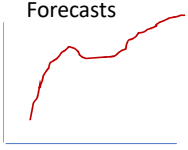
Decision Options ®

Artificial Intelligence driven decisions

Decision Options ® for faster and better decisions for any problem

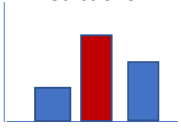
Forecasts



Forecasts based on historical data

- Products, processes, people, space, time, money…..
- A library of forecasting engines encompassing all known mathematical techniques
- Automated selection and optimization of mathematical techniques for best results

Predictions



Predicting the probability of an outcome

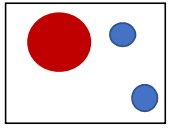
- A library of machine learning techniques – over 100 best of the breed engines
- A library of deep learning optimizers with automated configuration builders
- Automated selection for building meta models that combine multiple techniques

Patterns

Pattern finding in structured and unstructured data

- A library of machine learning techniques – over 25 best of the breed engines
- A library of deep learning optimizers with automated configuration builders
- Automated selection of the best technique for the data presented

Value/Risk



Economic valuation, risk assessment and portfolio management

- Application of options pricing principles in the valuation of private assets
- Flexible architecture to accommodate virtually any asset or decision problem
- Optimization of a portfolio of disparate assets with interactions

We have a long history in analytics driven decision-making

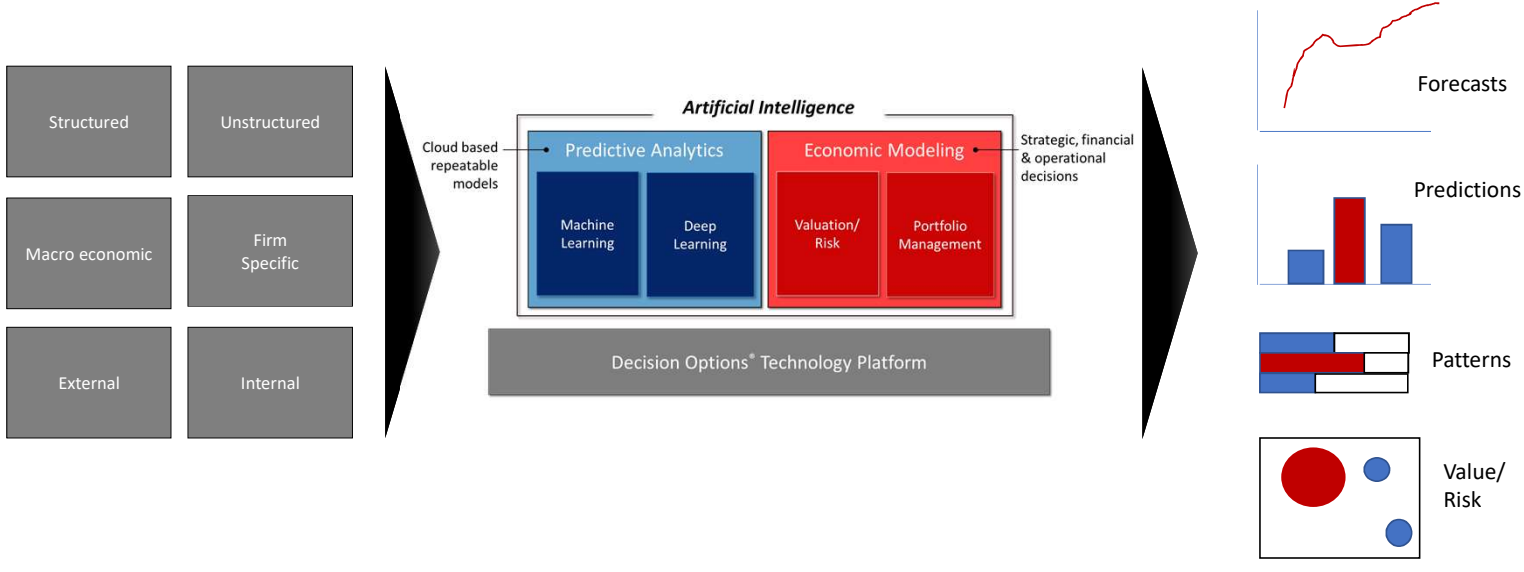
- 1986: Artificial Intelligence application in graduate school engineering education to accelerate design intuition by computer interaction (Northwestern Univ.)
- 1988: Automated creation of adaptive mesh for finite element analysis of aircrafts, automobiles and nuclear power plants (Heavy Equipment)
- 1990: Prediction of treatment intensity for patients to leverage physician time and economic impact of personalized interventions (Private Company)
- 1995: Prediction of optimal pricing for propane distributors across the country and overall economic profits due to predictive pricing (Propane Company)
- 1997: Predictive analytics in resource allocation for R&D programs of $4 Bil/year and the economic value and risk of the portfolio (Pharmaceutical Company)
- 2001: Economic analysis of next generation space vehicle program to assess societal benefits, risk and overall value of considered choices (Aerospace Company)
- 2003: Predictive analytics and economics for the pricing of under water pumps and the design of insurance contracts to maximize value (Energy Company)
- 2004: Automated investments in public equities by the prediction of price, trends and higher order risks by statistical arbitrage (Hedge Fund)
- 2005: Prediction of manufacturing demand of R&D substances and economic value of outsourcing contracts (Pharmaceutical Company)
- 2006: Optimization of manufacturing network considering demand uncertainty and features in outsourced contracts (Manufacturing company)
- 2007: Prediction of success rates and costs and economic analyses of clinical trials in R&D (Pharmaceutical Company)
- 2009: Predictive and stochastic analysis of inputs in concentrating solar power plant and the valuation of the plant and operating policies (Private Equity)
- 2010: Predictive model for the timing and size of clinical trials and economic valuation of clinical trial design choices (Biotechnology Company)
- 2011: Prediction of redemption patterns by employees given rewards and the economic value of reward portfolio (Employee Rewards)
- 2012: Prediction of protocol deviation probabilities in clinical trials in R&D and economic value loss due to deviations (Pharmaceuticals)
- 2013: Prediction of costs savings of providing counselling to geriatric patients and economic gain due to customized intervention (Academic Hospital)
- 2014: Prediction of food safety and productivity in food manufacturing and economic value, downside risk and upside potential (Food Manufacturing)
- 2015: Prediction of agricultural inputs and demand patterns in manufacturing and economic value due to optimized plans of execution (Food Manufacturing)
- 2016: Prediction of the probability of litigation at a patent and economic value loss due to litigation (Hedge Fund)
- 2017: Prediction of best match of therapist to patient in behavioral health and overall economic gain to the clinic due to matching (Independent clinic)
- 2017: Prediction of risk of not meeting quality thresholds in hypertension patients and economic value added due to higher incentives (Primary care clinic)
- 2018: Forecasting of SKU demand for a manufacturer using machine learning to substantially reduce forecast errors produced by the ERP system (automotive)

