The Michael J. Fox Foundation & Gecko Ventures: The Parkinson’s Disease Data Challenge

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The Partnership: MJFF and Gecko Ventures

The Michael J. Fox Foundation is the world’s largest nonprofit funder of PD research
• Our Mission: To accelerate the development of improved therapies, and ultimately a cure, for people living with Parkinson’s disease today.

Gecko Ventures is an assembly of entrepreneurs who collaborate on solving some of today’s most complex challenges
• Our Mission: Find ways to improve people's lives and simplify complex tasks
The Inspiration Behind the Initiative

The Challenge:
The distinctive degenerative features of PD can make the disease difficult to manage and challenging to understand the progressive nature of symptoms manifested in patients.

The Inspiration:
Many symptoms and features of PD can be objectively measured with technology sensors used every day.
Why Launch the PD Challenge?

- Entrepreneurs at Gecko Ventures recognized an opportunity to collect and leverage objective data collected on smartphones to address some of these inherent challenges of PD symptom progression.
- MJFF was committed to developing opportunities for patients to contribute data about the real experience of PD, which researchers can leverage.
- The Data Challenge sought to inspire research teams, individuals, and anyone with an interest in PD, to develop solutions to benefit patients and clinicians through analysis of objective data.
Dataset used in PD Data Challenge

- Data compiled by Daniel and Alex Vannoni in partnership with Max Little
- Contest hosted on Kaggle
- Data collection started as ‘ad hoc’ $850 clinical trial
  - Purchased smartphones on Ebay and collected data from participants via an android based mobile phone application
  - Data collected over 10 week period: audio, accelerometry, compass, ambient light, GPS, proximity and battery level
  - Trial population: 9 PD patients and 7 controls, roughly matched for age and gender
  - Over 18,000 hours of data were collected
Organization of PD Data Challenge

- Directed by MJFF and Gecko Ventures
- Winner awarded a “no strings attached” $10,000 prize
- Established a judging team to review entries:
  - Alexandra Carmichael, Co-founder of CureTogether and Director of Quantified Self
  - Karl E Case, Professor of Economics Emeritus at Wellesley College and Co-Creator of the S&P Case Shiller Index and PD Patient
  - Maurizio Facheris, Associated Director, Research Programs at the Michael J. Fox Foundation
  - Ken Kubota, Director, Kinetics Foundation
  - Daniel Vannoni, Entrepreneur and Managing Director, Gecko Ventures
PD Data Challenge results

- Enthusiastic response from scientific community
- Contest entries received from a variety of academic and industry applicants
  - Mainly data scientists
  - Little to moderate exposure to PD research
- 630+ downloads of dataset from teams in 21 countries
- Winner: LIONsolver (www.lionsolver.com)
  - Provided proof of concept for ‘machine learning approach’
    - Provide clues to PD onset and progression embedded in data collected on smartphones
    - Proved feasibility and value of gathering mobile data for monitoring PD
- Two other teams’ submission were deemed worthy of special mention
  - ‘Remote monitoring of Levodopa Response in Parkinson’s Disease’ – James T.H. Teo and Parashkev Nachev, Neurologists at Charing Cross Hospital, London, UK
  - ‘Identifying Parkinson’s Disease from Passively Collected Acceleration Data’ – Michelle Wang, Undergraduate Student at MIT, Cambridge, MA, USA
Takeaways from PD Data Challenge

• Entrepreneurial, cost-effective and ‘scrappy’ approaches, like the clinical trial yielding the data used in the Challenge, can generate big impact for patients.

• Proof of concept that collecting data with everyday tools/technology can be useful for research

• Contest/challenge model can be applied to other diseases
  – Effective way to engage collaborators outside of the ‘classical’ medical and research institutions
  – Facilitates practical implementation faster, getting solutions in the hands of those who need it
Future Opportunities

• The contest approach to crowd source solutions can supplement traditional research by leveraging previously untapped resources
  • This approach can link doctors, with mathematicians/computer/data scientists, with entrepreneurs to find answers, influence behaviors, and improve treatments
  • A similar approach is being taken by Technology for Autism Now

• Imagine solving large scale problems in a fraction of the time, for a fraction of the cost
  • Maximize the concept of “citizen science”
Questions?

Special Thanks To:

https://www.michaeljfox.org

http://www.jhumhealth.org

http://www.geckoventures.com