Disease surveillance with

Lifebit REAL

Tracking tomorrow's diseases today

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Introduction

Lifebit's products and consulting solutions make health data usable and accessible for life-saving research. <u>Lifebit REAL</u> is our machine learning (ML) solution to track real-world data and gain insights into real-time disease distribution. Lifebit's disease surveillance software includes an alert system that notifies users when a new disease outbreak is detected, or an ongoing outbreak spreads.

This whitepaper focuses on Lifebit REAL, our solution that tracks disease spread in real-time.

Lifebit REAL enables organisations to keep ahead of the curve with pathogen surveillance and incorporate these early warning systems into their responses.

Disease surveillance can transform how commercial organisations prioritise drug and vaccine development pipelines and how public health bodies implement disease mitigation strategies.

The Lifebit REAL platform is used by <u>Boehringer Ingelheim Animal Health</u> for the detection and early reporting of global disease outbreaks.

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We are strategically partnering with Lifebit to leverage AI to monitor and interpret scientific sources in real-time, enabling us to track data related to animal diseases. This, in turn, will accelerate the detection process as the vast amounts of scientific relevant information being produced at many levels cannot be feasibly collected and analysed manually.

Prof. Dr. Eric Haaksma
Head of Animal Health
Global Innovation,
Boehringer Ingelheim

The increasing impact of infectious disease: today and tomorrow

In recent years, infectious diseases caused by viruses, bacteria, fungi or parasites have had a catastrophic impact on the lives of people across the globe[1]. In particular, <u>zoonotic diseases</u> (infections transmitted from animals to humans) have become increasingly prevalent, with repeated pathogen 'spillovers' into human populations[2].

The most recent example is the COVID-19 pandemic, but a multitude of other zoonotic pathogens continue to wreak havoc on global communities, including MERS, SARS, Ebola and monkeypox[3].

These outbreaks have been caused by pathogens moving from an animal into a human host. There are multiple reasons that these zoonotic disease outbreaks or 'spillovers' are becoming more frequent, more severe and having more serious consequences, which include:

➔ **Climate change**
➔ **Urbanisation**
➔ **Destruction of natural environments**
➔ **Travel**
➔ **Population growth**[1]

Given these factors will only continue to increase - it is highly likely that the emergence of zoonotic pathogens will also continue to rise.

The burden of infectious disease is substantially higher in lower and middle income countries compared to those with higher incomes[4]. This problem is further compounded by the emergent antimicrobial resistance crisis[5]. It is clear we are 'sleepwalking' into the next pandemic.

60% It is estimated that 60% of known infectious diseases have an animal origin.
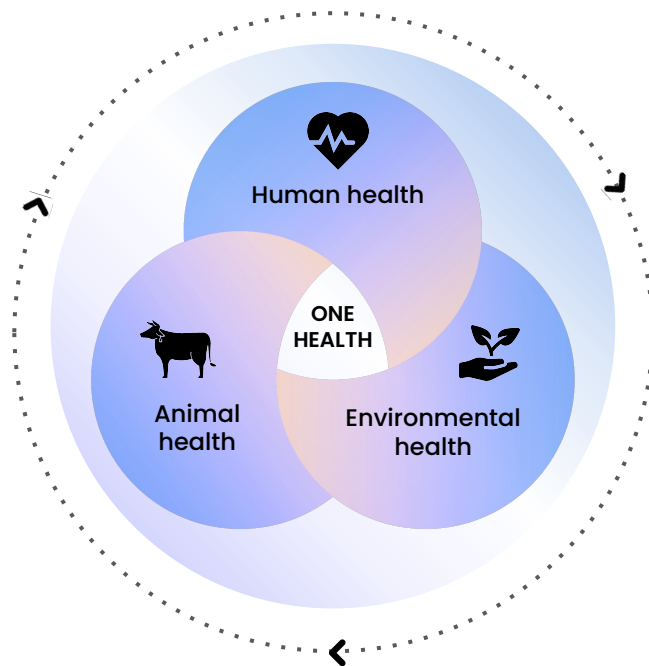
75% Additionally, up to 75% of newly emerging pathogens are zoonotic.[2]

Using a One Health approach to address the impact of infectious disease

This impact of zoonotic disease spillover is increasingly recognised and is being addressed using an approach termed **One Health**[6].

One Health is a holistic view which seeks to maximise the health of humans, animals, and the environment in a sustainable manner.

However, the One Health approach still needs strengthening at regional, national and international levels - and global networks are needed to share data. There is a clear opportunity for innovative technology solutions, such as Lifebit REAL, to drive this field forward.

Disease surveillance is a critical priority to prevent the next pandemic, as part of a One Health approach[7].

