

Super Sensors: the Perfect Picture of Health

A proactive, data-driven healthcare solution that harnesses the power of AI, IoT, and Machine Learning (ML)

Client: Healthcare insurers

Industry: Healthcare & Life Sciences

Project Type: Proof of concept / conceptual architecture



Overview

1 Challenge:

Managing a busy healthcare organization isn't just about treating patients anymore. Ever-increasing patient expectations around e-health have stepped up the pressure on the industry.

Now, the industry challenge is moving from reactive (non-technological), to proactive (monitoring, smart watches, etc.) and predictive (using data) healthcare.

2 Approach:

Introducing smart technology into the everyday lives of individuals, without compromising patient privacy, provides the insights needed to improve patient-centric care.

Our approach benefits healthcare providers who need to manage costs, quality, and access to the service. It also supports healthcare insurers looking for innovative ways to reduce the number of claims made, and patients who want to stay as healthy as possible, for as long as possible.

3 Solution:

Super Sensors are capable of monitoring entire environments. They use a single custom plug-in sensor board packed with multiple individual sensors.

The solution integrates data from a patient's home environment with data from external sources – weather, pollen count, activity data from wearables and mobiles, and so on – to produce a 360° health model of a patient's life.

4 Outcome:

Luxoft utilized AI, ML, and IoT to create a Super Sensors solution which enables users to predict and act upon health issues, as well as supporting their aspirations to maintain optimal health.

The Super Sensors identify changes in patient behavior that could indicate a deterioration from normal health. They mine information that helps provide low-cost, proactive healthcare, reducing costs for payers, providers, and patients, alike.

Solution Dashboards

The dashboard consists of four main panels:

- Profile Panel (Moreen!):** Shows a profile picture, heart rate (80), distance (2,3 km), and weight (53,7). It includes sections for 'Achievements' (Light sleeper, All meds in time!), 'Medications' (Foradil 0,012mg - 2 times a day), and 'Appointments' (27 Apr, 10:00 am; Life Clinic Ltd; Elm street, 47-105; Dentist: Mr. Aaron McLaughlin).
- Your home Panel:** Displays smart home controls for Living room (Dancing), Bathroom, Kitchen, Bedroom, Children room (Playing), and Garage (Washing).
- Weather Panel:** Shows weather for Bern, Switzerland: clear, 25,4°C, 43% humidity. Includes a 'Wearables & gadgets' section with step counts: 3656 steps and 2170 steps.
- George, 35 Panel:** Shows a profile picture, heart rate (65), distance (23,3 km), and weight (75,3). It includes 'Achievements' (Best cyclist!, Protein master, Breathing cool) and an 'Activity' section showing 'dancing now...'.

Challenge

Reactive care is no longer up to the job

Every year, in spite of spending something like \$3 trillion¹ on healthcare (around double that of other developed countries), the USA falls short of their goal. The problem is that managing a busy healthcare organization isn't just about treating patients anymore. Ever-increasing patient expectations around e-health, as well as an increasing familiarity with, and understanding of, technological advances have stepped up the pressure on all concerned. However, one of the most enduring challenges for the healthcare industry has been managing this transition from reactive (non-technological), to proactive (monitoring, smart watches, etc.) and predictive (using data) healthcare. This is true, particularly for healthcare insurance companies that focus on the following areas:

- Ensuring patients are adhering to doctors' orders
- Preventing healthcare issues escalating to chronic conditions
- Reducing acute scenarios requiring medical treatment
- Enhancing public health

The Luxoft Super Sensors solution complements the work that you do, streamlining processes and heightening results.

