 'algorithmic transparency'. It operates on two levels. On the individual level, transparency allows users of a product or service run with algorithms to understand how its decisions are made. If provided with the right information, users gain control. They can decide whether to trust an algorithm and, if necessary, challenge an algorithmic decision. On the collective level, transparency allows society to investigate whether algorithms systematically disadvantage certain groups. Discrimination is often caused by the data that is fed into an algorithm. Social data contains the traces of discrimination that has pervaded our societies for millennia. Transparency tools can for example detect if a recruitment algorithm gives male applicants an unfair systematic advantage over female applicants. Once identified, society can correct course. Transparency thus paves the way to holding those humans who design and deploy harmful algorithms accountable.

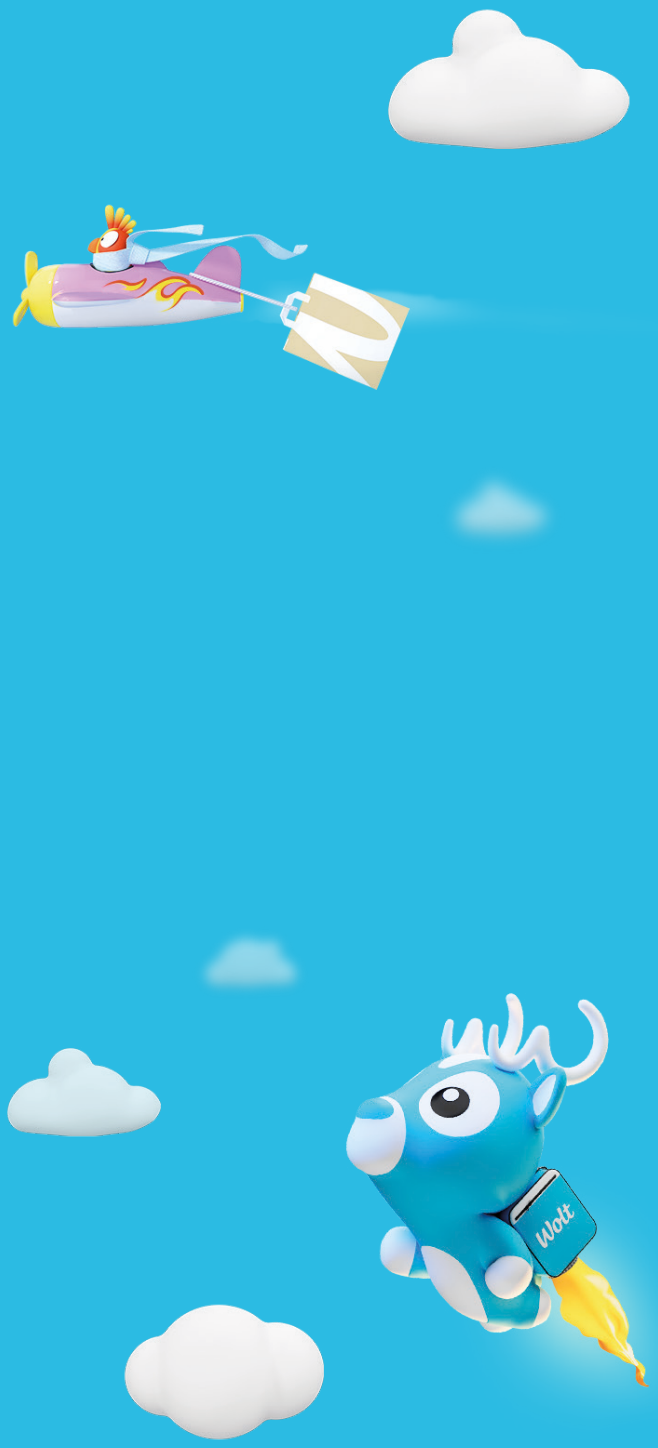
For algorithmic transparency to be effective, a multitude of methods needs to work in unison. First, laws are needed to crack open the protective layer of intellectual property rights which would otherwise allow businesses to protect their algorithms from public scrutiny. Like the recipe of your favourite soda, the set of instructions contained in an algorithm can be so valuable that their inventors have a legitimate interest that others do not copy them for free. The GDPR was such an opener, and other laws such as the Digital Services Act or the AI Act followed. Second, we need functioning technical tools to audit algorithmic systems for discrimination and unfairness as well as privacy and safety risks. With today's AI, even experts can struggle to interpret their decision-making. The field of explainable AI (XAI) therefore develops methods to explain the reasoning behind an AI's decision that humans can understand. Third, the audience of transparency does not only include technical or legal experts. Regular users are affected by algorithmic decisions. The information provided in transparency reports must therefore be digestible for every user.

By now, many tech companies have established teams that audit their algorithms for potential harm. However, the results and consequences of such in-house audits are often not reported. Even those companies who are committed to being open about their use of algorithms find it difficult to know whether they are providing the right information. While we now have laws that demand transparency, we still lack best practices and common standards which guide the application of these laws for everyone. In this vacuum, companies who have no intention of shining a light on their algorithmic systems may thus find ample opportunity for "ethics washing". By releasing largely useless information, they create an ethical façade to prevent regulators from enacting stricter laws and to avoid making real changes to how their algorithms operate.

To create a fair playing field, our toolbox for algorithmic transparency needs to continue to grow. We need technical standards and reporting practices that are sensitive to the rights and interests of everyone who is affected by algorithmic decisions. Only then can transparency empower users and enable society to rid itself from historical patterns of discrimination. The deep-sea exploration into algorithms that we began in 2016 is not only about technology, but also about ourselves and what we owe to each other as humans.

About the Author

Dr Johann Laux is a British Academy Postdoctoral Fellow at the Oxford Internet Institute, University of Oxford. He studies the legal, social, and economic implications of emerging technologies such as AI and Big Data. At Oxford, Dr Laux leads a research project called "The Emerging Laws of Oversight". The project asks how meaningful human oversight over AI can be effectively implemented.



Behind the SCENES: The Role of Algorithms at Wolt

Welcome to Wolt – a local commerce platform connecting people looking to order food or goods with neighborhood shops and restaurants offering them, and courier partners that make the deliveries to their doorstep within minutes.

Technically, however, Wolt is more than just one app – it's a whole ecosystem of products and services developed in-house to serve our partners and consumers. Wolt's mission is to make our cities better places to live. Each of the algorithms we build and use is intended to serve this mission by helping consumers more easily connect with local merchants they love, helping merchants grow sales and build successful businesses, and making it easier for couriers to access earnings opportunities, or improving the quality of our services.

