This paper is devoted to the problem of texture classification. Motivated by recent advancements in the field of compressive sensing and keypoints descriptors, a set of novel features called dense micro-block difference (DMD) is proposed. These features provide highly descriptive representation of image patches by densely capturing the granularities at multiple scales and orientations. Unlike most of the earlier work on local features, the DMD does not involve any quantization, thus retaining the complete information. We demonstrate that the DMD have dimensionality much lower than Scale Invariant Feature Transform (SIFT) and can be computed using integral image much faster than SIFT. The proposed features are encoded using the Fisher vector method to obtain an image descriptor, which considers high-order statistics. The proposed image representation is combined with the linear support vector machine classifier. Extensive experiments are conducted on five texture data sets (KTH-TIPS, UMD, KTH-TIPS-2a, Brodatz, and Curet) using standard protocols. The results demonstrate that our approach outperforms the state-of-the-art in texture classification.