



Intelligence at Fingertips

Enabling tools and Methods

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New Paradigm

Science Paradigms

- Thousand years ago:
science was **empirical**
describing natural phenomena
- Last few hundred years:
theoretical branch
using models, generalizations
- Last few decades:
a **computational** branch
simulating complex phenomena
- Today: **data exploration** (eScience)
unify theory, experiment, and simulation
 - Data captured by instruments
or generated by simulator
 - Processed by software
 - Information/knowledge stored in computer
 - Scientist analyzes database/files
using data management and statistics



$$\left(\frac{\dot{a}}{a}\right)^2 = \frac{4\pi G\rho}{3} - K\frac{c^2}{a^2}$$



Enabling Tools and Methods

Data Storage
Structured
Unstructured
Streaming

Data Analysis
Statistical
Algorithmic

Data Visualization
Interactive
Realtime

Version Control
Package Manager

Prototyping

Cloud Platform
Data Science as a Service
Algorithm as a Service

Enabling Tools and Methods

Data Storage

PostGres
MongoDB
Pipeline DB

Data Analysis

R
Python, Scala

Data Visualization

D3.js, Bokeh,
Shiny
ggplot2

Git

Anaconda

Heroku

Cloud Platform

AWS, Azure, HANA
Alexa, Google Now,