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China Unicom transforms operations with AI based automation

Nokia AVA AI and Analytics

Case study

China Unicom is transforming its traditional network operations from manual methods and towards a greater use of automation, AI and big data-based analytics.

As part of this transformation, China Unicom wanted to avoid the time consuming and costly manual testing of wireless networks. To meet the CSP's needs, Nokia used its AI expertise to build an AI-driven Smart Wireless Analysis Tool (SWAT). Based on China Unicom's own big data and network AI platform, SWAT replaces conventional 4/5G field testing, leading to major increases in testing efficiency and dramatically reduced costs.

The vision

China Unicom was spending a lot of money on optimization, but manual methods gave a poor result.

In its aim to provide an excellent service for customers, China Unicom was finding that optimizing 4G and 5G networks was taking a lot of time. The CSP was spending around €24 million per year and 251,000 working days on 4G and 5G field testing but could only cover about 80% of the network range. This made it difficult to monitor quality in the remaining 20% of the network.

Problems taking too long to resolve

Even a skilled engineer took between 30 minutes and an hour to deal with a 5G network problem, from identification, to discovering its root cause then deciding on the best action. This meant that each engineer could only handle 12 problems a day.

Subscribers were finding that their complaints about service took extended amounts of time to resolve – VIP customers' issues required engineers to visit their sites to conduct testing, which typically took at least four hours to complete.

As a result, customer satisfaction was suffering.

The benefits

The solution had a dramatically beneficial effect on China Unicom's operations.

Field testing costs saved per year **16 million euros**

Accuracy of Root Cause Analysis improved to **91%**

Problems identified increased by **36%**

Time to resolve problems cut by **67%**

Working days saved per year **167,000**

How Nokia helped

Using existing data, the AI solution analyzes the entire network.

During a Proof of Concept exercise, China Unicom compared Nokia's offering with that of other potential providers and concluded that its combination of secure AI models and cost savings made it the best fit for its needs.

Another point in Nokia's favor was that its proposed Smart Wireless Analysis Tool (SWAT) made extensive use of China Unicom's existing data contained within its Hadoop data platform.

Distributed processing covers the complete network

Decoupled from the existing OSS system and based on cloud native architecture, SWAT provides closed-loop 4/5G network virtual testing. This encompasses automated data collection, problem identification, root cause analysis, decision making and evaluation of results. SWAT uses the distributed processing of the Hadoop platform to analyze 55 billion records per day, from across all 31 provinces of the network and for all 317 million subscribers. With data accessed from all users and from all sections of road, the test range can cover 100% of the network.

APIs interpret actual customer perceptions

Intelligent analysis of the data was provided by 10+ mature 'out-of-the-box' AI models. These conduct tasks including LTE DL SINR prediction, VoLTE MOS prediction, wireless problem aggregation and user identification.

The data and AI capabilities can also be used by external systems through the use of over 50 RESTful APIs. This means that the Customer Experience Management system, the Customer Churn Management system, and the Customer Complaint Management system can all interpret the actual customer perception of the service, removing the need for onsite testing.

AI and Analytics

Unlock network intelligence

Discover more here

The opportunity

SWAT solution cuts costs and gives customers a measurably better experience.

The SWAT solution produced a number of measurable and valuable benefits for China Unicom.

One of the major benefits was to reduce the need for road testing, a factor which saved the CSP some 16 million euros a year. Previously, the company was using up over 250,000 working days a year conducting 4G/5G field tests - since the implementation of SWAT, this has been reduced by 167,000 working days, with 12 road tests a year reduced to only four.

### Field testing now covers complete network

A major goal of the client was to extend the effective field test range. The SWAT solution achieved this, extending the road testing range from 80% to nearly 100%, an increase of some 25%.

Reducing the problem resolution time significantly was another major success for SWAT. Before the solution was implemented, it would take an experienced engineer 45 minutes to solve a 5G network problem – identifying the problem, discovering the root cause and deciding how to fix it. SWAT's AI models helped reduce this to only 15 minutes, a saving of 67%.

Customers see problems solved in half the time

Root cause analysis (RCA) also benefited. Traditional RCA methods could typically achieve an accuracy of around 75%, while SWAT's AI based methods achieve 91%.

