

20ES012 - Embedded Machine Vision

UNIT – I: Basic Steps of Video Processing

Analog Video, Digital Video. Time-Varying Image Formation models: Three-Dimensional Motion Models, Geometric Image Formation, Photometric Image Formation, Sampling of Video signals, Filtering operations

UNIT – II: 2-D Motion Estimation

Optical flow, General Methodologies, Pixel Based Motion Estimation, Block- Matching Algorithm, Mesh based Motion Estimation, Global Motion Estimation, Region based Motion Estimation, Multi resolution motion estimation, Waveform based coding, Block based transform coding, Predictive coding, Application of motion estimation in Video coding.

UNIT – III: Video enhancement and restoration

Video enhancement and Restoration- Video quality assessment-Restoration-Super resolution-Video coding: motion compensated prediction and interpolation, block-based hybrid video coding, scalable video coding

UNIT - IV: Tracking in Video Processing

Motion tracking in video-2D and 3D tracking in digital video- Bayesian methods-Deep learning motion estimation. Video compression standards (H.261 and H.263, MPEG1, MPEG2, MPEG4, H.264).

UNIT–V: Transcoding and Applications

Digital video Transcoding-Embedded video codecs-Video stabilization and mosiacing- video surveillance

TEXT BOOKS:

1. Digital Image Processing – Gonzalez and Woods, 3rd ed., Pearson.
2. Video Processing and Communication – Yao Wang, Joem Ostermann and Ya-quin Zhang. 1st Ed., PHInt.

REFERENCE BOOKS:

1. Digital Video Processing – M. Tekalp, Prentice Hall International
2. Digital Image Processing – S. Jayaraman, S. Esakkirajan, T. Veera Kumar – TMH, 2009
3. Essential guide to video processing by Bovik