**Data Exploration and API First Design**

In this tutorial we will go through how to analyze data, when you can trust your results and when you can't. This is a crucial first step. If your assumptions about your data are wrong then there is nothing there. Putting something into production that doesn't make sense or hold up to scientific rigour is useless. The exploratory analysis ensures that what you are trying to build will actually work without wasting engineering's time.  
  
Once you are sure that there is a pattern that can be learned. The next step is to bring in engineering resources to make sure you can start building the engineering system as quickly as possible. For most machine learning systems there is a lot of engineering that needs to be done, but doesn't really rely on the science. Building the API first and then figuring out everything else is really important. This way, you don't waste time, and folks can work in parallel.

🎓 What you will learn  
- Experiment specification and testing  
- descriptive statistics  
- hypothesis based testing  
- model specification  
- A practical introduction to deep learning  
- forward propagation and back propagation  
- batch versus mini-batch  
- the bottleneck principal  
- learning rates  
- activation functions  
- sigmoid and tanh  
- exploding and vanishing gradients  
- elu, relu, leaky relu, and others  
- loss functions  
  
API First Design  
- What is an API?  
- What does engineering need to know, to get started?  
- Clean Code  
- naming  
- functions  
- doc strings  
- classes  
- inheritance and composition  
- making modules - code structure  
- Unit Testing  
- what is a test?  
- test flavors  
- testing in machine learning - what can you test?  
- CI/CD  
- CI basics  
- CD basics