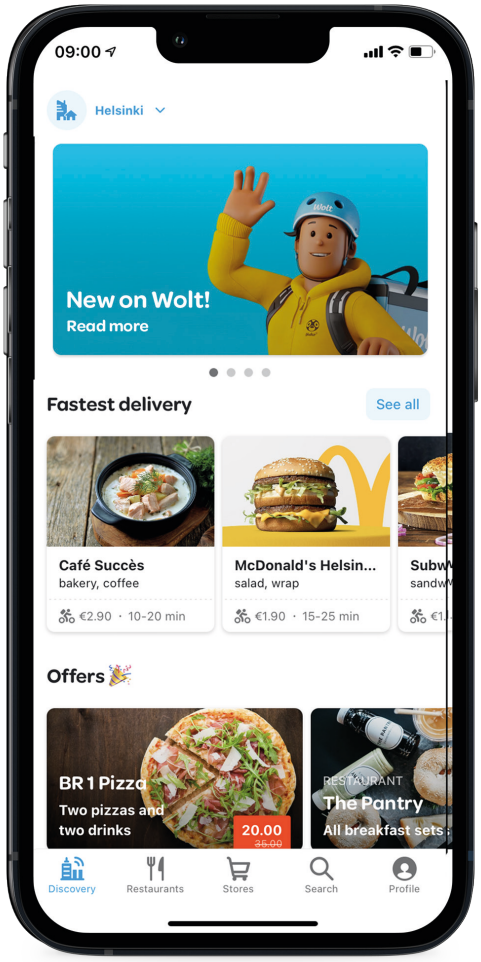
The people behind the algorithms

Before we take a deep dive into our systems, we have to also highlight the team behind building them. Artificial Intelligence – it's in the name – is human-made. Behind the AI systems at Wolt and all things tech, there is a team of more than 700 dedicated people. They are divided into over 80 autonomous product teams spread across the globe, but mainly located in our Tech Hubs in Helsinki, Berlin, Tokyo, Stockholm and Tel Aviv.

Consumers

Whenever you're in the mood for food, need a light bulb, or realize you forgot to grab dog food or diapers, the Wolt App can make your life easier by bringing you what local stores and restaurants in your city offer, straight to your door, at the click of a button.

When you open the app, you might wonder why a particular restaurant or store is being shown to you. In this section, we'll explain how our recommendation and search algorithms help you find what you want or need among the thousands of choices available. In 2022 more than 10 million consumers made 150 million orders across our 23 markets – choices are seemingly endless, and a little help to filter it down to make it relevant for you is essential. We provide here an overview of visibility on the Wolt platform. It should be noted that Wolt may change its algorithms, practices and parameters from time to time and may also conduct certain trials that have an effect on the visibility, rankings and search results.



Ranking & Recommendation Algorithms

The first screen that users of the Wolt App are greeted with is called 'Discovery'. Discovery lives up to its name – it's a place where you can explore what's available in your neighborhood.

You can also choose to view Discovery by only looking at a list of restaurants or a list of stores. Due to their differences, the recommendation system for stores operates differently compared to restaurants, and is detailed after the following section focusing on restaurants.

Restaurants in Discovery are ranked by:

- **Consumer's location:** To ensure swift deliveries and to maintain the quality of the food, we prioritize showing you restaurants that are closer to your location when you open the app. We want to avoid displaying venues that are too far away, as this could impact the timeliness and freshness of your order.
- **Opening hours of the restaurant:** We don't want to show you a restaurant serving really good food if it is not open and available when you open up the app looking for something to order.
- **Time of day when you open the app:** We humans tend to eat roughly around the same times of the day – breakfast in the morning, lunch around noon and dinner in the evening. We therefore think that you would be more interested in breakfast-related items in the morning and dinner options in the evening.

Carousel Ranking Algorithm

On the Discovery page, you'll see different content types displayed in a carousel format. A machine learning algorithm decides where each item goes, favoring what works best in each city based on the number of impressions and the number of orders of an item. This changes multiple times a day. So, depending on your location, time and highest conversion rates in a city, you'll see different content in different positions. There's also a manual option for local operations to control specific placements. For example, if we want to promote relevant venues for Valentine's Day or if there is sponsored content.

Collaborative Filtering Algorithm

We also try to make the content in Discovery even more relevant to you by basing it on what other consumers have ordered and what we think you might also enjoy. This filtering is based on consumers' purchase behavior, a method more commonly called 'collaborative filtering'.

Let's take a look at how this works in practice through the lens of two fictional consumers living in Wolt city – Alice and Bob. In the real world, the names of the consumers would remain unknown. The user data used by the recommendation algorithm is stored and processed through randomly generated IDs, ensuring the anonymity of the people involved.

Alice is a seasoned consumer at Wolt. She likes to order food from her favorite local sushi restaurant.

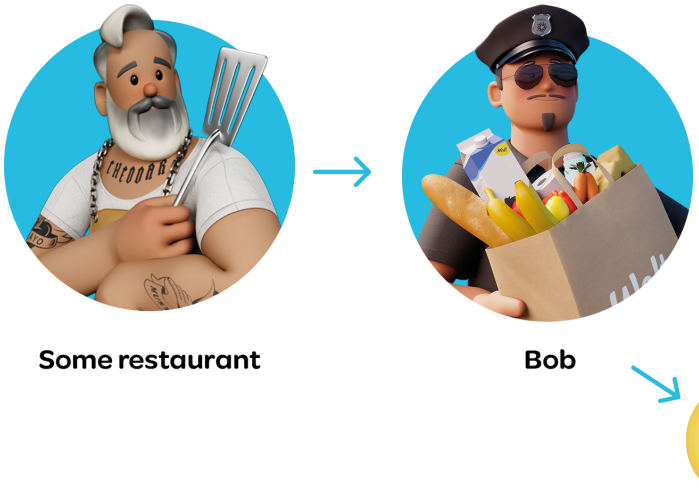
Bob is relatively new to Wolt. He has tried a few different restaurants, but has yet to find his favorites.

What Alice and Bob have in common is that they have both ordered and liked the food from the same pizza restaurant. 'Liking' meaning that they have either ordered from the restaurant again, opened their menu, added it to their favorites or rated it high. From this, we can assume that Alice and Bob have similar tastes (at least in pizza). If that assumption is correct, then Bob might be interested in Alice's favorite sushi place. So let's recommend it to Bob!

Now there are two different scenarios; either Bob orders from the recommended sushi restaurant and likes it (by rating it high, opening the menu, adding it to his favorites or ordering from it again). From that we can infer that indeed, Bob and Alice are similar in their purchase behavior and we can continue recommending them venues that they both like.

If Bob doesn't order from the recommended sushi restaurant or he orders, but does not like it (for example by not continuing to interact with the venue, such as by not ordering from them again). We make the conclusion that Bob is not that similar to Alice. If that is the case, we find a new 'Alice' for Bob to make sure we can help Bob find his favorite venues on Wolt.

Recommendationa are based on purchasing behavior



Recommendation in the 'Stores' section

Determining the best way to rank the most relevant stores and shops is different compared to restaurants. For instance, predicting the time of day you might order from an electronics or flower shop is more challenging compared to typical meal times for restaurants.

In the Stores section we therefore apply a different recommendation algorithm that prioritizes venues based on their:

- Popularity (partner sales figures on the Wolt platform)
- Customer rating
- Attractiveness (ratio of a partner's visibility to their sales figures). E.g. we support new venues (less than 60 days on Wolt) by boosting their visibility.

These main parameters are considered in equal parts. As with restaurants, we show only the closest franchise partners to your delivery address and prioritize any category lists displayed based on their popularity.

First-Time Users

How does personalisation work then for people who are new users? If they have not registered an account or have a registered account but with no purchases, recommendation will be based on a simple status model we call the 'First Time User'-model. The model works with aggregated data, so no personalisation is applied, and is used on the Discovery and Restaurants page.

