

Welcome to 15.071x, The Analytics Edge.

In this first lecture, we'll discuss how analytics redefines the meaning of intelligence, how it can contribute to your personal happiness and health.

Data is transforming business, social interactions, and the future of our society.

The amount of electronic data that exists in the world today is a phenomenal 2.7 zettabytes, which is equal to the storage required for more than 200 billion high-definition movies.

Not only the amount of data is extremely high, but it increases at exponential rates.

Our ability to effectively process this data is also increasing very rapidly.

As an example, decoding the human genome originally took 10 years to process.

Now it can be achieved in just one week.

Analytics is increasingly important in the world today, and this influence is expected to increase.

McKinsey estimates that there is a shortage of 140,000 to 190,000 people with deep analytical skills to fill the demand of jobs in the United States by 2018.

IBM has changed its business focus over the last 100 years very successfully from typewriters to mainframes to personal computers to consulting, and now to analytics.

It has invested over \$20 billion since 2005 to grow its analytics business.

Companies will invest more than \$120 billion by 2015 on analytics, hardware, software, and services.

Analytics is becoming increasingly critical in almost every industry, from health care, to media, to sports, to finance, to government, and many others.

Let us give a definition of analytics so we make it as concrete as possible.

We define analytics to be the science of using data to build models that lead to better decisions, that add value to individuals, to companies, to institutions.

Note that there are four ingredients-- data, models, decisions, and value.

And all four are needed in this definition.

What are the key messages of this class?

First, analytics provides a competitive edge to individuals and companies.

Analytics are often critical to the success of a company.

And they provide often the decisive essential technology.

Our teaching methodology is to teach you analytics techniques through real-world examples and real data.

And our overarching goal is to convince you of the analytics edge and inspire you to use analytics in your career and your life.

The teaching team comes from the Operations Research Center at MIT and the Sloan School of Management.

I am Dimitris Bertsimas.

I have received my Ph.D. from MIT from 1985 to 1988.

And I have been with the MIT faculty at the Sloan School of Management since 1988.

Currently, I'm the co-director of the Operations Research Center.

My career is centered in analytics.

And I believe that analytics can change the world.

The other instructor of this class is Allison O'Hair.

Allison received her Ph.D. from the Operations Research Center at MIT in 2013.

Allison and I have worked together in the area of health care analytics, and are working at the moment with our colleague Bill Pulleyblank on an analytics textbook.

The teaching assistants in the class are Iain Dunning, Angie King, Velibor Mistic, John Silberholz, and Nataly Youssef, all Ph.D. students at the Operations Research Center at MIT.

To give you a sense of the breadth of applications in this class, we'll cover the story of IBM Watson, the computer that beat the best human players in Jeopardy!, the company eHarmony, the Framingham Heart Study, and D2Hawkeye, a company that I have been involved for almost a decade.

Other examples include the story of Moneyball, how analytics can help predict the Supreme Court decisions, the role analytics have played in predicting the outcomes of the US presidential elections, how analytics can utilize effectively data from Twitter, Netflix, airline revenue management, radiation therapy, sports scheduling, and many others.