Impact story

Augmenting clinical decision-making

Working with the Cystic Fibrosis Trust, Turing researchers have been developing machine learning methods that could dramatically improve the accuracy of clinical assessments of people with cystic fibrosis.

- Cystic fibrosis (CF) affects more than 10,000 people in the UK, and leads to progressive respiratory failure.
- When to refer for a lung transplant – a major, risky operation – is traditionally based on a single measure called ‘forced expiratory volume’ (FEV), but fewer than half of the people referred in this way have a sufficiently urgent need for a transplant.
- Turing Fellow Mihaela van der Schaar applied cutting-edge machine learning to improve this referral process, utilising a data set representing 99% of all CF patients in the UK.
- A tool called AutoPrognosis (AP) was developed that considers years’ worth of patient-specific data on 115 variables, including genetics, BMI, infections, hospitalisations and more.
- AP predicts a disease trajectory for each patient, and makes correct referrals two-thirds of the time – a remarkable 35% improvement in accuracy over traditional methods.
- AP displays clear superiority to all competing methods for deciding when to refer patients for a transplant, in terms of both diagnostic accuracy and impact on clinical decision-making.

"This work elegantly demonstrates that machine learning is now ready for the clinic."
Professor Andres Floto, University of Cambridge and Cystic Fibrosis Physician, Royal Papworth Hospital

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- Could help predict how a patient will fare without a transplant, and assist decision-making.
- Potential to dramatically improve the treatment process and quality of life for people with CF.
- Could also produce risk predictions for conditions such as heart disease and breast cancer.

Images: Cystic Fibrosis Trust

The predictive tool could assist clinicians in making more confident decisions, with their patient, about whether it is right to talk about a transplant.

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