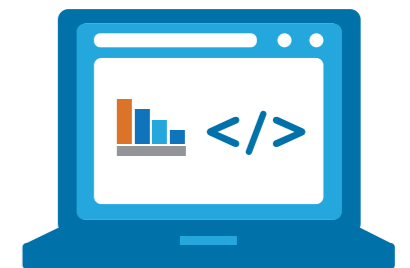
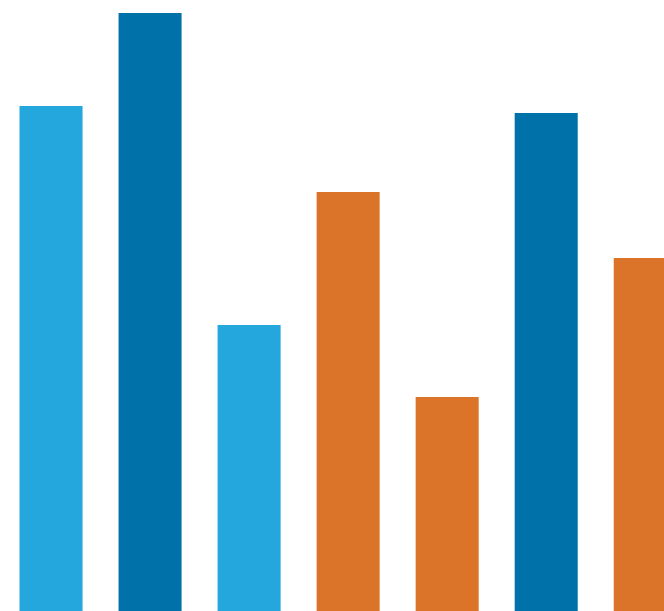
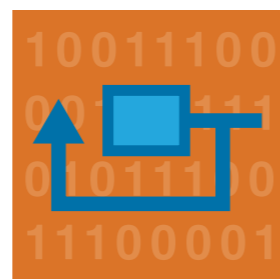
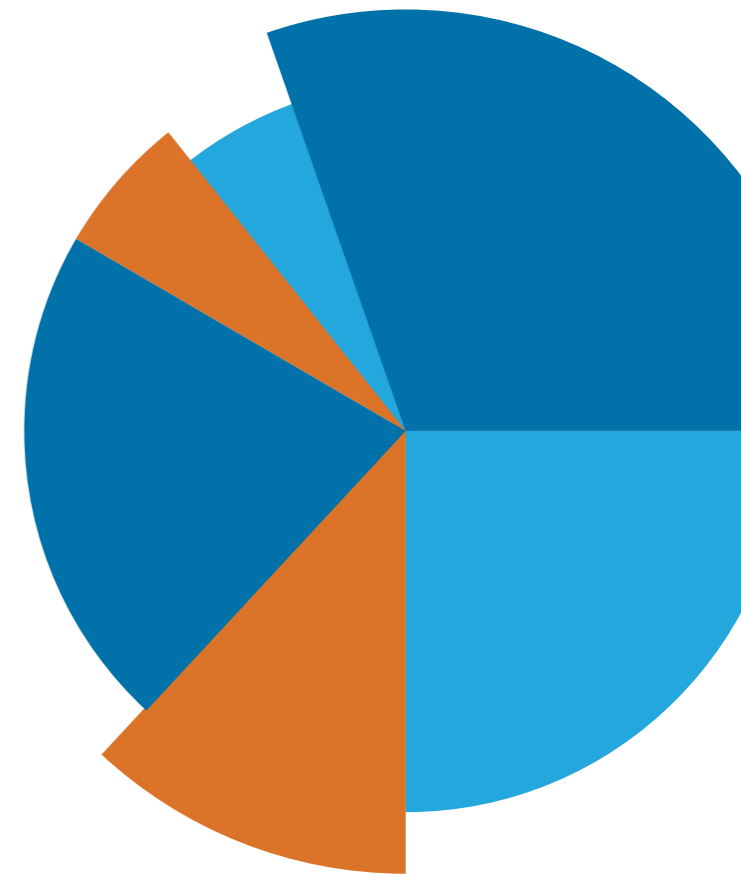


