Fusing Data and Design
Tales from a flipchart

Tim Daines, Designer
Philip Pilgerstorfer, Data Scientist

QuantumBlack

A McKinsey Company
We exploit data, analytics and design to help our clients be the best they can be

We were born and proven in Formula One, where the smallest margins are the difference between winning and losing and data has emerged as a fundamental element of competitive advantage
10 years of experience aka scar tissue
No silver bullets
Working in expert silos narrows view on data
Interdisciplinary perspectives on data are at the core of an AI solution

Human decision making with data

Designer

Data Engineer

Data Scientist

AI Solution

Translating data into structured formats

Patterns in data

@timdaines @philippilgerstorfer
Designer and Data Scientist are closest to the user

Designer

Understanding how and why things are truly the way they are

Data Scientist

Developing algorithms that make predictions based on historic data
Three key shifts needed to deliver adoptable AI solutions

- Silos to Squads
- Experimentation & Convergence
- Single product mindset to organisational adoption
Case study: Optimising chemical processing operations

Goal

Each day, find the setup of the production network that will achieve the optimal production rate.

The challenge

Massive complexity of the operations, initial input space $10^{250}$.

First of a kind AI solution in the organisation.

Approach

Building an optimisation algorithm recommending a production plan to the operations team, on a day-to-day basis.
Silos to Squads

QuantumBlack’s delivery of analytics relies on interdisciplinary teams of specialists including domain expertise, design, engineering and analytical skills.

**Engagement Directors**
Works with clients, engineering, and design to identify requirements and potential solutions and communicates those to the client.

**Data Engineers**
Extracts, wrangles, cleanses and links data, and presents the data in a form ready for analysis.

**Designers**
Runs workshops, communicates insights clearly, designs data visualisations and tools.

**Content Directors**
Senior advisor to engagement team, bringing content expertise to accelerate and assure delivery. Expertise can be from domain or analytics perspective as required.

**Engagement Managers**
Leads the day to day of a project, guides team members, and owns the project’s deliverables.

**Data Scientists**
Completes complex mathematics, writes and optimises algorithms, explains findings and predicts results.

**Technical Architects**
Works with clients and project teams to ensure optimal architecture and technical design for solutions.

**Machine Learning Engineers**
Links Data Scientists and Data Engineers, makes the data sets work for the science and translates data science insights into business analytics.
Day-to-Day Collaboration

- Co-located desks
- Daily stand-ups
- Weekly team learnings
- Full-team problem solving sessions
- Joint client interviews
Experimentation & Convergence

We use QuantumBlack’s protocol – People, Process, Technology

Jobs being done with data

- Ideation
- Intelligence
- Inception
- Intervention
- Independence

Jobs being done with AI/ML

- Design Thinking
- Data Scientists and Data Engineers

Mine the data

- Understand the Business Problem
- Observe Engineer’s in operations room using data
- Find signal in the data
- Understand IT Infrastructure

Employee Experience Experiments

- Co-Design the human and machine experience with Engineer’s
- Finalise Data Pipeline
- Experiment with and iterate Model

Employee Interaction Experiments

- Employee Experience Hypotheses & Model Concepts Defined
- Visualise model insights

Analytics Integration

- Engineer and AI begin relationship working together
- Deploy AI Solution
- Performance and Impact monitoring of model in real-world use
- Empower client to enrich model with more functionality

Problem solving with data-informed decisions

Implement AI solution(s) - MVP

All content copyright © 2019 QuantumBlack, a McKinsey company
**Experimentation & Convergence**

Turning object function of optimiser into a human metric - triggering decision making

---

**Engineer Decision Making with no AI**
- Siloed data used to make decisions

**Engineer and AI form Relationship**
- Test 'Trust' in AI generated data

**Operations Target Variable Testing**
- Test 'Target Variable' in AI Solution

**Engineer and AI in operation**
- Change fluid direction
- Operations Plan

---

**Understand Engineer Decision-Making**

- Identified Operational constraints
- Test with Operations Team

**Defining Model Space**

- Validated Solution Space
- Test with Operations Team

---

**Excel Spreadsheet to Visualisation**

1. $F = X$
2. $F = X - Y$
3. $F = \alpha X - \beta (Y - \bar{Y})^2$

---

**Engineer Decision Making with Target Variable**

- Refine Target
Single product mindset to organizational adoption

Cloud Infrastructure

Data Collection

Data Verification

Machine Resource Management

Serving Infrastructure

Monitoring

Cloud Infrastructure

Configuration

Feature Extraction

Process Management Tools

Analysis Tools

ML Code

User Interface

Data Scientist needs to consider wider context

Designer helps identify organisational experience
The ‘aha moment’ seeing the value in a natural setting
Three key shifts needed to deliver adoptable AI solutions

Silos to Squads

Experimentation & Convergence

Single product mindset to organizational adoption
Questions & We’re Hiring

Tim Daines
@ tim.daines@quantumblack.com

Philip Pilgerstorfer
@ philip.pilgerstorfer@quantumblack.com

quantumblack.com/careers
careers@quantumblack.com