Human health

ONE HEALTH

Animal health

Environmental health

THE CHALLENGE

Addressing the increasing impact of infectious diseases

The COVID-19 pandemic, along with other recent zoonotic pathogen emergences, has made abundantly clear the requirement for a worldwide framework for infectious disease surveillance.

Being able to accurately and rapidly detect disease outbreaks and identify hotspots for potential outbreaks is crucial to being able to respond quickly. Obtaining this information is key for multiple stakeholders.

For governments, public health and policy experts, understanding where and when diseases are spreading is important for many reasons. It allows these stakeholders to:

➔ **Target public health measures** accurately where they can have the most impact

➔ **Distribute treatments** and medical supplies to areas that require them most

➔ **Deploy vaccines** to areas that will benefit from them

➔ **Prevent further spread** of the disease outbreak and ultimately save lives

In terms of **research and development**, monitoring disease outbreaks are crucial in both an **academic and industry** setting.

Allowing researchers to track diseases and notifying them of emerging outbreaks enables them to develop and test relevant diagnostics, treatments and vaccines sooner. This faster access improves patient outcomes and ultimately saves lives.

From a commercial standpoint, this real-time access to disease outbreak information will enable organisations to:

➔ **Tactically position their business** and operations in preparation for change

➔ **Adjust their focus** and rapidly fill new industry niches

➔ **Increase potential to boost revenue** and profits, by leaving competitors behind
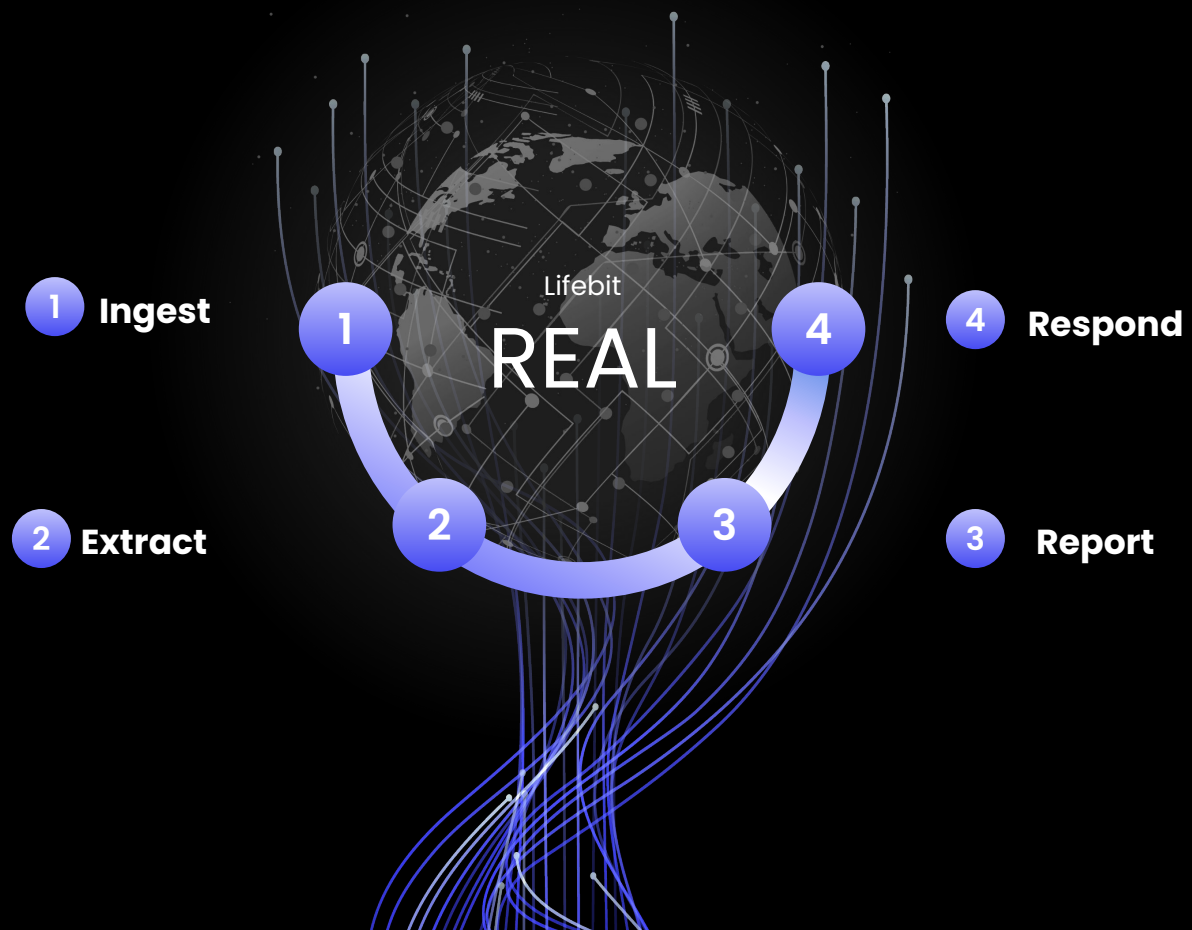
THE SOLUTION