Decision Options combines econometrics with machine/deep learning

Data

Technology

Decisions



Example 1: Reducing forecasting errors in automotive manufacturing

- Large after market automotive component manufacturer in Detroit
  - 200K different SKUs, >$250 Million in inventory, carrying and obsolescence costs of >$25 Million/year
  - 2 manufacturing facilities, 3 distribution centers and retail customers across the country
  - CFO wants to reduce inventory without impacting stock out levels
- Decision Options system operating on top of ERP data on premise
  - A different model for each SKU forecasting for 12 months forward
  - Uses historical demand data from ERP as well as POS data directly from retailer
  - Able to reduce forecast errors by a factor 5 compared to status-quo
  - Targets inventory reduction of 15% from status-quo without impacting stock-out levels
- Differentiating aspects of Decision Options Artificial Intelligence
  - Agnostic platform, able to received data from any legacy system in a flat file
  - Able to report results on existing reporting and management systems
  - Learning models able to improve based on emerging data autonomously
  - Able to consume variety of data feeds including internal and external data such as GDP and weather

Example 2: Predicting disease risk in primary care patients

- Primary care clinic with >50 physicians and >50K patients
  - Payment to physicians by payers have quality targets
  - Physicians need to identify patients with disease risk for prevention and maintenance
- Decision Options system operates on EMR data on premise
  - Every night, EMR data flows into Decision Options database
  - Models built to predict disease risk prior to diagnosis and disease progression risk post diagnosis
  - Variety of diseases tracked including Diabetes, Hypertension, COPD and CHF
  - Risk scores assigned and updated on a daily basis on every active patient
  - Risk scores are reported on EMR screens as patients visit physicians
  - System creates automated scheduling of patients based on need for care and physician availability
- Differentiating aspects of Decision Options Artificial Intelligence
  - Agnostic platform – able to use any EMR vendor for data and reporting
  - Able to create incidence and progression risk for any disease modality
  - Able to use structured and unstructured data present in the EMR
  - Learning system – able to get better based on emerging data

