

Title:	Depth Map Estimation using Defocus Blur and Motion Cues
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Abstract: The three dimensional(3D) display has assumed considerable importance for display systems. So there is inherent need of converting two dimensional(2D) media into 3D for such display. In general, videos do not contain depth information. Explicitly depth information can be inferred by visual and motion cues present in the video. However, it is always difficult to construct depth map from single depth cue. Thus combining multiple depth cues increase the accuracy of the estimated depth map. In this thesis, we present a depth estimation framework which uses multiple cues namely defocus blur and motion to generate more accurate depth map. Depth is related to the extent of defocus blur, higher the amount of blur present in the object farther it is from the camera. While depth from motion exploits the relation between camera motion and distance of the objects from the camera. This relationship implies that closer object has larger motion and farther object has small motion. So in this thesis, we present a novel and accurate way of combining defocus blur and motion. The proposed method is not only able to correct the depth cue information for moving object part but also other parts. This is important as estimation of defocus and motion can be erroneous. Firstly we obtain the motion direction and estimate the blur at the edges perpendicular to motion direction, as defocus information is preserved in perpendicular direction of motion. Further in case when camera is also moving we relate motion information and defocus through camera parameters and reject all the outliers. This helps us to generate more accurate, credible and reliable depth map. Experimental results on different synthetic and real video data sets demonstrate the effectiveness and superiority of our method compared to state of the art methods.

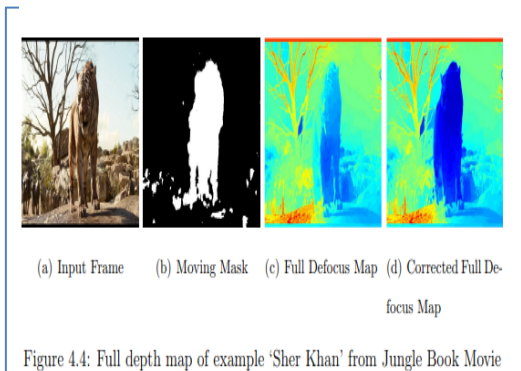


Figure 4.4: Full depth map of example 'Sher Khan' from Jungle Book Movie

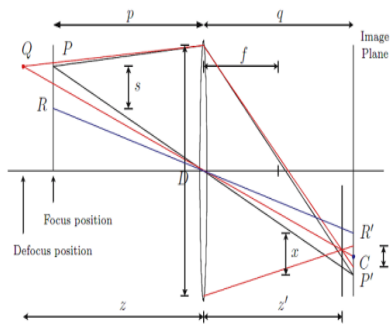


Figure 2.3: Defocus Blur Model



Figure 2.5: Texture Variation in Field