In order to rank venues for first-time users, the model factors in:

- Venue delivery time
- Venue popularity (partner sales numbers on Wolt platform)
- Price level
- Delivery price
- Distance
- Type of business operation model (e.g. brick and mortar vs. virtual)
- Venue rating
- The number of ratings and retention.

The importance of these signals is determined through an automated machine learning process. Essentially, the system observes how each signal impacts a customer's choices over time. For example, if many customers prefer items with faster delivery, the influence of the 'delivery time' increases. This learning process is ongoing, adapting to changing trends and preferences on real-world behavior.

Recommendation in other parts of the experience:

In-cart

Once you are viewing your cart and ready to order, we may also recommend additional items that you might be interested in. This is based on item popularity, user purchase history, items in basket, and basket value. For example, if there is an item that a user has purchased frequently in the past 12 months, the system will recommend that item in case it is not already in the cart. How many times have you forgotten to buy milk while going to the grocery store? If it is a frequent purchase, we've got your back!

Ratings

Consumers have an option to rate the venue they ordered from after receiving their delivery. This rating system helps us to gain insights into their experience and preferences. We calculate the average rating (on a scale of 1 to 10) by aggregating the ratings provided by all consumers who have ordered from the venue in the past six months. This rating is displayed on both the Wolt App for other consumers and the Merchant App for the merchant to identify any areas that require improvement. The ratings are calculated and updated daily.

Search Algorithm

Wolt Search is designed to help you quickly and easily find products and services that are relevant to you. Wolt has two search functions that work differently: The standard search in the Wolt App and on the website, and the partner-specific search for searching a certain item at a specific restaurant or business.

Standard search

Standard search allows you to search the entire Wolt platform for products, services, and partners. When you enter a search term, we match your search with our index of partners (e.g. restaurant name) and product data (e.g. product description). To give you the most relevant search results, we also use synonyms and correct spelling mistakes.

By default, the results are sorted by 'Recommended', which is based solely on the:

- Venue's opening hours
- Text-based relevance of the search results (match of the search term with the partner and product data)
- Popularity of the venue (partner sales figures on the Wolt platform)
- Distance of the venue to the delivery address.

These parameters, determined by algorithms, weightings, and internal business rules, shape the partner's position in search results. Accordingly, the text-based relevance influences with most weighting the position of the partner in the search results, after all search results have been previously grouped according to the opening hours. The popularity of the partner influences the results with the second importance in weighting and the partner's distance influences the results as the least important factor in weighting. Partners matching your query but not open or located farther away are displayed at the end of results.

You can also sort the search results manually using different options, such as the delivery price and the partner's customer rating.

We also store your search history and suggest searches that you have used in the past. If you want to delete your search history, you can log out of the app, or manually delete previous searches.

Partner specific search

With the partner specific search you can search for items that are available at a specific partner. We match your selected search term with the partner's product titles and descriptions. The results of your search are always sorted based on the text-relevance of the search results (match of the search term with the product data).

Ads & Promotions

The order of your results in Discovery and the search results can also be influenced by paid placement. In this case, such results may be ranked higher than they would be based on the algorithms explained above. Paid placements are marked with the label 'Sponsored'. We'll go into more detail about ads & promotions in the section on Merchants below.

Accessibility

At Wolt, we are committed to ensuring that our products are accessible and usable for all users, including those with disabilities. We understand that for sighted users, visual cues often suffice to navigate and interact with our content. However, for users with visual impairments or other disabilities, alternative methods are essential for an equivalent experience.

To address this, we have implemented features like 'high contrast mode,' designed specifically for users who need a more distinct contrast between background and foreground colors. This mode can be enabled manually by the user or activated automatically if their operating system is set to prefer high contrast settings. This ensures that when a user opts for higher contrast across the web, Wolt.com will recognize this preference and adjust accordingly.

Furthermore, we are dedicated to ensuring that both Wolt.com and our iOS and Android applications comply with Web Content Accessibility Guidelines (WCAG) 2.2 standards. To achieve this, we are actively auditing our products to identify and rectify any issues that may hinder full compliance. Adhering to these guidelines serves a dual purpose: it not only guarantees that our content is easily navigable by users but also ensures that our products are developed with semantic integrity. This allows assistive technologies to effectively and clearly communicate all necessary information to users with disabilities.

We have also implemented training programs designed to increase awareness and understanding of accessibility issues among our staff. These programs cover a wide range of topics, from the basics of web accessibility standards, such as WCAG 2.2, to the practical implementation of accessible design and development techniques. Our goal is to ensure that every team member, regardless of their role, understands the importance of accessibility and how it impacts our users.

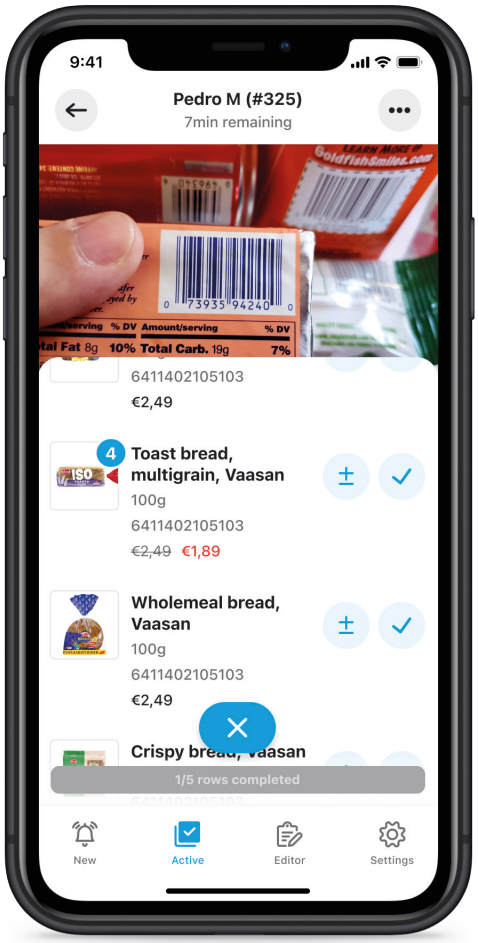
Merchants

Wolt helps local stores and restaurants bring their business online. We believe this empowers brick-and-mortar businesses to better compete with larger e-commerce platforms and restaurants to reach a wider audience, allowing them to generate more sales while providing additional job opportunities in their communities. In this section, we will explore the products and tools available to merchants, as well as how algorithms help streamline their business operations.

Wolt MERCHANT

Our easy-to-use Merchant App simplifies business growth, running smoothly on any device and adapting to specific merchant requirements. For instance, restaurants use tablets to manage orders, view live courier forecasts, and receive timed reminders for scheduled orders.

For retailers handling larger orders (e.g., supermarkets), the app provides valuable picking support, facilitating accurate item selection and enabling the marking of individual items as missing or for replacement.



Efficiency Algorithms

For merchants, we mainly use algorithms and automated systems to ease the burden of mundane tasks, enabling them to concentrate on their core business activities. In today's tough economic climate, our tools assist merchants in running their businesses more efficiently, optimizing operations, offering valuable insights, and expanding their customer base.

Going digital

Wolt's services enable merchants to reach customers they may not have been able to with just their stores. In order to do that, we help merchants bring their goods online via easy to use self-service tools and integrations.

