JOHN HESS

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SUMMARY

Technically adept leader and communicator with experience in data science, engineering, and policy analysis. Lifelong learner committed to teaching and continuously improving the organizations I work with and myself.

Seeking consulting and full-time opportunities helping organizations, particularly those with meaningful missions, to better understand their data and their business.

EXPERIENCE

KnowledgeHound (knowledgehound.com)
Chief Data Scientist, Lead Engineer
2013 – Present

Led company's technical team including executive responsibility for development, technical operations, security, product management, quality assurance, and support

Designed and brought to market never-before-seen, patentable analytics systems for market researchers

Instigated and led organizational change from the trenches to create a high quality, reliable technical organization

- Defined processes and metrics to rally organization behind
- Implemented and coached Agile processes for development and Lean processes for data processing. Improved data supply chain performance
- Led architectural transformation from pile-of-scripts to MVC, services, and reusable, maintainable, extensible design
- Mentored junior team members, teaching testing, version control, architecture, and security best practices and why to love each

Developed hiring process to select engineers with technical talent, ability to conceptualize complex problems, and soft skills

Audited and secured existing application and infrastructure

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Independent Consultant (datademystified.com)
Data Science Consultant
2009 – Present, alternately full-time and part-time

Advice and Strategy

- Retained to advise clients on how to capitalize on opportunities in data and analytics
- Trained teams in data collection and analysis, especially survey design
- Elicited expertise from client organizations using custom-built analytical tools to foster exploration and shared understanding of complex interactions between multiple variables
- Guided process improvement workshops grounded with a combination of data-driven analysis and process improvement expertise

Analysis and Implementation

- Designed and built a platform for live- and back-testing commodity trading strategies and implemented highly profitable strategies. One strategy, created and launched in 2009, has brought in six figure profits each year since.
- Built predictive models to guide global staffing and hiring decisions

edX (edX.org)
Fellow, Program Manager
May 2012 – Sep 2013

Analyzed millions of user interactions to support exploratory research, pedagogical decision making, and quantifying achievement of the non-profit's goals

Guided world famous instructors from MIT and Harvard in translating their brick and mortar classes into massive open online courses for more than 250,000 students. Especially focused on community building at scale, the interplay between instructional design and community and peer-to-peer learning.

Negotiated intellectual property rights to software and textbooks for use in novel environments

Air Force Flight Test Center
Electronic Warfare Engineer
August 2008 – August 2009
Led small analysis team that reported several critical deficiencies in aircraft's missile defenses
Designed and coded custom data analysis software that found major safety issues. Presented findings to leadership and defended them when challenged by the responsible contractor
Planned and conducted flight tests including execution from control room

EDUCATION AND RESEARCH

Massachusetts Institute of Technology
MS in Technology and Policy and MS in Aeronautics and Astronautics
Class of 2012
Advised the Chairman of the Joint Chiefs of Staff and DOD leadership on improving access to mental health care using telehealth. Supported recommendations by:

- Interviewing dozens of stakeholders across services and in dozens of roles
- Analyzing millions of patient records and deployment patterns to characterize demand
- Modeling patient flow using custom discrete event simulation
- Analyzing real-world organizational and policy constraints to provide actionable recommendations tailored to the complex set of incentives driving systemic behavior

Developed artificial intelligence tool to classify 800,000 emergency department records.

University of Michigan
BS in Mechanical Engineering
Class of 2008

INTERESTS

Privacy, security, intellectual property, design and using deep understanding and simple solutions to effect major changes.

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SELECTED PROJECTS

Digester Streaming Data Analysis Platform, Data Demystified (2013-Present)
After working side-by-side with traders (including a month trading commodity futures) to understand their needs, I created a web-based platform to run custom analyses on real-time market data. This platform, Digester, lets traders and developers use custom code to analyze more nuanced details than available in common commercial solutions.

Digester handles all the data collection, cleaning, warehousing and replay necessary so new strategies and real-time dashboards can be built in hours instead of days or weeks.

Massive Open Online Course Data Analysis, edX (2012-2013)
To inform teaching of MIT and Harvard MOOCs, I analyzed the performance and persistence of over 100,000 students. While some courses graduated 15% or more of enrolled students, others graduated only about 1%. This analysis illustrated some new lessons and some old ones we re-learned from the broader web community, like the importance of direct email. It also yielded a hypothesis that women might be more likely to complete MOOCs taught or facilitated by a woman.

Entertainingly, I also had the opportunity to analyze size, demographics, and subject matter preferences of the famed "Colbert Bump".

U.S. Military Mental Health Care Policy, MIT (2010-2012)
To support advice I delivered directly to the Chairman of the Joint Chiefs of Staff, I interviewed dozens of servicemembers, practitioners, and leaders in the military's mental health care system. A clear theme emerged from those interviews: surges in demand from returning Army units were overwhelming local mental health care teams.

To verify the qualitative findings, I analyzed millions of medical and deployment records to see how servicemembers used the mental health system right after they returned from deployments to Iraq and Afghanistan.

I conclusively verified the huge spikes demand and, using a Discrete Event Simulation (DES), showed that the Army's current policies did not address demand as expected. I also simulated an alternate policy, which I subsequently recommended, that would alleviate these particular types of spikes and get urgent care to servicemembers faster.

Artificial Intelligence Medical Record Classification, MIT (2011)
To determine whether painful and dangerous tests were medically appropriate for children with a rare symptom, Febrile Status Epilepticus (FSE), Amir Kimia, a Boston Children's Hospital physician needed to sort through hundreds of thousands of medical records to find historical cases to study. Plain-text search, the most common method used in this type of research, was not performing adequately, so he sought out more advanced techniques.

I built and trained an Artificial Neural Net (ANN), a type of artificial intelligence algorithm, to analyze the entire corpus of records at Children's Hospital in Boston and flag those most likely to describe patients with FSE. To tune its performance, I experimented with several feature extraction schemes and configuration parameters. To verify this relatively rudimentary approach was appropriate, I compared its performance to other algorithms, like a Support Vector Machine, and found comparable performance.

Dr. Kimia and his team of physicians and researchers hand-reviewed each of the records my tool flagged and examined the test results for each patient to determine whether lumbar punctures or CAT scans are worthwhile tests for children with FSE.

C-130 Flight Test, US Air Force Flight Test Center (2008-2009)
N.B. Because of the classified nature of the work, some of this description is necessarily vague

To verify the defensive systems of the C-130 aircraft worked as expected, I broke from customary manual spot-checks, and wrote custom analysis scripts to extract data on tens of thousands of events from our dataset, verify each of those conformed to the specifications, and visualize the performance of the system under different conditions.

Because this new methodology searched the dataset exhaustively, it uncovered a condition rarely (<.1%) found in flight test, but common in combat where they system would fail catastrophically.