# **Track II: Implementation and Analysis**

This project track is for students who want hands-on experience with existing 3D computer vision tools. Students will work on two separate projects, each focusing on applying 3D computer vision tools to specific applications.

# **Project Requirements:**

• Project Selection:

Students will choose one application for each project:

- Project I Applications:
  - Monocular Depth Estimation
  - Pairwise Matching
  - NeRF vs. Gaussian Splatting
  - Text-to-3D

# • **Project II Applications:**

- Structure from Motion
- SLAM
- Inverse Rendering
- Dynamic/Physics-Based Applications

# • Subtopic Selection:

For each application, students must select a **specific subtopic** (e.g., for Inverse Rendering: Intrinsic Decomposition, Material Estimation, or Lighting Estimation).

# • Model Selection and Evaluation:

- Identify three different models addressing the chosen subtopic.
- Ensure the models have publicly available code and pre-trained checkpoints.
- Use pre-trained models on a suitable dataset (either found or collected) without additional training.
- Identify three instances of success (where the model performed well) and three instances of failure (where it did not meet expectations).
- Compare the three different models to determine their strengths and weaknesses.

# • Report Writing:

- For each project, students will document their work in a **4-page report** (using the <u>CVPR format</u>). This includes:
  - Detailed model explanation.
  - Analysis of results.
  - Key insights and findings.

# Grading Breakdown:

# 1. Project Pitch (5 points)

Present your Project selection, Subtopic and approach.

# 2. Project I (20 points)

- **Presentation + Q&A (10 points):** Explain your results and answer questions.
- Progress (10 points):
  - Visual Results (6 points): 2 points per model.
  - Comparison (4 points): Analyze and compare the models.

# 3. Project II (20 points)

- **Presentation + Q&A (10 points):** Explain your results and answer questions.
- Progress (10 points):
  - Visual Results (6 points): 2 points per model.
  - Comparison (4 points): Analyze and compare the models.

# 4. Final Reports (15 points)

# • Project I Report (7.5 points):

- Introduction (1 point).
- Explanation of 3 models (2 points).
- Experiments (3 points).
- Conclusion (0.5 points).
- Project II Report (7.5 points):
  - Same structure as Project I.

By the end, students will have completed two projects, presented their results, and submitted detailed reports totaling **8 pages (4 pages per project)** in the CVPR format.