

## Part 1: Practical Model Deployment (Hands-On)

**Goal:** Given aerial imagery, detect buildings via semantic segmentation.

**Instructions (choose your path):**

### 1. Dataset Selection

- a. Use this dataset(<https://spacenet.ai/paris/>) or another one if you wish

[https://spacenet-dataset.s3.amazonaws.com/spacenet/SN2\\_buildings/tarballs/SN2\\_buildings\\_train\\_AOI\\_3\\_Paris.tar.gz](https://spacenet-dataset.s3.amazonaws.com/spacenet/SN2_buildings/tarballs/SN2_buildings_train_AOI_3_Paris.tar.gz)

- b. Feel free to crop, resample or augment as needed.

### 2. Deliverables

- a. Code for data prep, training, evaluation
- b. Notebook/scripts demonstrating
- c. Brief report (1 paragraph) comparing results across variations

## Part 2: Research Challenge (Solution Survey & Explanation)

**Goal:** Explore and explain existing methods for fusing DSM with RGB imagery to improve building detection.

**Tasks:**

- **Literature Search**
  - Find **at least three** papers or projects that integrate DSM (or height data) with RGB for building segmentation.
  - Identify which fusion strategy they use: early, mid-level, or late.
- **Solution Summaries**
  - For each method, summarize:
    - **Architecture** (e.g. dual-encoder, attention fusion, 3D convolution)
    - **Key innovations** (e.g. feature alignment, multi-scale fusion, loss functions)
- **Comparison & Insights**
  - Compare pros/cons of each strategy (e.g. simplicity vs. accuracy, compute cost).

- Highlight any preprocessing or alignment techniques they employ to register DSM with RGB.

**Deliverable:** A concise write-up (1–2 pages or slides) that presents your survey of solutions, clear explanations of each approach, and your comparative insights.