



## SYSTEMS, METHODS, AND MEDIA FOR GENERATING DIGITAL IMAGES USING LOW BIT DEPTH IMAGE SENSOR DATA

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### The Invention

UW researchers have developed a novel technique that compensates for motion between high-noise frames using a recurrent convolutional neural network. Existing work uses convolutional neural networks (specifically, 3D convolutional networks) for frame denoising. Convolutional neural networks are the state of the art for many computer vision tasks. They are effective for processing spatially localized structures in images. However, recurrent neural networks are the state of the art for temporal sequence processing. They are capable of processing and generating sequences of arbitrary length. The inventors leverage these models. The core building block in the new model is the convolutional long short-term memory (LSTM) layer. LSTMs are capable of modeling long-term dependencies by adaptively updating their internal state and are used and are applicable to both images and video. Convolutional LSTMs replace the dense operations in a regular LSTM with convolutional operations. Bidirectional LSTMs, which allow information to flow both backward and forward in time. Bidirectional LSTMs require capturing and storing all frames before processing. Alternatively, a unidirectional LSTM (which processes frames in the forward temporal direction only) can be used for real-time, low-memory processing.

### Additional Information

#### For More Information About the Inventors

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#### Tech Fields

- [Information Technology : Computing methods, software & machine learning](#)
- [Information Technology : Image processing](#)

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