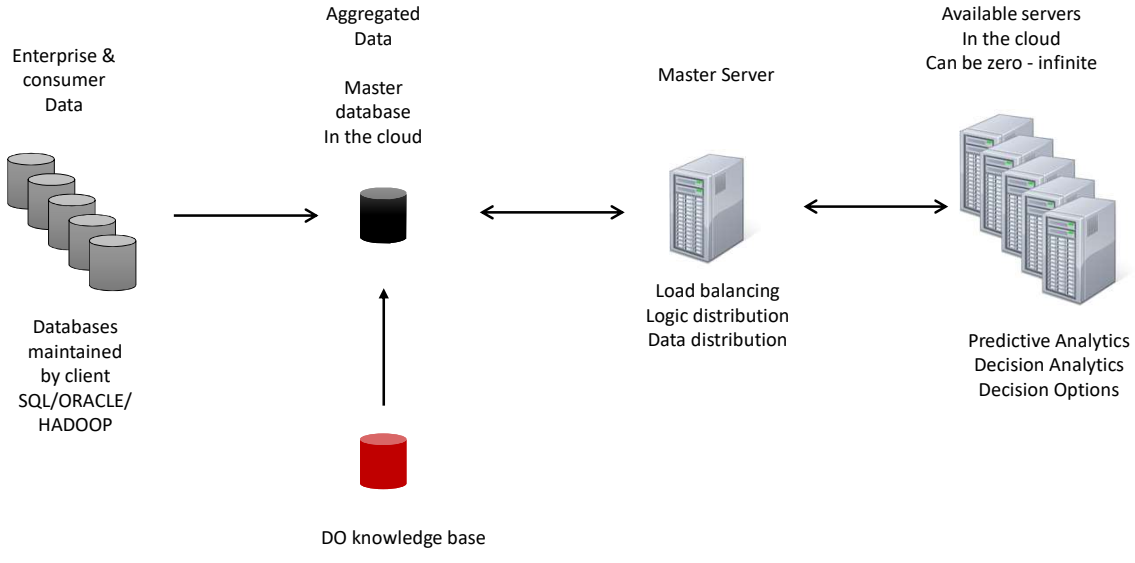
Example 3: Pattern finding in human resources

- Large law firm in the Midwest needs to understand who is likely to be successful in the firm
  - Human resources at all levels – from associates and partners
  - Different hiring modalities – direct from school and lateral transfers from other law firms
- Decision Options system operating on HR, billing and project management data on premise
  - Data is pushed to Decision Options database on a regular basis
  - System imputes project success based on pre-defined financial metrics
  - Models are built on HR attributes that show commonality to project success
  - HR resources are clustered into buckets based on project success
  - System is able to predict success at intake of a new employee
  - System is able to suggest need for corrective actions for existing employees
  - System is able to suggest optimum compensation structures based on success rates
- Differentiating aspects of Decision Options
  - Agnostic platform able to receive any type of data from legacy systems
  - Able to finely control the number of different clusters
  - Learning system – able to retune pattern logic if major differences are found

Example 4: Valuation, risk and potential

- Large pharmaceutical company with >500 R&D programs requiring 4.5 Billion/year investments
  - Need to deploy limited resources – People, Money, Space and Time – across the alternatives
  - Complex problem requiring hundreds of people across the company to decide and maintain
- Decision Options system operating on a variety of data sources across the company
  - Assigns economic value, downside risk and upside potential for every program
  - Considers
    - Market and technical uncertainty
    - Uncertainty in costs, timelines, revenues and outcomes
    - Inter-relationships among longitudinal decision choices
    - Correlations among various assets in the portfolio
    - Stochastic and probabilistic uncertainties
- Differentiating aspects of Decision Options
  - World's first fully generalized economic modeling platform that values uncertainty and flexibility
  - Applicable in any situation, asset class or problem definition with stochastic and probabilistic features
  - Market based methodology, allowing private assets/companies to be fully translated to markets

Cloud based technology architecture : always on and everywhere



How do we engage?

- We engage with our clients for the long term to make a tangible economic impact
  - We seek to deliver at least a 10X return to every client and every problem we solve
- Flexible fee structure
  - Advisory services
  - Software subscription
  - Gain share
- Fast results, less people, no systems build and agnostic
  - Our projects deliver results within days or weeks
  - Our processes do not require many people to execute
  - We do not build systems as our technology is already fully automated
  - We can work with any existing legacy system – we remain agnostic on data and on results reporting
- We have a stringent selection process
  - We do not engage with all prospective clients
  - If we engage, we guarantee success

Why Decision Options ®

Technology companies do not solve problems, they deliver technology
"A pizza-sized box," of technology does not deliver tangible results

Consulting companies do not solve problems, they deliver reports
"A powerful presentation," does not deliver tangible results

Analytics companies do not solve problems, they deliver confusion
"Big data!," does not deliver tangible results

We combine domain expertise, best of the breed analytics and technology to deliver repeating and tangible results to all of our clients