Merchants encompass a wide spectrum, ranging from small-scale mom-and-pop shops to large enterprises with numerous venues. To ensure our solutions cater to this diverse range, we assist merchants in seamlessly integrating their existing operations and software with the Wolt platform, tailored to each merchant's unique requirements.

Through integrations, our merchant partners can effectively manage their Wolt delivery operations using familiar tools such as point-of-sale software (POS) or enterprise resource planning systems. This eliminates the need for multiple operating processes or devices across different channels. Real-time data sharing between systems minimizes errors and enhances the overall consumer experience.

These integrations are made possible through our open Application Programming Interface (API) platform, empowering merchants to develop custom integrations aligned with their system design and preferences. The API facilitates smooth communication between our software and the merchant's systems. Furthermore, our Wolt Developer Portal offers partner developers comprehensive guidelines and insights to develop high-quality integrations using our open APIs. Partners gain the ability to manage menus, orders, and Wolt stores directly from their systems.

For merchants without sophisticated software, a robust online presence, or development teams, we have a no-code solution so that they can easily integrate their business needs with the Wolt platform

Our APIs

Order management API

Enables partners to get orders and put them into their POS systems. Our system sends (webhook) notifications while a partner's system pulls order details. Partners are able to accept, reject, and mark orders ready directly from their POS systems.

Menu management API

Enables our partners to push their venue/store specific menus to Wolt. This saves time and effort by preventing duplication of work. Partners manage their menus on their venue's POS or other menu management system and the same reflects on their Wolt store.

Venue management API

Enables partners to manage their venues without having to use an iPad. They can control the venue's opening hours and status.

What's on offer?

The venue's offerings, known as 'listing', contains a vast array of items. Setting up a venue's listing on Wolt, especially in retail settings, can be labor-intensive, often involving thousands of products. Automation has significantly streamlined processes, particularly for listings featuring multiple images. Previously, each picture had to be uploaded individually, but now we've introduced a bulk upload tool. This tool allows merchants to upload numerous images at once, automatically matched to the correct product using identifiers like barcodes in the filenames.

Moreover, we also provide automated bulk tools for importing listing data from text files, enabling listing sharing across venues and establishing a comprehensive product database. Additionally, we use third-party automation tools like X-Menu and OpenAI's GPT-models to expedite the online transition for merchants. X-Menu aids in extracting restaurant menu information directly into Wolt's merchant tools, while we use GPTs to understand the meaning of product information uploaded by merchants (e.g. is this a meal or a drink or cutlery), which helps customers find these more easily.

Selling stuff

After a consumer places an order in the Wolt App or on the website, the baton is handed over to the merchant to fulfill the next steps in the Wolt journey. Once received, the merchant has the option to either accept the order and start preparing it, or reject it if the item is unavailable or they lack the time to prepare it.

Once a merchant accepts an order, they then begin preparing it. We suggest to the merchant an estimation of the preparation time. We do this to better estimate the best time for the courier partner to arrive at the venue and to provide estimates for the consumer's delivery expectations.

The order preparation time estimate is based on:

- The courier partner's proximity and availability.
- The expected preparation time by the merchant (predicted based on their usual duration, order size, and current workload).

The merchant can either accept our estimate or provide a new estimate that aligns with their ability to fulfill the order. This respects the merchant's operational capability and in-store experience, while reducing waiting times.

Once the order is ready, the courier partner takes over the next part of the Wolt journey, making the delivery to the consumer.

Knowledge is power

With data and insights to recommend actions for improvement, merchants can grow their business. At Wolt, merchants have access to all their data – from sales data to customer reviews and general insights on purchasing behaviors and trends. Knowing the busiest days and times can help merchants make better decisions about staffing and preparation.

Ads & Promotions

It's important for merchants to stand out and market their businesses effectively for growth. At Wolt, we offer restaurants and stores the opportunity to promote their venues to attract more visits, gain new customers, and ultimately increase sales.

How does it work?

Merchants enjoy access to convenient self-service tools on Wolt for running their ads. Within this tool, they can decide how long they want the campaign to run for and how much they want to spend. They can opt to boost their venue's visibility across Discovery, Search, and the Restaurants and Stores tabs, and are only charged for ads when someone clicks on them and makes a purchase from their venue. Additionally, the tool offers valuable daily performance insights, enabling merchants to fine-tune their ad strategies as needed.

Boosting your visibility

When a merchant runs an ad to enhance their visibility the placement of the ad is based on three key factors:

- Location and availability of the venue.
- Personalisation score based on quality of the ad for the specific user in question.
- The merchant's bid to spend for each conversion.

All venues whose placement is based on ads are labeled as 'Sponsored', and it is also possible for the consumer to expand the label to see why they are being shown this particular venue and on whose behalf the ad is displayed.

Search ads

Merchant ads are also shown in search results. We use a machine learning model to automatically generate keywords for venues based on which terms users search for and then organically buy from said venue. For example, if lots of people who search for 'burger' end up buying from Restaurant X, then the system infers that 'burger' is a suitable keyword for Restaurant X. Should Restaurant X choose to then boost their venue's visibility, it will show up as a sponsored venue in the search results of users looking for burgers.

Promotional activities

We also offer merchants and brands opportunities to run promotional campaigns, such as offering discounts on their products or free deliveries. With promotions merchants can choose whether they want to target users who have not yet purchased from their venue, or to target all possible users.

More services and products available to merchants

Wolt Drive

Wolt Drive lets our partners add fast and reliable last-mile deliveries to their online store checkout with easy set-up, live tracking and world-class customer support. Their customers place an order and in less than an hour it's in their hands.

Wolt Self-Delivery

Our merchant partners use their own in-house couriers to deliver the orders while using Wolt to reach more customers and accelerate business growth.

Courier Partners

At Wolt, we partner with thousands of self-employed courier partners who can decide when, where, and how they want to perform delivery services. The following section explains the technology that the courier partners interact with and how the delivery journey works.

Wolt Courier Partner App

The Wolt Courier Partner App is the central hub for courier partners. In the app, they can access delivery offers, along with insights on when and where a city is more busy with deliveries and see their real-time earnings totals.

Once logged in to the app, courier partners can decide if they want to make themselves available for deliveries by choosing to go online. They are free to choose when they go online during Wolt opening hours in their location, as there are no available deliveries when the platform is closed.

Making sure the right courier partner is offered the right delivery

Courier partners play a crucial role in connecting consumers with local merchants by making the deliveries. With over 60,000 orders occurring simultaneously at times, ensuring every order is delivered is no small feat.