# From Raw Data to Actionable Insights with MATLAB Analytics



**1** Access and explore data

**2** Preprocess data

**3** Develop predictive models

**4** Integrate analytics with production systems

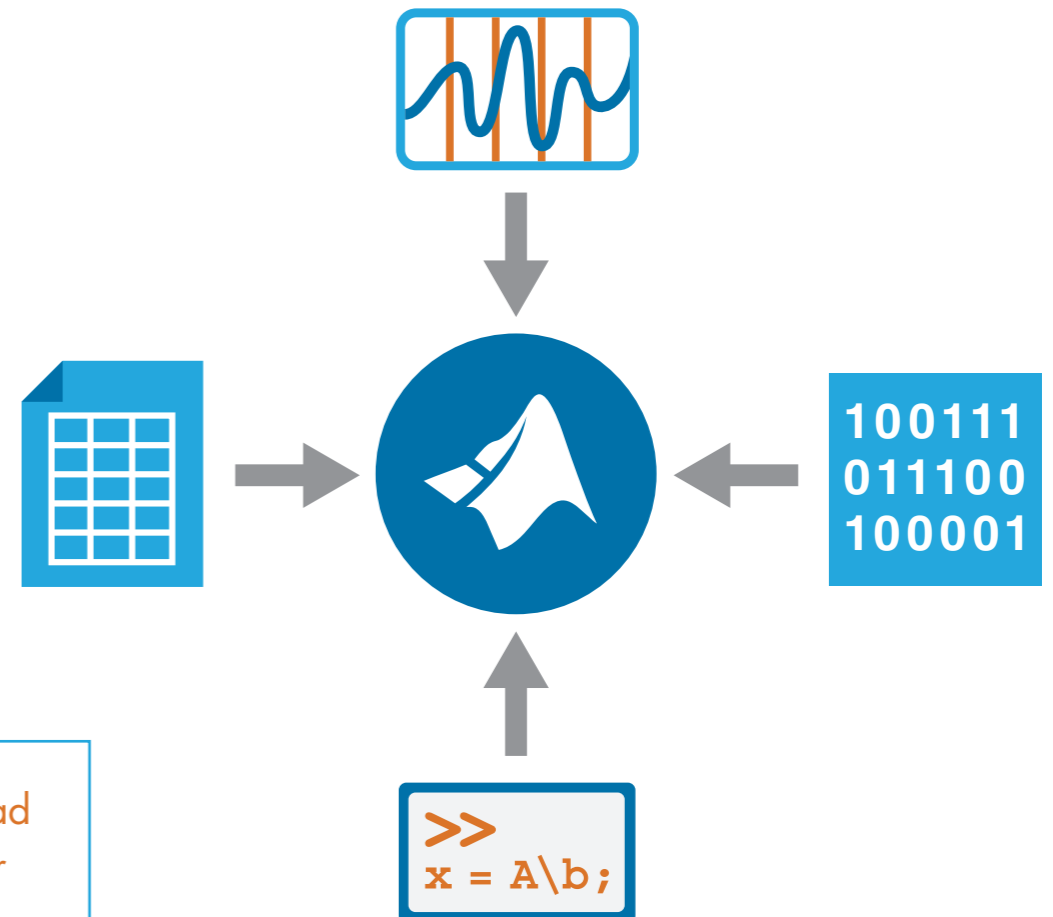
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[mathworks.com/solutions/data-analytics](https://mathworks.com/solutions/data-analytics)

# 1 Access and Explore Data

For data scientists the problem is not a lack of available data but a deluge. Terabytes of data pour out in a variety of forms—text, time-series, numbers, images, audio, RF signals, video, telemetry—and from a multitude of sources.

