**What is 2D transformation**:

It is a way to change the position, orientation, or size of an image or an object in a 2D plane, that is mapping from one 2D coordinate system to another This is also called:

* **Spatial transformation**
* **Geometric transformation**
* **Warp**

**What is Image Registration?**

Imagine you take two pictures of the same place, but from slightly different angles. To align them perfectly, we use **image registration**.

**Purpose**: Aligning two or more images so that their features overlap.

**Used in**:

FARM

* **Forensics** (facial recognition, fingerprint matching)
* **Astronomy and Space**
* **Augmented reality** (merging virtual objects with the real world)
* **Robotics And Autonomous systems**
* **Remote sensing** (detecting environmental changes)
* **Medical imaging** (align MRI & CT scans)

**Steps:**

1. Feature Identification: Identifying all important edges corners e.t.c.
2. Feature Modeling: Understanding How Those features are mapped in both images.
3. Transformation Estimation: Understanding what transformation required to align image to others.
4. Sampling and Interpolation: Applying the required transformation and then smoothing the results