Using Lifebit REAL to predict tomorrow's diseases today

Lifebit REAL is an AI tool that enables disease surveillance in real-time for organisations spanning academia, industry and governments. Lifebit REAL utilises ML and NLP to extract information from a vast range of real world data (RWD). It provides a real-time view of how frequently, and in which locations, diseases are affecting health globally.

Enabling collaborative **Epidemic Intelligence** through our proprietary ML disease surveillance software will allow our clients to prepare effectively for the next pandemic.

How does Lifebit REAL work?

Lifebit REAL works in four steps, which are explained below.

Lifebit REAL takes advantage of the vast amount of RWD available today and combines this with advances in ML and NLP to obtain disease outbreak insights.

1 Ingest

The first step is data ingestion. Data sources utilised by REAL include, but are not limited to, the world-wide-web, scientific publications, news articles, social media posts, government institutes and public health agencies.
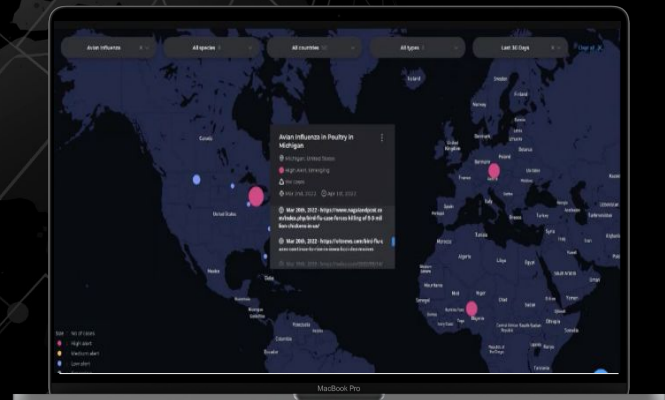
2 Extract

Harvested articles are ingested into Lifebit's proprietary AI and NLP algorithms.
The NLP algorithms extract relevant data fields such as date of disease event, number of cases of the disease, the species affected, the location of the disease event and the causative disease agent, as shown below.

3 Report

Disease and outbreak information is compiled to reveal insights into disease distribution as viewed in the Lifebit REAL app. When the disease landscape changes, such as where there is transboundary disease spread or an emergent agent is identified, the user can be notified via email alerts.

4 Respond

Clients are provided with actionable information that can be used to make data-driven decisions. The client is empowered to utilise data synthesised from thousands of articles that would normally be lost as noise.

Advantages of Lifebit REAL for disease surveillance

Table 1: The benefits of using Lifebit REAL for disease monitoring

Cloud deployment supporting scalability and security

→ Lifebit REAL is fully deployed and maintained on Lifebit's Cloud account. This ensures ultimate security with a secure sign-on procedure and account management to keep your insights safe.

Federated technology secures data at its source

→ When a client wishes to include their proprietary data in the application, they do so with the data remaining on-site, so it is secure and never copied.

Best-in-class NLP algorithms

→ Lifebit REAL's NLP algorithms are proprietary and best-in-class. They are developed by our team of NLP researchers. Lifebit REAL provides client-specific training of algorithms for ultimate accuracy of results.

Active learning for continuous improvement

→ AI feedback loops are in place to ensure the system undergoes continuous improvement and user feedback is fed into the system to produce results that are useful to the specific user.

Fully customisable

→ Notifications and alerts can be personalised ensuring that users and organisations only receive notifications that merit attention and are truly useful to them.

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Conclusion

Lifebit REAL offers unparalleled insights into disease distributions and trends, utilising best-in-class AI and an easy-to-use web app.

Obtaining pathogen spread information via Lifebit REAL allows organisations to respond faster and more efficiently to disease outbreaks.

We envisage rapid expansion across the pharmaceutical and public health sectors, accelerating insights from real-world data.

How to get started with Lifebit REAL

01 →	02 →	03
Book a demo	**Create your blueprint**	**Stay ahead**
Learn how REAL provides insights for the diseases you care most about	Co-develop a strategy to leverage RWD for your areas of interest	Leverage RWD to stay ahead of your competition and at the forefront of innovation

Request a demo

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Let's get in touch.

Email **hello@lifebit.ai** to talk to us or arrange a demonstration.

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