That's where our task algorithm comes into play – it's designed to offer delivery tasks to the most suitable courier partner available based on four main parameters:

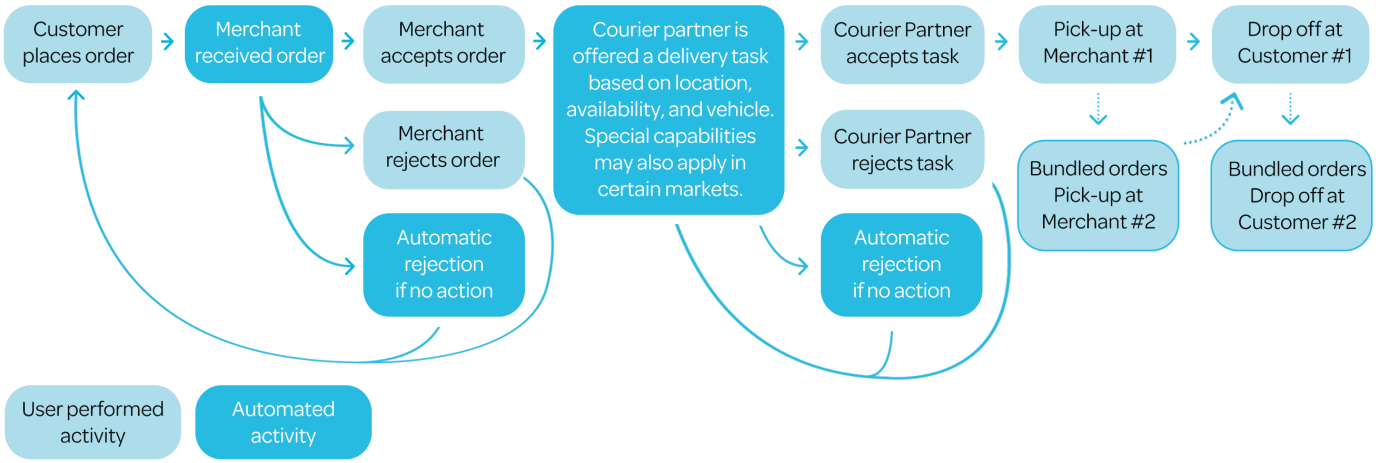
Availability: The algorithm needs to know that a courier partner is online and has marked themselves as ready to accept deliveries or if the courier partner is not available due to being offline or busy making another delivery.

Location: The algorithm needs to know the location of the courier partner to understand their proximity to the pick-up location. It receives the courier partner's location data when they are online in the Wolt Courier Partner App and not when they are offline.

Delivery vehicle: The algorithm needs to know the delivery vehicle the courier partner is using to understand their capacity for larger orders and the vehicle's speed. We currently factor in three different vehicle types—bicycle, motorcycle, and car—and the data is based on the courier partner's own reporting. In 2024, we are planning on adding more vehicle types, such as e-bikes, to accommodate the variety of capacities and speeds these vehicles offer, ultimately improving the accuracy of the algorithm.

Special capabilities: Some courier partners have capabilities to deliver special kinds of orders based on training or interest on their behalf. For example, only some courier partners are able to deliver pharmacy orders or handle cash in markets where this is available.

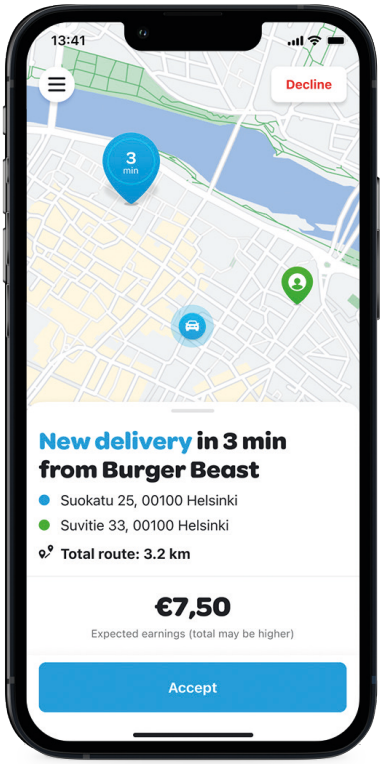
Task algorithm flowchart



Delivery offers are only made to one courier partner at a time, and courier partners are offered the choice to either accept or reject the task at hand. Deliveries may also be offered as bundles in case there are multiple orders to pick up at the same venue or multiple venues in the same area and then subsequently drop off to different consumers who may live generally in the same area.

To help inform courier partners about the offer, every offer comes with information about:

- The name of the venue
- Pick-up location
- Drop-off location
- Estimated distance the courier partner needs to make to complete the delivery
- Expected amount to be earned (the total may be higher, for example, due to customer tips, but it will never be lower than what is shown in the delivery offer).



If the courier partner does not respond to the delivery offer, it is automatically rejected within 30-60 seconds (range depending on market). Based on the same parameters above, the task algorithm then calculates the next suitable courier partner. There are no penalties for rejecting delivery offers, and this does not impact the courier partner's future delivery offerings.

At Wolt, we do not use any type of performance monitoring or rating to factor into the task algorithm. In fact, courier partners are anonymized in connection to the automated delivery offering so that no type of subjective criteria, like personal characteristics or traits, could be factored in the algorithm.

Delivery Time Estimation Algorithm

Delivery estimates before you place an order

When you open the app, you might wonder how we predict the delivery duration displayed for each venue. For consumers, this pre-checkout delivery estimate may play an important role in choosing where to order from.

The pre-checkout delivery time estimate is computed using a mix of data sources, which include:

- Delivery distance between venue and consumer
- The ratio of ongoing deliveries and active courier partners
- Average delivery time in the city in the past 30 mins
- Average venue order fulfillment time in the city in the past 30 mins
- Average venue order fulfillment time in the city based on different aggregations of historical data
- Pickup estimate in the city based on the past month's pickups
- Current weather conditions in the city

Delivery estimates while waiting for your order to be delivered

You've placed your order, eagerly awaiting its arrival, while the delivery estimate countdown clock ticks away in the app. But have you ever wondered how we calculate these delivery estimates after you've placed your order?

The order tracking estimates consider factors such as:

- Venue preparation time
- Courier partners' availability
- Courier partners' estimated travel time incl. type of vehicle, as well as the time needed to find the venue or your location.

One of the factors for calculating the delivery estimates is the estimated travel time for the courier partner to make the delivery. Ensuring the accuracy of these estimates is crucial, as it not only reduces the average delivery time but also lowers the costs associated with service quality by minimizing the likelihood of late deliveries. It's important to note that courier partners are not required to complete the delivery within the estimated time frame. Deliveries made later than what was estimated are often due to circumstances outside the control of the courier partner, such as difficult traffic or weather conditions.

In 2023, we introduced a machine learning (ML)-based travel time system to enhance the accuracy of travel time estimates for the delivery estimate. With our new ML-based model, we learn from past deliveries how the travel time varies over time. This more dynamic approach, updated hourly, better adapts to traffic fluctuations throughout the day, such as peak lunch and dinner times.

Similarly, we leverage ML-models to predict the time needed by courier partners to locate the venue or the delivery location once in a given geofence. These pickup and dropoff service times correspond to the time needed by courier partners to park and walk to the target location.

The pickup and dropoff service times are estimated considering information, such as the average delivery execution time in the neighborhood, the order size or the vehicle type used by the courier partner. In 2023, accuracy improvements were achieved through using a modified algorithm (based on decision trees), training on larger time windows, and incorporating additional features like the courier partner's vehicle type. These enhancements ensure that our predictions reflect the real-world challenges faced by courier partners and contribute to a smoother and more efficient delivery experience for everyone involved.

Algorithms Enhancing Safety

Algorithms play an important role in enhancing safety in the digital space. With thousands of people who deliver on our platform on a daily basis, we take every action to prevent the misuse of our platform and protect it from being a place to treat anyone unfairly.

