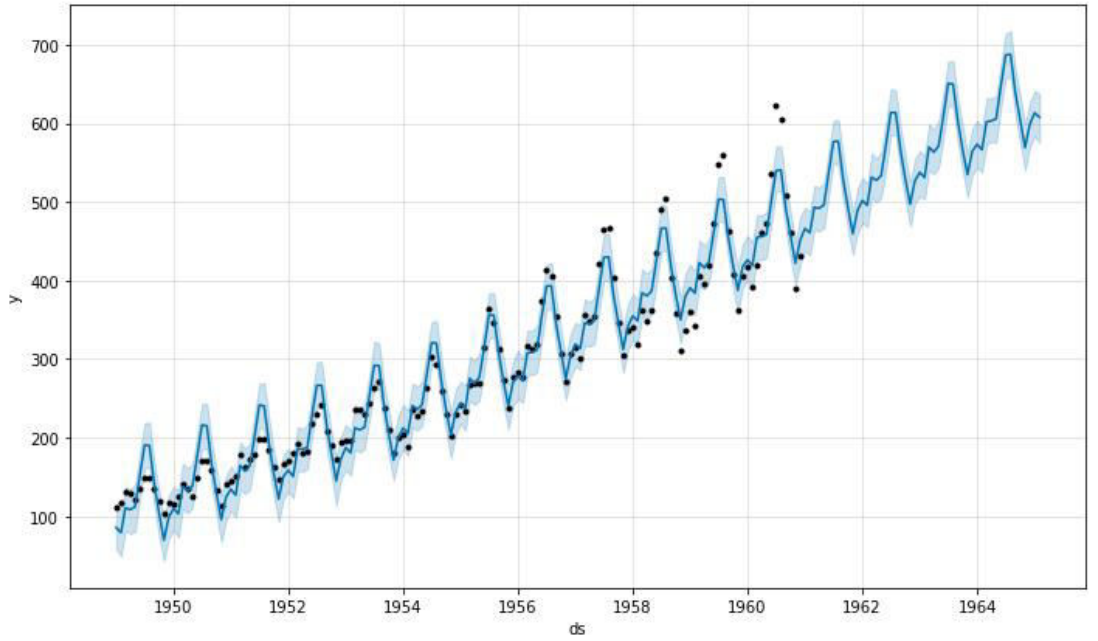
Start-Tech Academy

# Seasonality & Trends

## Seasonality

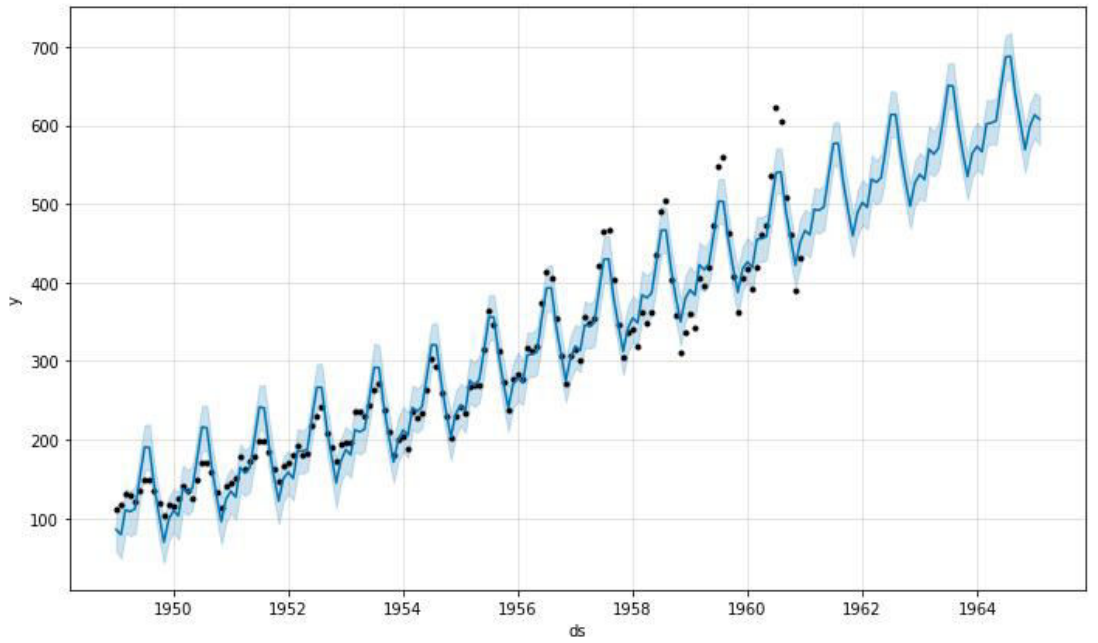
- Seasonality is a characteristic of a time series in which the data experiences regular and predictable changes that recur every calendar year.
- Any predictable fluctuation or pattern that recurs or repeats over a one-year period is said to be seasonal.



# Seasonality & Trends

## Trend

- A pattern of gradual change in a condition, output, or process, or an average or general tendency of a series of data points to move in a certain direction over time, represented by a line or curve on a graph



# Seasonality & Trends

## Problem Statement

- We have monthly airline miles travelled data Jan 2009 to April 2018
- We want to identify seasonality and trend effects
- We want to forecast future sales

# Seasonality & Trends

## Additive Model

You can often use seasonality and trend to predict sales

*Predicted Period t Sales = Base +Trend * Period Number +*

*Seasonal Index for Month t*

**Base**: The base is the best estimate of the level (without seasonality) of monthly airline miles at the beginning of the observed time period.

**Trend**: The trend is the best estimate of the monthly rate of increase in airline miles traveled.

**Seasonal Index**: Each month of the year has a seasonal index to reflect if travel during the month tends to be higher or lower than average.

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## Multiplicative Model

You can often use seasonality and trend to predict sales

*Predicted Period t Sales = Base * (Trendt) * (Seasonal Index for Month t)*

**Base**: The base is the best estimate of the level (without seasonality) of monthly airline miles at the beginning of the observed time period.

**Trend**: The trend now represents the percentage monthly increase in the level of airline miles.

**Seasonal Index**: The seasonal index for a month now represents the percentage by which airline travel for the month is above or below an average month.