CHAPTER 4 HUMAN ACTION RECOGNITION

This chapter explains the approach we use to recognize human actions. The approach is based on a posture state transition diagram constructed with the seven main postures. It recognizes human actions according to posture transitions. Since our system is used to detect the occurrence of dangerous human actions for elder's home care, the approach emphasizes dangerous actions recognition. In section 4.1, the posture state transition diagram is described. How to use the posture state transition diagram for human action recognition is specified in section 4.2.

4.1 Posture State Diagram

In our experiments about the normalized silhouettes of the seven main postures, we observed that each main posture could change to another one immediately or through some postures. According to the immediate changes, we can construct a posture state transition diagram based on the seven main postures. Fig. 4.1 shows the diagram we construct.
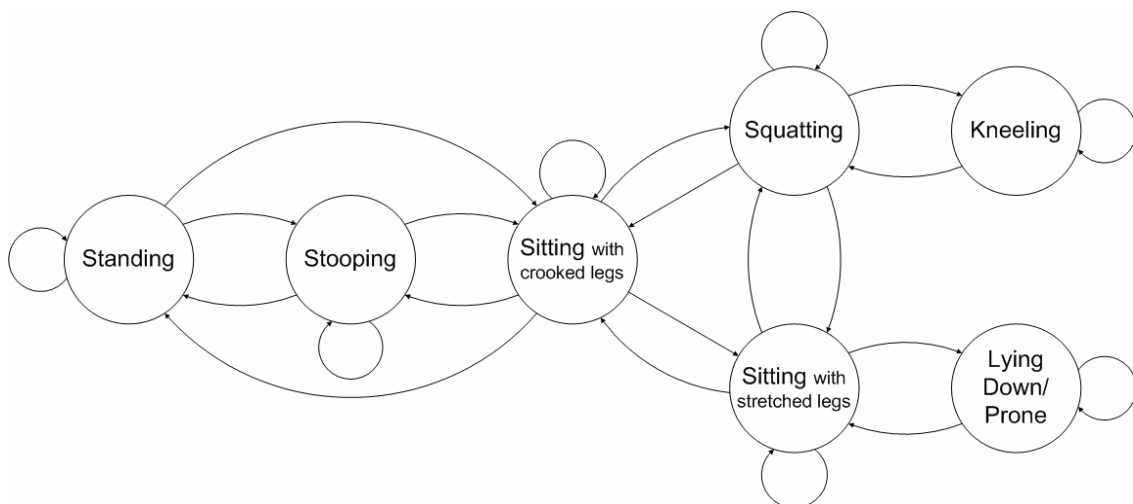

Fig. 4.1 The posture state transition diagram.

4.2 Action Recognition

According to the posture state transitions, human actions can be classified into normal actions or dangerous actions.

Normal action: A human action is a normal one, if any two successive postures in this human action have a transition in the state diagram. By tracking the posture transitions, what the human is doing can be understood.

Dangerous action: If there are two successive postures that do not have a transition in the diagram, the human action that contains these two postures is called a dangerous action. For example, consider a dangerous action, falling down (see Fig. 4.2). The transition from stooping to lying down does not exist in the posture state transition diagram, so this action is detected as a dangerous one.
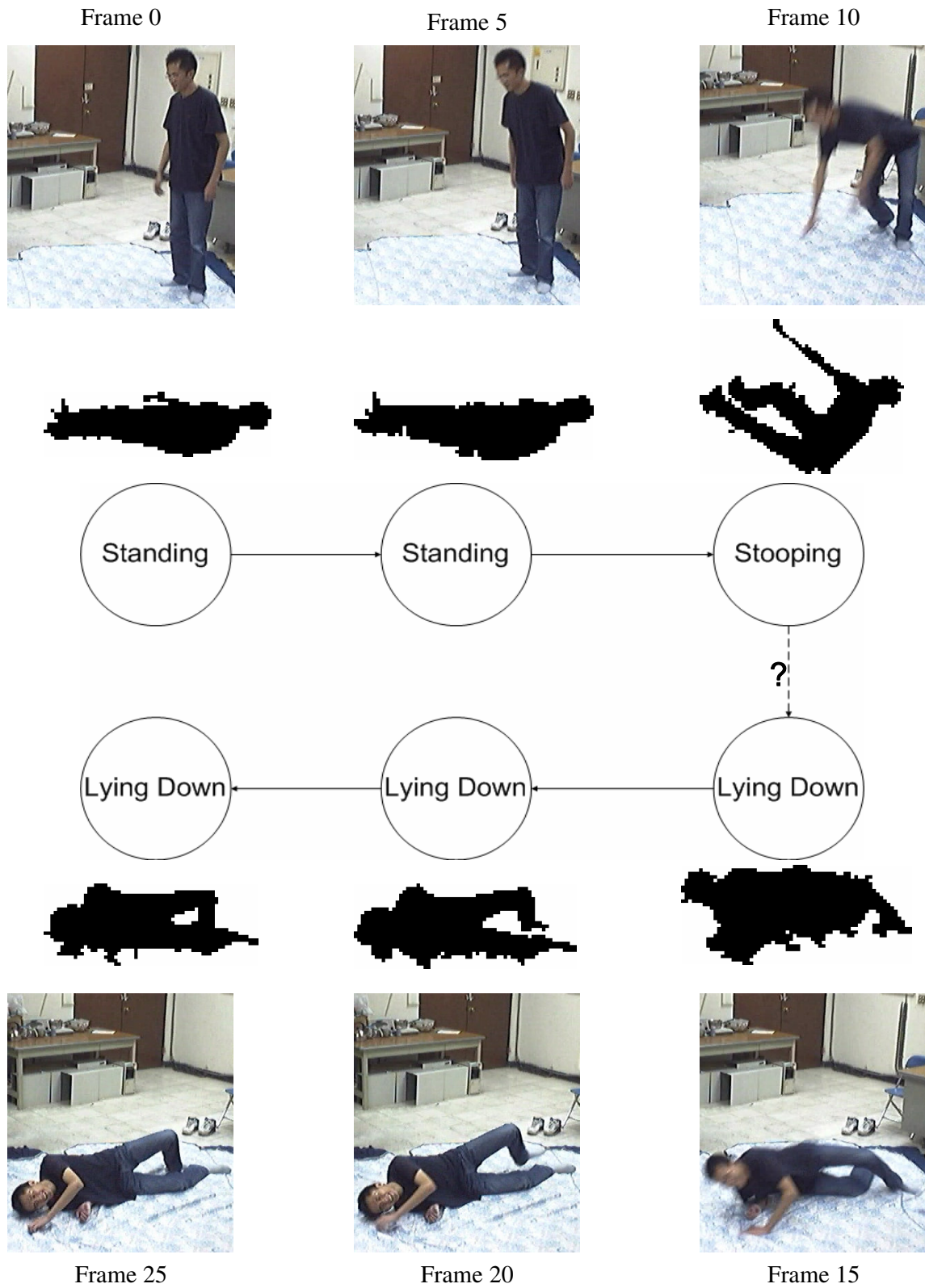
Fig. 4.2 An example of the detection of dangerous actions.