We already check every courier partner's ID and working permits when they join the platform, but we also use facial verification technology to ensure that the person making deliveries is who they are supposed to be. In practice, this means that a courier partner can get a request to take a selfie on the Wolt Courier Partner App. The facial recognition technology then compares the selfie to the photo in the ID documentation on file, to ensure that the two images match.

Automated facial verification improves partner privacy by standardizing biases across checks and minimizing data exposure within our systems, compared to manual verification. This helps mitigate potential biases and keeps data transfers to a minimum, supporting our principles of privacy and data protection.

Our initiative stems from a desire to responsibly manage platform access, safeguard customer privacy, and maintain the integrity of our courier partner community. We will continue to develop our technology, platform and operations to ensure that Wolt is a safe service for everyone.

The Principles of our Pricing Model

At Wolt, we are committed to ensuring that courier partners engaging with our platform have access to attractive earnings. Courier partners are entitled to a delivery fee for each completed delivery they choose to accept. Based on the experiences gained from millions of deliveries since our very first in 2015, we understand that no two deliveries are alike. The same trip can be very different on different days due to elements out of courier partners' control, such as traffic or weather conditions. Our ambition is therefore to make each task equally attractive for courier partners to accept. We want to ensure that each task is priced based on the effort needed to complete it.

The model for pricing each individual delivery is based on the following factors:

- **Delivery distance:** The actual estimated traveled distance (not based on straight line distance) by the courier partner from the pick-up location to the customer (and each successive consumer in case there are bundled deliveries).
- **Pick-up distance:** The estimated distance traveled to reach the pick-up location (if applicable).

Moreover, to make the estimation even more accurate, the model may also take into account:

- **Consumer and merchant location type:** The locations might be difficult to reach (e.g. limited parking space).
- **Weather:** Difficult weather conditions may also impact the delivery. In case of severe weather, operations will be closed.
- **Type of order:** Bigger orders in terms of volume and weight, such as large grocery orders, usually impact the delivery and should therefore be reflected in the pricing.
- **Other factors:** Other conditions, such as difficult terrain or poor parking, higher need for courier partners to come online due to time of the day or other special events may also influence the estimation.

It is important to note that the delivery fee and service fee consumers pay Wolt is usually just a fraction of what Wolt pays courier partners for their services. In fact, there is no direct link between what consumers pay and what we pay courier partners for their delivery services, e.g. promotional fees or discounted delivery fees do not negatively impact earnings. In addition to the delivery fee consumers pay, Wolt funds courier partner earnings from the fees we charge merchant partners and other revenue sources.

Support

Support makes up roughly 40% of our whole team here at Wolt, and is the backbone that holds everything together. Whether it's our consumers, merchants or courier partners, Support is there in case any hiccups occur. And quite often even before that, as we continuously monitor our operations and proactively reach out to our consumers in case we spot any potential delays or other issues.

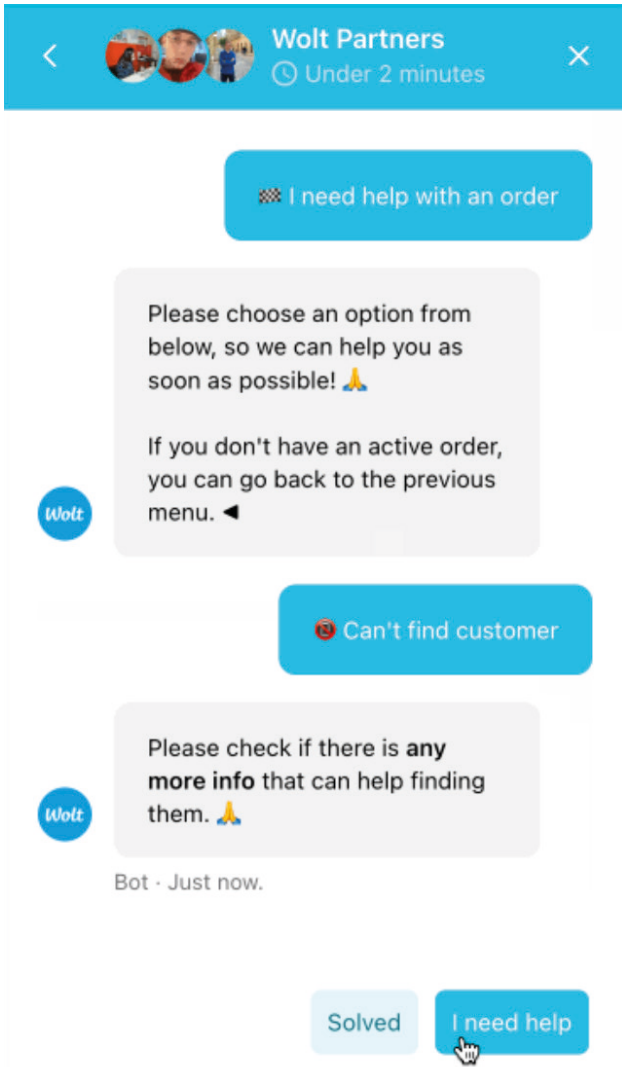
The main tool for contacting Support is through our in-app chat, available on all Wolt apps. In the chat you can talk to our team of support associates that are available to you in all local languages in the markets we operate.

Bot flows

To make it easier for consumers or partners to get help from Support via the chat, we show you clickable options to filter your request for quicker service. These options, called 'bot flows', are not chatbots, but predefined choices based on common issues. The options you see depend on whether you're a consumer, courier partner, or merchant and whether you have an ongoing order/ delivery or not.

How you interact with the pre-defined choices helps our Support understand what kind of help you need. For example, whether it's regarding a late delivery or something missing from your order.

Many problems can be fixed without speaking to our live Support. But if we can provide a better service by handling the conversation, our team is always available to help you. You can also always be connected to a real person through our support email (or by phone if available in your country).



Generally about Generative AI

Ever since ChatGPT entered our vocabulary in 2023, generative AI has become a household name for many. It is likely even your grandmother has heard about it. But what really is generative AI?

Very simply put, Large Language Models (LLMs) churn through vast amounts of text to learn the patterns of words in those texts. Once the patterns are learned, the models are able to generate new text based on some input text, like a question. Generative models pick words based on probabilities, generating them one at a time. The model's 'intelligence' comes from learning many patterns from its vast amount of data.

It's clear that generative AI has caused unforeseen waves in the technology space, and we at Wolt are strong believers in its potential to change the way we use tech in the medium to long term for the better. With such a significant shift, it's understandable that it will take some time for the tech industry to figure out how this technology can be applied in the most useful way. So far, we haven't generally seen any killer features based on generative AI, especially not in user-facing interfaces, and the early adopters are still testing the best application areas for the technology.

Generative AI at Wolt

From the point of view of a company operating a business in the physical world, generative AI can help us improve efficiency in several areas of our operations; the physical world is a messy place and generative AI can help at the interface of the physical and digital world!

For example, we use third-party automation tools like X-Menu and OpenAI's GPT models to help and speed up the online transition for our local merchant partners. X-Menu helps extract restaurant menu information directly into Wolt's merchant tools, avoiding boring and time-consuming manual tasks. The GPT models help with the integration of large, intricate product lists from retailers and merchants into our tools.