Wherever your data is, you can get to it with MATLAB®. You can source from databases, Hadoop, audio streams, sensors, files, web archives, spreadsheets, and instruments, and set up multiple data connections to other applications and hardware. As a result, you spend less time getting data and more time analyzing it.



“ One data set captured 100,000 hours of sound. It was so large that we had previously processed less than 1% of it, estimating that it would take a year or more to process the rest. With our MATLAB high-performance computing platform, we processed the data six times, using different detection algorithms, in two days.

– Peter Dugan, lead data scientist, Bioacoustics Research Program Cornell Laboratory of Ornithology

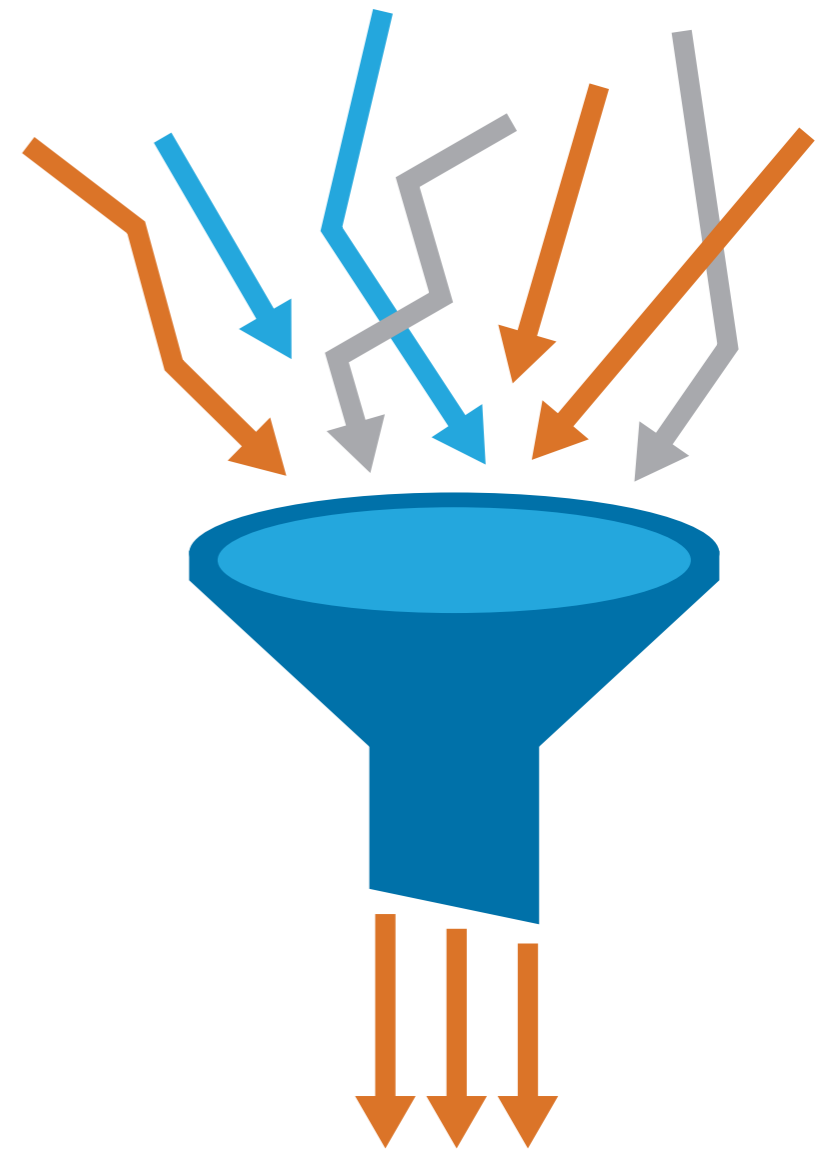
## 2 Preprocess Data

To be of use, your data needs to be accurate. But data acquired from numerous sources and repositories is often full of errors, outliers, duplicates, and noise. Before you can begin thinking about developing models, all this data must be preprocessed and cleaned—necessary but irksome tasks that eat up valuable time and take you away from the important work.

