

Team Brown Munde

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Objective

- As our project we are going to implement the following paper : [3D Reconstruction from Accidental Motion](#)
- Our **aim** is : **“To reconstruct a 3D scene from a set of initial frames of a video capture by exploiting accidental motion”**
- Our implementation will take the following parameters :
 - ◆ **Input** : Sequence of frames of parts of video.
 - ◆ **Result** : A 3 Dimensional reconstruction depth map of a reference frame

Problem Brief

→ We have an image sequence of N_c images and N_p projections (2D points) of corresponding 3D points as seen from every camera, we try to estimate the world coordinates of the real world points using **Bundle Adjustment**.

◆ **Bundle Adjustment** : It refers to solving the location of pixels for a given estimated initial pose and location of 3D points.

→ We take the first frame as reference frame and parametrize all the 3D points by inverse depth relative to reference frame.

→ We start with a random initialization and then solve for camera poses using Bundle Adjustment.


Problem Brief...

- We then reconstruct the 3D scene from estimated camera poses. This results in a smooth depth map.
- We regularize the depth estimation by minimising an energy function.

Method Overview

- The paper describes the following pipeline for the 3D reconstruction
- ◆ Extract good features using **Shi-Tomasi** method.
 - ◆ Track the detected features using **Lucas-kanade** method from reference image I_R .
 - ◆ Now use the tracked features to estimate the 3D structure of scene using bundle adjustment.
 - ◆ The final result is a dense map reconstructed from the sparse 3D structure using a **CRF model**. This incorporates a photo-consistency and smoothness loss.

Goals

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- The background image shows a computer screen with a teal overlay. It features a line graph at the top with a peak and a dip, and a pie chart below it. The text '19 av.' is visible near the line graph, and 'New Visitor' and 'Returning Visitor' are visible near the pie chart. The taskbar at the bottom shows several icons.
- We will follow the mentioned deadlines for our project deliverable :
 - ◆ Extraction of Feature (2 weeks)
 - ◆ Tracking of features (2 weeks)
 - ◆ Bundle Adjustment (2 weeks)
 - ◆ CRF energy minimization (1 week)
 - ◆ Integration and results (1 week)
 - We will aim to cover till Bundle adjustment for mid presentation but will surely cover all of the tracking part till then.

Thank You