**🔵 Scatter Plot**

**✅ Purpose:**

To show the **relationship or correlation** between **two numerical variables**.

**✅ Key Features:**

* **Each point** represents one observation.
* **X-axis**: One variable.
* **Y-axis**: Another variable.
* Used to detect **patterns**, **trends**, or **outliers**.

**✅ Example Use:**

To check if there is a relation between **study hours** and **exam score**.

**✅ Example Data:**

| **Study Hours** | **Exam Score** |
| --- | --- |
| 1 | 35 |
| 2 | 45 |
| 3 | 50 |
| 4 | 65 |
| 5 | 70 |

**Each pair (x, y)** is plotted as a point (e.g., (1,35), (2,45)).

**✅ Insight:**

* If the points rise from left to right → **positive correlation**
* If they fall → **negative correlation**
* If randomly scattered → **no correlation**

**🟠 Bubble Plot**

**✅ Purpose:**

To visualize **three variables** in one chart.

**✅ Key Features:**

* Like a scatter plot but adds **bubble size** to show a **third variable**.
* **X-axis**: Variable 1
* **Y-axis**: Variable 2
* **Size of bubble**: Variable 3 (magnitude or importance)

**✅ Example Use:**

To compare **cities** based on:

* X-axis: Population
* Y-axis: Average income
* Bubble size: Pollution level

**✅ Example Data:**

| **City** | **Population (L)** | **Income (₹K)** | **Pollution Index** |
| --- | --- | --- | --- |
| A | 10 | 50 | 30 |
| B | 15 | 60 | 40 |
| C | 8 | 45 | 20 |

So bubble plot shows:

* (10,50) with small bubble
* (15,60) with larger bubble (pollution = 40)

**✅ Summary Table**

| **Feature** | **Scatter Plot** | **Bubble Plot** |
| --- | --- | --- |
| Data Dimensions | 2 variables | 3 variables |
| Visual Element | Dots | Circles (bubbles) |
| Third Variable | ❌ Not shown | ✅ Shown as bubble size |
| Used For | Correlation, patterns | Multi-variable comparison |
| Common Uses | Performance, stats, analysis | Demographics, sales, geo data, etc. |