

Fisher & Paykel Healthcare Transforms Respiratory Device with Predictive Analytics

11ANTS ANALYTICS CASE STUDY

CLIENT: Fisher & Paykel Healthcare
INDUSTRY: Medical Device Manufacturing

Fisher & Paykel Healthcare is a leading global manufacturer of products and systems for use in respiratory care, acute care and the treatment of obstructive sleep apnea. With over 40 years' experience manufacturing medical devices and products sold in over 120 countries, Fisher & Paykel Healthcare continues to be recognized as one of the most innovative companies in this space.

SITUATION

Fisher & Paykel Healthcare prides itself on industry-leading solutions. A current challenge F&P were facing was how to distinguish between different types of respiratory phenomena and modulate treatment appropriately.

As the underlying physiology of the phenomena was fundamentally different, it was hypothesised that analysis of an appropriate signal may provide a way to differentiate between the states. The hope was that machine learning predictive analytics techniques could be successfully used to provide a solution.

David Whiting, Fisher & Paykel Healthcare Product Development Manager describes the situation: 'While we knew that 11Ants Analytics had some powerful proprietary technologies and know-how, and we hoped that there may be some exploitable patterns in the data, we were unsure of the chances of a successful outcome prior to their engagement. However, within a few weeks of working with 11Ants Analytics and reviewing preliminary results we could see that their approach actually yielded encouraging results within a short period of time.'

SOLUTION

Fisher & Paykel Healthcare engaged 11Ants Analytics and issued them the challenge of finding patterns in the patient breathing flow data.

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11Ants Analytics mobilized its team of leading data scientists. The combination of 11Ants Analytics proprietary technologies and know-how did indeed discover new patterns in the data. This was no regular simple statistical analysis exercise, rather careful deployment of a combination of complex machine learning techniques, complex data transformations and highly advanced mathematics. 11Ants Analytics worked closely with Fisher & Paykel Healthcare's engineers over a period of several months.

The engagement followed 11Ants Analytics standard four step process of engagement for professional services:

1) Plausibility, 2) Experimentation, 3) Model Development, 4) Deployment.

This methodology serves as an effective means for clients to exploit advanced predictive analytics while significantly de-risking the process. A brief description of the process follows:

1) Plausibility – plausibility requires establishing if there is a plausible correlation between the data available and the thing required to be predicted. This does not require any sophisticated analysis, rather is a matter of consultation between 11Ants Analytics and Fisher and Paykel Healthcare. In this case it was established that it was quite plausible (though as yet unproven) that there

was a relationship between the data and respiratory states.

2) Experimentation – This involved doing some preliminary analysis of the data to establish what the likelihood of success was. It was determined that useful patterns did exist in the data, and that it was worth continuing on towards full predictive model development.

3) Model Development – This component involved more diligent analysis of the data with view to build the best predictive model(s) possible. Often this may involve gathering additional data, different data transformations, and increased algorithm evaluation. This work is now significantly de-risked based upon the results of the experimentation phase. 11Ants Model Builder and other proprietary technologies featured heavily in both the experimentation and model development phases.

4) Deployment – This is where the predictive model gets ‘operationalized’. In this case it was determined that the most logical solution was to code the resultant algorithm out into C# so that this could be flashed onto a chip that would be embedded in the device.

will be a substantial improvement to one of our products.’

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BENEFITS

At the completion of the engagement Fisher & Paykel Healthcare were provided with a PC executable algorithm that was able to predict the nature of the observed respiratory phenomena.

The end result is a new competitive advantage to Fisher & Paykel Healthcare in a several hundred million dollar market and a very satisfied customer. The final word goes to David Whiting:

‘The team at 11Ants Analytics has greatly assisted my team’s R&D. Their innovative techniques and software allowed large amounts of data to be quickly analysed and provided rapid proof of concept. The result