**KONE: Using Artificial Intelligence To Move Millions Of People Every Day**

Finnish-headquartered elevator and escalator engineering and maintenance group KONE are responsible for 1.1 million elevators worldwide.

It considers its mission to be to improve the flow of urban life, and at Heathrow Airport in London alone it is responsible for moving 191,000 people every day using 1,035 escalators, elevators and autowalks.

In 2017, KONE announced an ambitious data-driven program with the target of measuring and analyzing data collected from thousands of pieces of machinery all round the world. The information will be processed with machine learning algorithms and made available to other operators and maintenance businesses.

**What Problems Is Artificial Intelligence Helping To Solve?**

With so many moving parts across a large number of complicated systems, breakdowns and faulty equipment can mean that thousands of people are affected by delays.

Having to wait until things go wrong before remedies can be put into place leads to further downtime and inefficiency, while replacement parts are sourced and moved to the locations where they are needed.

As well as this, coordinating different people-moving equipment in large buildings is a difficult task. When someone presses an elevator call button, the system has to decide which car is best placed to respond. In many situations this won't be the closest one – which may already be full, or heading in the wrong direction. As this is traditionally handled by non-intelligent machines, it can often mean passengers waiting for longer than necessary.

**How Is Artificial Intelligence Used In Practice?**

KONE began the process of teaching machines to operate themselves back in the late 1980s, when microprocessor control of elevator systems started to become the norm. Processors were designed to estimate the average number of passengers that would be waiting at each floor and adapt the way they operated predictively.

Today, KONE has connected more than 1 million of its escalators and elevators to the cloud. They are fitted with sensors that can pick up everything from the start and stop times of elevators leaving and arriving at floors, to acceleration, temperature, noise levels and the frequency of vibrations running through cables.

KONE CEO Henrick Ehrnrooth told me: “We are connecting elevators and escalators to the cloud … that means we're connecting a lot of data, and this enables us to provide significant value for our customers.

“When you're managing a building, it's important to have a full understanding of what's going on, all the time – What is happening? How is the equipment performing? How are people moving in the building?”

With all of this data, machine learning algorithms are able to build models that enable correlations and outliers to be determined, which leads to a build-up of the machine's “understanding” of when faults or breakdowns are likely to occur. This means maintenance work can be more efficiently scheduled, and replacement parts are more likely to be in the right place at the right time.

Artificial intelligence also informs the “group control” function of elevator systems, which coordinates the way that multiple elevators operate together – for example, deciding which elevator is best placed to respond to a waiting passenger's press of the call button.

This is done by taking into account the predicted demand and availability of every elevator in the system together, and making decisions on the best way to move everyone efficiently.

KONE packages this data up into a service it calls KONE 24/7 Connected Services and sells it to other operators, enabling them to take advantage of machine learning-driven predictive analytics themselves.

**What Technology, Tools And Data Are Used?**

KONE launched its 24/7 Connected Services through a partnership that saw it working together with IBM. More specifically, it uses IBM's Watson cognitive computing platform to understand and learn how its machinery is working.

You can actually listen in on the system's conversation at [http://machineconversations.kone.com](http://machineconversations.kone.com/) – and experience for yourself what has been described as “both really dull and truly fascinating” interaction between machines.

Data is collected by sensors connected throughout the machinery, and this includes a limited amount of “edge computing”, where decisions about which data is or isn't useful are made within the sensors themselves. This helps to reduce the overall data volume by cutting out worthless “noise” at its source.

## What Were The Results?

KONE, as well as other engineering and maintenance businesses using the connected system, is able to better understand the operation of its machinery and more accurately predict breakdowns and failures.

This cuts down on wasted time and energy – both on the part of the engineers themselves and the millions of people that rely on its equipment to get them from A to B each day.

On top of this, machinery can operate more efficiently. For example, an elevator can learn how busy it is likely to be at certain times of the day, and adjust the time it waits at each floor to allow passengers to enter. In buildings with multiple elevator systems, their operation can be co-ordinated so they travel more frequently to floors where they are needed, reducing passenger wait time.

## Key Challenges, Learning Points And Takeaways

* As buildings – and populations – grow larger, improving the efficiency of systems responsible for moving people around is vital to ensuring the smooth flow of urban life.
* In industrial applications, more data makes it more likely that machines will make accurate predictions – by “crowd sourcing” from its own machinery, KONE ensures that its systems are trained using the best possible real world datasets.
* KONE has leveraged one of the key opportunities offered by the “data age” by becoming a data provider. It is effectively monetizing its own data by packaging and selling it to other organizations. It recognizes that its own data is valuable due to its power to drive change and efficiency.

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