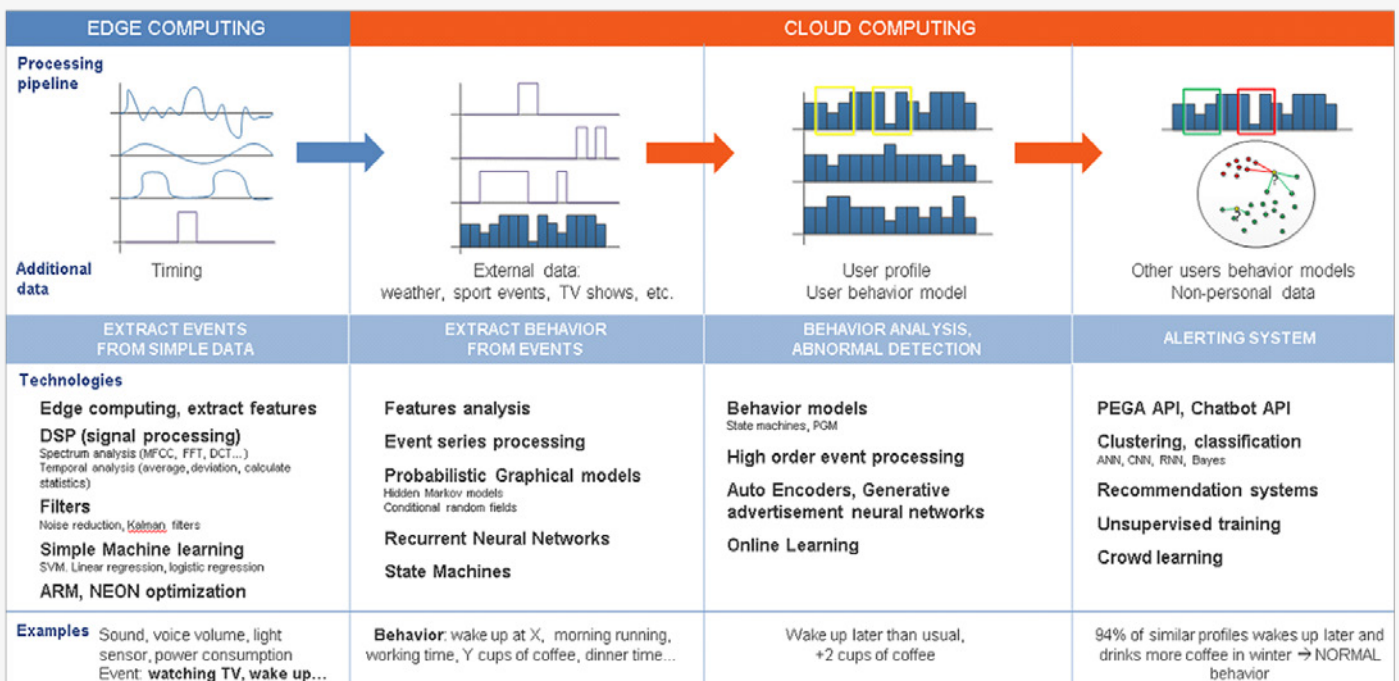
1. <https://medcitynews.com/2018/09/shifting-healthcare-needs-why-reactive-care-is-no-longer-cutting-it/>

Approach

Smart technology can help implement telemedicine to prevent health complications early, without compromising patient privacy. The solution identifies individuals with similar characteristics to the patient (calculating their behaviors, habits, etc.), tracking deviations from their usual behaviors – deteriorating health, for instance. Our solution also benefits healthcare providers who need to manage costs, quality, and access to the service, as well as healthcare insurers looking for innovative ways to reduce the number of claims made. And, not forgetting patients who want to stay as healthy as possible, for as long as possible.