MATLAB simplifies these time-consuming tasks with preprocessing techniques such as advanced signal processing, for removing noise from sensor data; image processing, for sharpening an image and isolating objects of interest; and feature selection, extraction, and transformation, for reducing the dimensions of your data sets.

“ We need to filter our data, look at poles and zeroes, run nonlinear optimizations, and perform numerous other tasks. In MATLAB, those capabilities are all integrated, robust, and commercially validated. ”

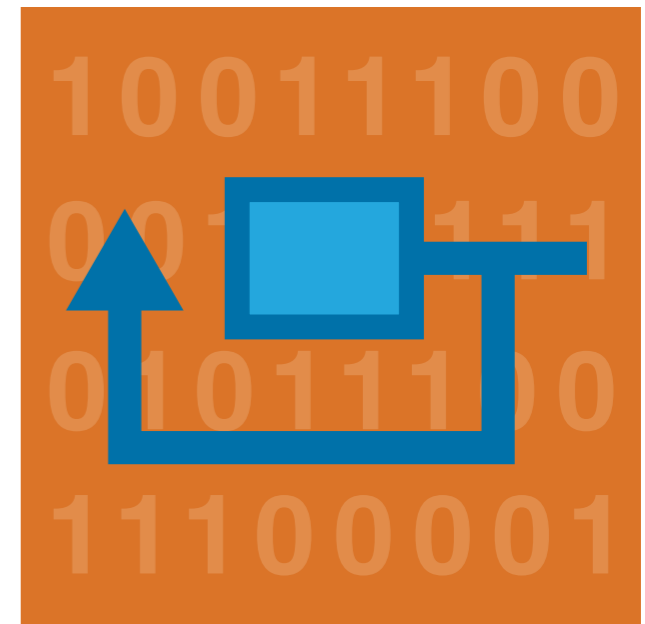
– Borislav Savkovic, lead data scientist, BuildingIQ



## 3 Develop Predictive Models

Your aggregated data tells a complex story. To extract the insights it holds, you need an accurate predictive model. But finding the right model takes time, and it requires deep expertise in statistics, machine learning, and other advanced techniques.

With MATLAB you have immediate access to prebuilt functions, extensive toolboxes, and specialized apps built by industry experts. You can quickly select and identify the right features for a model and then iterate through additional models to identify the best algorithm. You can compare machine-learning approaches such as logistic regression, classification trees, support vector machines, and ensemble methods, and use model refinement and reduction tools to create an accurate model that captures the predictive power of your data.



“ Because our team already knew MATLAB, we did not need a programmer. Instead, our structuring and market operations analysts, who already had the necessary experience in mathematics and economics, developed the system. MATLAB enabled these analysts to build a reliable, scalable forecasting and analysis solution from scratch. ”

– Manuel Arancibia, marketing operations manager, Horizon Wind Energy

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## 4 Integrate Analytics with Production Systems

Now that you have an accurate model, you want to make it available to analysts and other domain experts by integrating it into your production systems.

You can integrate analytics developed in MATLAB into production IT environments without having to recode or create a custom infrastructure. MATLAB analytics can be packaged as deployable components compatible with Java<sup>®</sup>, Microsoft<sup>®</sup> .NET, Excel<sup>®</sup>, Python<sup>®</sup>, and C/C++. You can share standalone MATLAB applications or run MATLAB analytics as a part of a web, database, desktop, or enterprise application.



“ The tools we developed with MATLAB are more reliable, scalable, and maintainable than our spreadsheet-based approach. We know the tools will work, we can add new capabilities, and we can update the production system without getting IT involved.

– Manuel Arancibia, marketing operations manager, Horizon Wind Energy



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