Customers are also having a better experience, with AI models being used to quickly find and resolve customers' wireless problems, cutting time to resolution from 4.5 hours to just two hours.
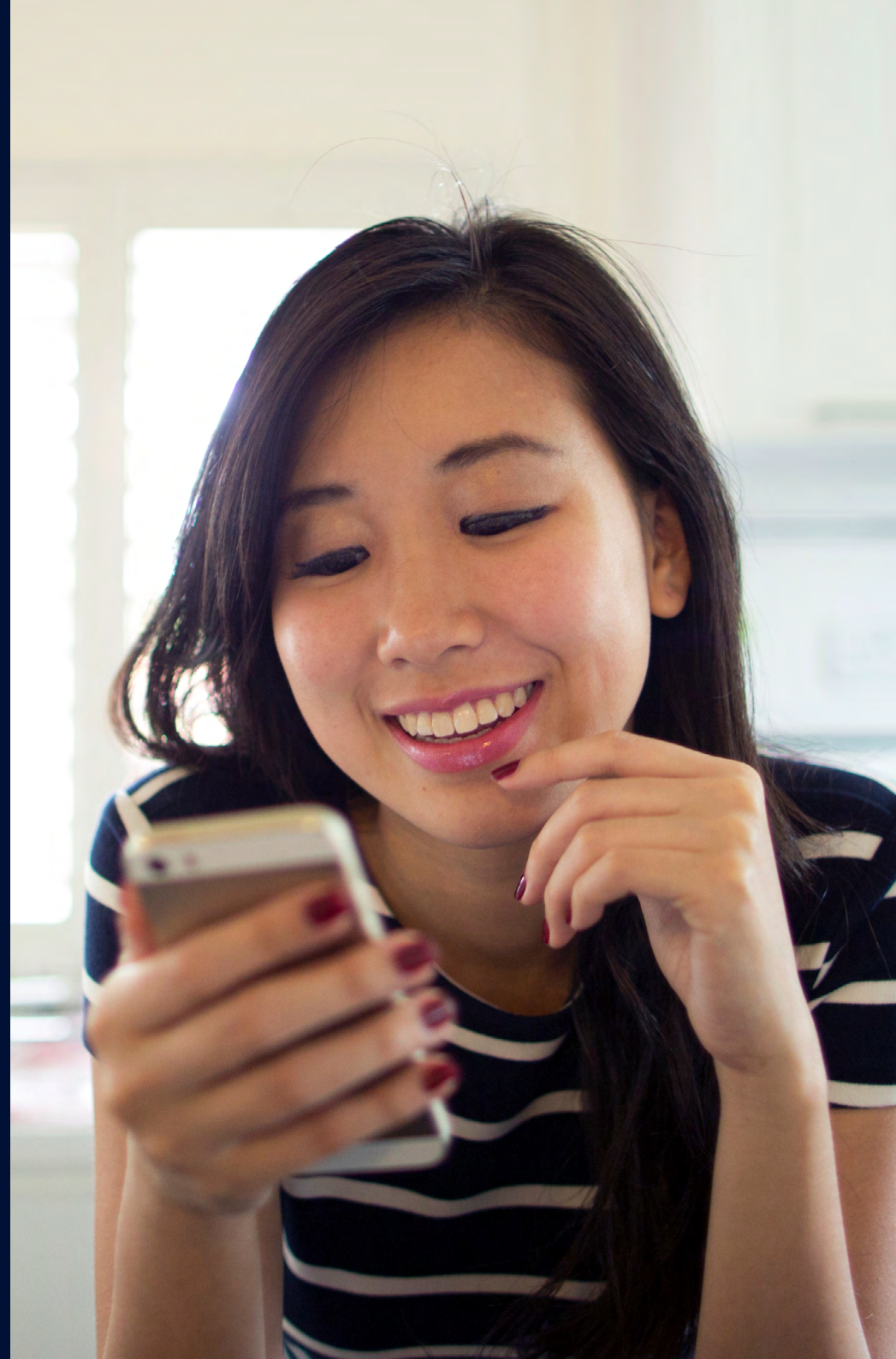
The customer's view

"Immediately upon deployment, the Nokia SWAT (Smart Wireless Analytics Tool) solution demonstrated the value it can deliver. Nokia is the trusted strategic partner in AI area for China Unicom, we are expecting more co-operation with Nokia to support Unicom AI network operation in digital transformation."

LLiu XianSong, Director of Shanghai AI Center
China Unicom

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering the future where networks meet cloud to realize the full potential of digital in every industry.

Through networks that sense, think and act, we work with our customers and partners to create the digital services and applications of the future.