When UX Designers Meet Data Scientists

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Abstract

This is a proposal for a short presentation at the Designing the User Experience of Machine Learning Systems symposium as part of the 2017 AAAI Spring Symposium Series in Palo Alto, CA.

With the advance of machine learning, the role of data scientists has been elevated from reactive stats-gatherers to partners who think proactively about future opportunities. Together with UX designers they tie the production of algorithms with the experiences they enable. In this article, I discuss the challenges of this partnership and how the practice of UX design is expending to the design of system behavior.

Introduction

Over the last year, I have been working at BBVA Data & Analytics, a center of excellence in financial data analysis transforming the banking industry in the domains of customer knowledge, customer advisory, risk, fraud and other new data products. My role is to leverage the best practices in design, research and data science to transform algorithms and data analytics into experiences that are future forward.

My responsibility is to bring a holistic experience design to teams of data scientists and make it an essential part of the lifecycle of visionary, and viable solutions. In parallel, I perform creative and strategic reviews of experiences that design teams produce (e.g. online banking, online shopping, smart decision making) to steer their evolution into a future of machine learning and extended intelligence. Practically, I boost the collaboration between teams of UX designers and data scientists to create desirable and feasible experiences. This paper introduces my observations stimulating the tight partnership between UX designers and data scientists to develop machine learning algorithms surrounded by a user experience.

Design + Data = Experience

Up until now UX designers and data scientists were coming together around the use of data, but with different objectives. Whereas scientists viewed data primarily as outputs of human activity, designers regard data as inputs into human activity that can change and enhance the way people interact with the world [1].

Today a growing number of digital services rely on the input of a new wave of machine learning algorithms mixing design and data to generate user experiences. Thus, at BBVA Data & Analytics the role of data scientists has been elevated from reactive stats-gatherers to partners who think proactively about future opportunities. We follow a centralized model with a core data science team broken into sub-teams that partner directly with UX designers as well as data engineers, and product managers. At the moment of shaping an experience, the multi-disciplinary teams engage with 'thick data' from the qualitative information that provides insights on people's lives, 'big data' from the aggregated financial data of millions of customers and the 'small data' that each individual generates.

The UX design and data science partnership

The main issue of the tight partnership between UX designers and data scientists is the lack of understanding of each other's practice and objectives. For instance, UX designers transform a context into an experience while data scientists transform a context into knowledge. Additionally, designers often adopt a path from the intention and the outcome that adapts to a changing context. Data scientists employ processes similar to user-centered design but are more mechanical and less organic. Typically they follow the scientific methods with its cyclical process of constant refinement. Finally, the scientific method is similar to any design approach that forms and makes new appreciations, as new iterations are necessary. Yet, it is not an open-ended process. It has a clear start and end but not definite

timeline. Consequently designers and data scientists must engage in conversations built around a common language, relationship and trust to define the user experiences that could and should be achieved with machine learning.

In my role I defined important touchpoints between designers and data scientists throughout the development lifecycle of a machine learning system:

- Prior to the development of a system it is mandatory to articulate the key research questions from desk and user research and build a tangible vision of the solution with priorities, goals and scope.
- During the prototyping phase it is key to for designers to understand the limitations of the models and for data scientists to share the insights from the quantitative data exploration. Moreover, the team needs to define the success metrics before tests of the models are released.
- Finally, when in production mode, metrics are necessary to evaluate the impact of the solution on the experience.

The design of system behavior

The challenge for UX designers and data scientists is to tie the production of algorithms with the experiences they enable. The previous section highlighted an expansion of contemporary UX design to the design of system behavior. In this section I will introduce the two features of this practice I consider important for both designers and data scientists to control: the evolving relation between a human and the imperfection inherent to machine learning algorithms.

The planning of a human-system relationship

Unlike previous computer programs, the experiences powered by machine learning are not linear or based on static business and design rules. They evolve according to human behaviors with constantly updating models fed by streams of data. Each single system becomes almost like a living, breathing thing. It is a different kind of engineering and design. Machines learn over time and rely on a proper design to acquire knowledge from interactions with humans and their context. Moreover, the set of functionalities evolve as the machine learns. Consequently, beyond considering the first contact and the onboarding experience, any learning system requires considerations on the evolution of the user experience. The algorithms requires a responsible design that considers moments when things start to disappoint, embarrass, annoy or stop working or stop being useful. The design of the 'offboarding' experience could become almost as important as the 'onboarding' experience. For instance, allegedly a third of the Fitbit users stop wearing the device within 6 months. What happens to these millions of abandoned connected objects. What happens to the data and intelligence on the individual they produced? What are the opportunities to use them in different experiences?

In addition, breakthroughs in machine learning are improving ways to connect with machines in subtle ways through voice. In return when properly designed, algorithms might start to be not so much bossy, but nurturing, paving the path from the design of human-computer interactions to the design of human-computer relationships [2].

The design of beautiful seams

Machine learning algorithms also influence the design of the interactions. Traditionally the design of computer programs follows a binary logic with an explicit finite set of concrete and predictable states translated into a workflow. Machine learning algorithms change this with their inherent fuzzy logic. They are designed to look for patterns within a set of sample behaviors to probabilistically approximate the rules of these behaviors. This approach comes with a certain degree imprecision and unpredictable behaviors. They often return some details on the precision of the information given. For instance the booking platform Kayak predicts the evolution of prices according to the analysis of historical prices changes. Its Price Trend algorithm is designed to display a confidence level on whether it is a favorable moment to purchase a ticket. This is an example of a 'beautiful seam' in the user experience, a notion coined by Mark Weiser at the time the Xerox Palo Alto Research Center and further developed by Chalmers and MacColl as 'seamful design' [2]. This approach promotes making explicit the limits and constraints that a certain technology has. By unveiling the seams is a way for user to become aware of system and appropriate its features even when not perfect.

Other types of machine learning algorithms communicate the seams with scores of precision and recall. The precision measures the ability to provide a result that exactly matches what's desired. The recall score communicate the ability to provide a large set of possible good recommendations. The ideal for an algorithm is to deliver high precision and recall scores. However, precision and recall often work against each other and here again require a UX design decision to consider the appropriate user experience over this tradeoff.

Conclusion

The design of experiences of machine learning systems is evolving into a new practice around the design of system behavior. Both UX designers and data scientist must collaborate to tie the production of system behaviors with the experiences they enable. To overcome their different practices and objectives, together they must engage in conver-

sations built around clear touchpoints and common language. These conversations are particularly important to shape desirable relations over time between a human and a learning machine often challenged by limits and constraints.

References

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