**Descriptive analytics**looks at data statistically to tell you what happened in the past. Descriptive analytics helps a business understand how it is performing by providing context to help stakeholders interpret information. This can be in the form of [data visualizations](https://www.logianalytics.com/resources/bi-encyclopedia/data-visualization/)like graphs, charts, [reports](https://go.logianalytics.com/whitepaper-pixel-perfect-report-design.html), and dashboards.

How can descriptive analytics help in the real world?

In banking system, for example, say lot’s of credit card frauds are happening. Descriptive analysis tells you that is happening and provides real-time data with all corresponding statistics like amount, time, place where card is used.

**Diagnostic analytics**takes descriptive data a step further and provides deeper analysis to answer the question: Why did this happen? Often, diagnostic analysis is referred to as root cause analysis. This includes using processes such as [data discovery](https://www.logianalytics.com/resources/bi-encyclopedia/data-discovery/), [data mining](https://www.logianalytics.com/resources/bi-encyclopedia/data-mining/), and [drill down and drill through](https://www.logianalytics.com/resources/bi-encyclopedia/drill-down/).

In banking system example mentioned earlier. Diagnosis analytics explores the data and makes correlations between the attributes. It may helps to determine usually for what amount and at what time these fraud happens.

**Predictive analytics**takes historical data and feeds it into a [machine learning](https://www.logianalytics.com/predictive-analytics/machine-learning-vs-artificial-intelligence-whats-the-difference/)model that considers key trends and patterns. The model is then applied to current data to predict what will happen next.

Back in our banking example, predictive analytics may forecast a happening of fraud based on at what time transaction is happening and does fraud occurs at what time and amount. Based on patterns in the data, we may predict it is fraud or not.

Prescriptive analytics takes the predictions made from the correlations of a predictive analytics engine and uses it to provide recommendations for what to do once fraud is detected.

Both predictive and prescriptive analytics software require the same data and training to implement. Banking data experts or data scientists employed by the client bank will need to label a high volume of transactions as either fraudulent or legitimate, and then run all of them though the machine learning model. This allows the machine learning model to be able to recognize fraud methods used in the fraudulent transactions.

For example, a fraudulent transaction may be for a product the account owner has never bought or would likely never buy. Additionally, the geographical location of the person who made the purchase may not line up with where the account owner was at the time of purchase.

The software can detect these inconsistencies after being trained, and so it will be more sensitive to those data points within transactions and flag them if the location data and the purchased product is suspicious.

Banks are likely to already have all of this data labeled due to their storage of bank records from years past. Fraud experts at the client bank working on the machine learning model will need to label which transactions are fraudulent or not while the system is being trained. The software gradually improves at discerning between fraud and legitimate banking operations as it is exposed to more labeled transactions.

Feature Extraction and Engineering(we can extract something from them)

* Texts(ngrams, word2vec, tf-idf etc)
* Images(CNN'S, texts, q&a)
* Geospatial data(lat, long etc)
* Date and time(day, month, week, year, rolling based)
* Time series, web, etc
* Dimensional Reduction Techniques (PCA, SVD, Eigen-Faces etc)
* Maybe we can use Clustering as well (DBSCAN etc)
* .....(And Many Others)

Feature selection(building your model on these selected features)

* Statistical approaches
* Selection by modeling
* Grid search
* Cross Validation
* .....(And Many Others)