Other ways we use generative AI is through OpenAI's API to analyze and summarize text, received through our Support chat, regardless of the language. This assists our Support in being more efficient in responding to partners on all sorts of matters ranging from feedback to delivery instructions.

While the technology is useful for understanding the unstructured free text and images, and other data that we collect, the impact of generating new text and data is still lagging behind. One hindrance we currently see with LLM-powered features is the unsolved quality control and security aspects of the technology, not to mention the lack of warmth and human tone of voice in the generated text.

The space is obviously very new, and development in these areas, along with many others around generative AI, is extremely fast and well-resourced. Therefore, we are certain that best practices around these aspects will emerge. Wolt is following the space intensely, and developing our own solutions and governance processes to be able to use the technology to its full potential in a safe way.

Ensuring strong AI governance

At Wolt, we have an *AI Usage Standard* that defines how machine learning (ML) or AI solutions may be used. Whenever someone wants to use such a system at Wolt, there are three things they must go through:

1. Conduct a risk analysis
2. Follow purpose-specific guidelines for specific usage scenarios of AI/ML
3. Follow general requirements that apply to AI/ML

Our AI governance is dynamic in nature. We constantly develop it further to make sure it meets our current and future needs.

Risk analysis

For any new or substantially altered application of AI, a comprehensive risk analysis is essential. This includes conducting Data Protection Impact Assessments if personal data is involved, and performing Transfer Impact Assessments if data is to be transferred out of the EU or processed by non-EU entities not covered by the EU Commission's adequacy decision.

When a new third-party vendor is involved, a specific onboarding process must be followed, including various checks and considerations. This process also includes Intellectual Property Rights considerations in cases involving generative AI. Additionally, before deploying any AI system, a thorough evaluation of implementation-specific risks, including security threat modeling, is needed.

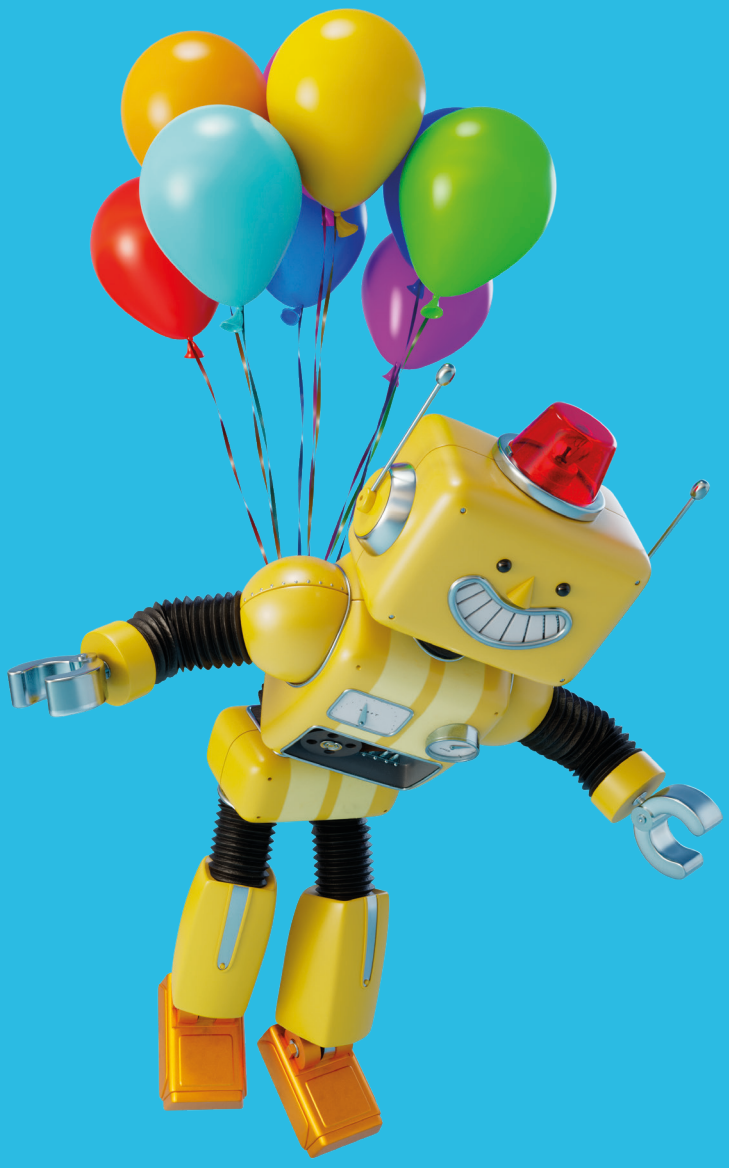
Purpose-specific guidelines

Depending on the purpose of the AI system, there are specific guidelines that have to be followed. For example, if a system is intended to be used for AI-based code generation, the generated code has to go through human review as there might be a risk that the automatically generated code would have security vulnerabilities.

General requirements

The *AI Usage Standard* also demands that any usage of an AI system needs to follow certain general requirements to ensure the safety and privacy of our users and partners. These are as follows:

- **No autonomous automatic decisions:** AI must not alone make automated decisions that have legal effects or similarly significantly affect an individual. In practice this means that the AI can mostly suggest alternatives, but the final decision should always be made and approved by a human.
- **Don't let generative AI speak for Wolt:** The output of generative AI should not be used in externally facing communications without a sufficient quality assurance action, to avoid a situation where a model would provide incorrect data with an implied authority
- **Enforce data retention periods:** If the AI system will store personal data by itself, e.g., for model learning, validation, or fine-tuning, a data retention period must be defined and personal data storage must be aligned with Wolt's data subject access rights and data deletion processes.
- **Ensure that AI systems are aligned with the legal basis of processing personal data:** If the AI system processes personal data, it has to take account of the legal basis under which we process the data. For example, allow for the deletion of data, consent withdrawal or ensure options for restricting and objecting to processing.



Privacy, Security & Data - Oh My

Privacy and security are at the heart of Wolt. We respect the privacy of our consumers, partners, and employees, ensuring Wolt is consistently reliable, available and secure to use. Upholding privacy isn't merely a compliance obligation; it's integral to creating trust and building strong relationships with all individuals whose data we process.

Data protection

We are committed to protecting the data of our stakeholders. Irrespective of the service and our privacy legal role therein, we constantly aim to limit the personal data to the very minimum that is required for the service and purpose in question. For specific and up-to-date information, please refer to our respective privacy statements.

You should always consult our privacy statements for the most up-to-date information on how we process your personal data. But let's have a look at some examples why we may do so:

- **For contractual and legal reasons:** We collect and process personal data solely for specific purposes, such as fulfilling contractual and legal obligations. For merchants and courier partners, we implement 'Know Your Customer' (KYC) and 'Know Your Business' (KYB) processes to prevent money laundering, to meet the requirements for tax reporting for digital platform operators, and screen for internationally sanctioned entities. Additionally, we monitor our platform for fraudulent activities, including voucher abuse, account takeovers, and bot account creation.
- **To serve our consumers, merchants and courier partners:** Wolt takes pride in world class customer service and we've always been highly rated compared to our competitors in that respect. In order to perform customer service tasks, we process relevant data in order to provide the best customer experience.
- **For business development and analytics:** We collect only the necessary amount of information about our users, their purchases and behavior on our platform in order to improve our service. Monitoring business performance through various metrics derived from our data pool is vital for our service offering and quality as well as customer satisfaction. This data is analyzed on our analytics platform to inform business development efforts. We've implemented security controls and information barriers in order to limit the personal data and business information exposed to our employees.
- **Law enforcement data requests:** We regularly cooperate with local law enforcement agencies to comply with data requests relating to criminal investigations in accordance with the applicable law. Data requests must always be linked to ongoing investigations, based on applicable legal grounds and must be appropriately limited to specific activity, time and place.

