is the updated affine origin and affine basis points in the K image plane.

$$M_{3*4}=\begin{bmatrix} u_1^k-u_0^k & u_2^k-u_0^k & u_3^k-u_0^k & u_0^k \\ v_1^k-v_0^k & v_2^k-v_0^k & v_3^k-v_0^k & v_0^k \\ 0 & 0 & 0 & 1 \end{bmatrix} \quad (9)$$

- According to step 5 to get the four points coordinates under affine coordinates and step 6 affine projection matrix M_{3*4},then we can get the four points coordinates on the current frame image plane $x_{ik}=(u_{ik},v_{ik})(i=1,..,4)$
- After given the four points coordinates in the image plane and the plane coordinates in the real world, according to the formula (2), get the homography matrix of current frame, so as to figure out the registration matrix. Then use OpenGL to render the virtual object and registry virtual object in the right position.

V. The experimental results

In this paper, we use OpenGL, Open CV and VS2008 to implement the proposed registered tracking algorithm. The hardware configuration is as follows, CPU of Intel Core Duo with frequency of 2.80 GHz and 2G memory, graphics card type is Geforce 9600 GT with a resolution of 1280 * 1280.

Experimental results are shown in figure 4 below, the figure (a) and (b) are the selected two frames of reference images under different Angle of view in the initialization phase, the red dot is specified, the square formed by 4 red points represent the location to place virtual object.

Figure (a) is the initial frame, the red dots stands for virtual object position to register, in figure (b) place a cube on the position specified by the red dots, represents the effectiveness of registration.

Figure (c) (d) are the registered effectiveness of virtual object under different perspective, Figure (e) and (f) register result on the specified registered location in the case of partial shaded, the result shows that even in the case of partial shaded, the algorithm can realize the registration well, greatly improved the registered feasibility than any algorithms based on the artificial marks.

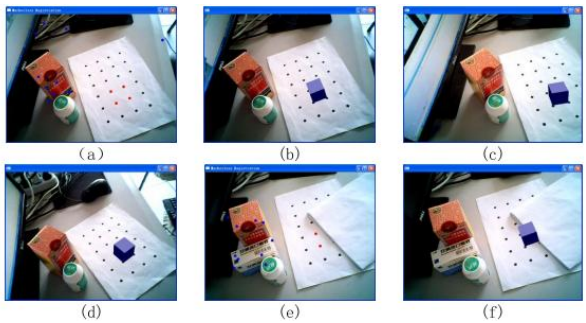

Fig. 4 experimental results

VI . Conclusions

In augmented reality, 3D registration is the most critical and most basic AR technology, and its registration effect can directly affect the fusion quality of real and virtual object. This paper discussed the approach of tracking based marker less registrations in details. Firstly introduced registration method of the augmented reality, including registered tracking approaches based on the marked and unmarked.

Second an improved feature point extraction and tracking algorithm is introduced in details, mainly considering the stability and accuracy to extract the feature points using SIFT algorithm, and KLT algorithm is a matching method based on the optimal estimation with high matching accuracy and fast speed, so the SIFT algorithm is adopted to extract the feature points, the KLT algorithm for tracking and matching feature points.

And the algorithm can be divided into two phases, the initialization and operation, during the initialization phase, its task is mainly to extract the feature points and build the affine coordinate system by Sift algorithm, with affine reconstruction technology, compute the real world coordinates of the four specified points to place virtual object,

During operation phase, calculated the affine projection matrix to restore the current image plane coordinates of the four points specified in initialization phase. And using the four points to calculate the homography relation between the current image plane and real world scenario, that is the homography matrix of each image. Further computed registration to overlay virtual objects on the real scenario corresponding to each image frame, so as to realize the stable and efficient tracking based marker less registration.

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