Solution

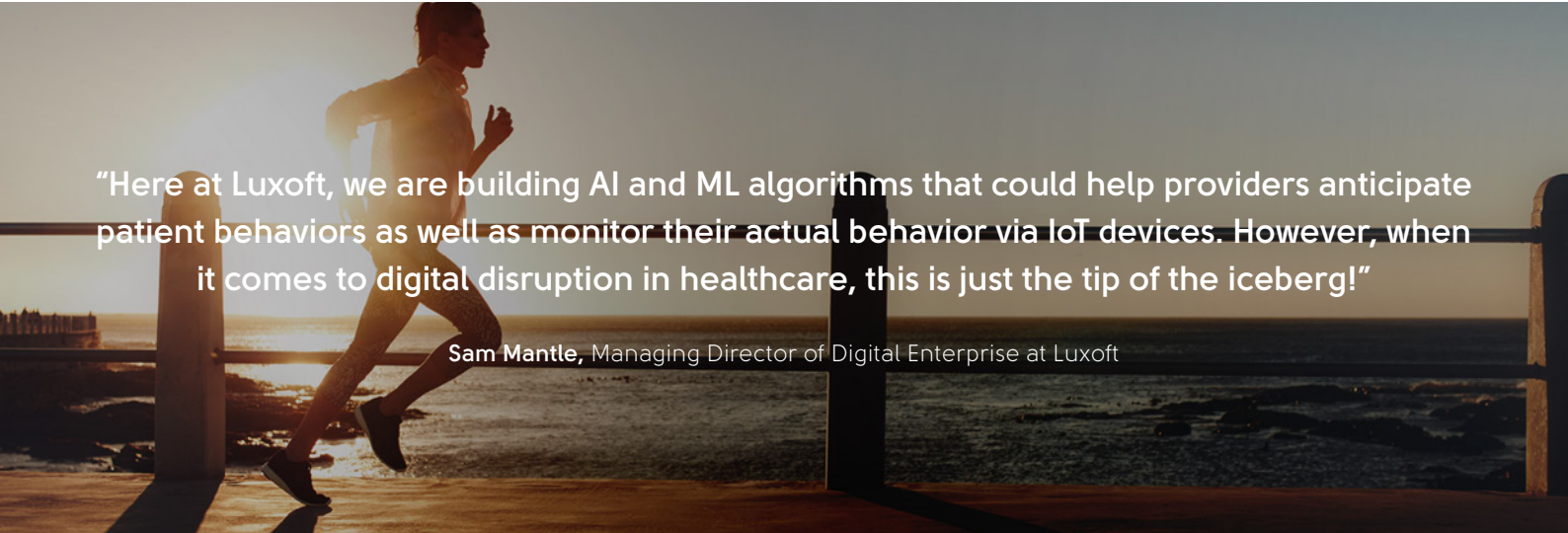
IoT-driven, predictive healthcare



Super Sensors are capable of monitoring entire environments and the activity within them, without the need for direct instrumentation of objects. These sensors use a single custom plug-in sensor board packed with multiple individual sensors but, crucially (from a privacy point of view), no camera.

Data from each sensor is combined and processed with the help of machine learning (ML) algorithms, and used to infer signals that cannot be measured directly. Deploying multiple sensors in an environment that networks one with the other creates a Distributed Sensing System. This system uses the power of self-learning algorithms to collect data from home environments, wearables, mobile devices, and external sources (including medical histories). It determines an individual's behavior patterns, then predicts events and takes action if anything out of the ordinary occurs. The data, again with the use of ML, is abstracted into meaningful representations that the whole population can understand.

The solution integrates data from the home environments of patients with data from external sources, such as weather, pollen counts, plus activity data from wearables and mobile devices, to produce a 360° health model of their lives.



"Here at Luxoft, we are building AI and ML algorithms that could help providers anticipate patient behaviors as well as monitor their actual behavior via IoT devices. However, when it comes to digital disruption in healthcare, this is just the tip of the iceberg!"

Sam Mantle, Managing Director of Digital Enterprise at Luxoft

Result

Promoting healthy lives, and healthy balance sheets

Thanks to IoT, AI, and ML, Luxoft's solution helps:

- Predict health issues and act upon them: remote healthcare monitoring prevents health issues by detecting potential problems early without compromising patient privacy.
- Support users in maintaining optimum health: identifying changes in patient behavior that indicate a deterioration from normal health, mines information that can be used to focus on providing low-cost, proactive healthcare. This not only reduces the cost burden to providers/payers, but also ensures patients live as long and healthily as possible.
- For patients, our solution improves the quality of their health, longevity, disease detection, and prevents serious health conditions.
- For healthcare insurers, our solution increases access to patient health, and optimizes insurance costs.

These are just a handful of the new opportunities made possible by the combined value and performance of AI, edge processing, and IoT that Luxoft delivers to help the healthcare industry achieve business outcomes through innovation.

Are you ready for predictive healthcare?

Contact Us

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