Data subject's rights respected

We respect individuals' legal rights and provide them easy, secure and privacy-friendly ways to ensure they can access their data or execute their other legal rights. Also, we can always be contacted and are happy to help with privacy related matters through our dedicated channel privacy@wolt.com.

Product security and privacy

At Wolt, security is a foundational requirement for ensuring privacy and the correct functioning of algorithms. Although security aspects cover much more than just personal data protection and algorithmic integrity, those areas are directly affected. Hence, it's useful to have a deeper dive into how Wolt manages the security of its products and the platform.

More details on Wolt's approach to security and our security whitepaper are available from our Security and Compliance web page.

Our architecture consists of individual services developed by independent teams (a microservice architecture). Because these services vary in terms or architectural location, programming languages, frameworks, and usage scenarios, their security needs differ. While teams have autonomy on security approaches within our applicable security policies and standards, we centrally provide common software security services to address typical needs. The most critical security requirements have been set in our *Secure Development Policy*. Our architecture naturally segregates services behind APIs, minimizing the impact of potential attacks to specific services.

Security and privacy in product management

Wolt adopts a 'Privacy by Design' and 'Security by Design' approach during product concepting and design, where Product Leads identify high-level security risks and consider privacy compliance and physical safety aspects as a part of their product concepting. Our Security and Privacy teams support the Product Leads when needed, and have continuous visibility to the developing product plans.

Security in development and operations

The actual software implementation and development process is based on DevOps, meaning that the product teams have responsibility not only for developing but also deployment and operations of their systems. The deployment pipeline is automated as much as possible, which allows us to offer centralized security services. The infrastructure is managed as code, so it is version controlled and benefits from similar quality checks as program code. Code changes are subject to Wolt's change management procedures.

Security can also be viewed as an aspect of quality. Wolt has a Quality Assistance team whose members are embedded in the development teams. The Quality Assistance team coaches the developers towards adopting quality assurance practices such as team-specific quality criteria. New employees working in product development get awareness training both by the Quality Assistance and Security teams.

Application security

Wolt emphasizes security throughout the development process, with teams encouraged to identify and document potential threats iteratively, particularly during design stages. Technical design documents have distinct security considerations sections, and the Security team has continuous visibility to these documents as they are being created. Development code is under version control, enabling visibility on quality and security metrics. Automated tools and a four-eyes-principle enhance code integrity, with security defects tracked through a unified system. Externally facing services are subject to regular independent security assessments, and we run a continuous vulnerability reward program.

Security operations and incident management

We believe that an unmonitored system cannot be secure. Extensive logging and observability ensure proactive monitoring, with security-critical logs collected into a SIEM system. We know that despite all our precautions, security incidents are unavoidable, so we run regular incident simulation exercises with variable scenarios tailored to us by external partners.

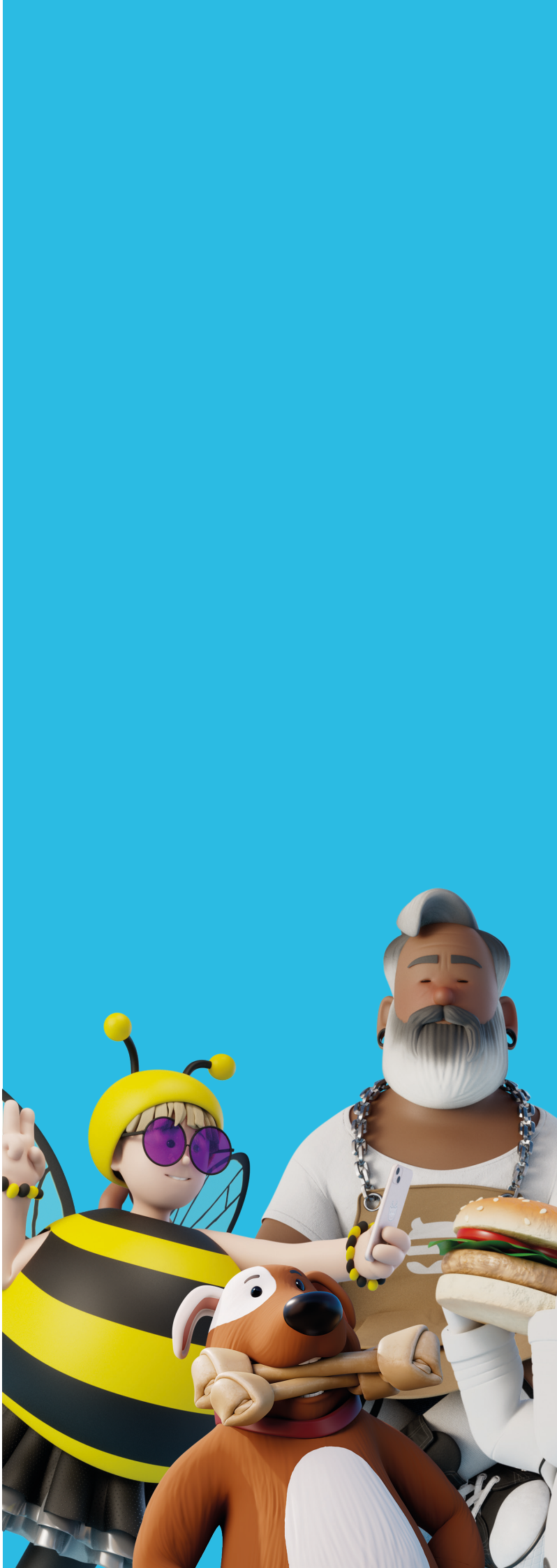
ISO 27001 certification

Wolt's Information Security Management System (ISMS) has been ISO 27001 certified since 2022. This is a big deal for us for many reasons, primarily because we want to demonstrate our commitment of protecting our customers, merchants and courier partners' data. Wolt was also among the first companies in our industry to acquire this certification.

Wolt's certified ISMS covers our Product organization including, e.g., product development, platform development, engineering and associated support teams: Security, IT, People, Risk Management and Legal.

Additional information and disclaimers:

This Wolt Algorithmic Transparency Report is limited to the relevant subject matter. For more information, please review Wolt.com and DoorDash.com, including the information that we have provided in our interim and annual reports.



Thank you!

Wow! You've made it to the end of our 3rd Algorithmic Transparency Report. Thank you for taking the time to read it – or *kiitos* as we say in Finnish!

It's a project that's been made possible with the dedication of numerous teams and people at Wolt and through invaluable feedback from external contributors. If you want to speak with us about all things algorithmic transparency, you can get in touch via: transparency@wolt.com. The alias is managed by Wolt's Public Policy team, who will gather the right internal people to get back to your questions, feedback and other input you might be interested in sharing with us.

Thank you again and we look forward to sharing another packed report with you next year!

Wolt