

Abstract**Drowning Early Warning System**

5 This invention describes an audio-visual based method and system for early drowning detection system. In this invention, a number of cameras are mounted on top of a swimming pool. These cameras are used to monitor swimmers in the pool together with the aid of an array of microphones.

10 Similarly, the microphone array is mounted above the water to cover the entire swimming pool. Based on the motion and activity of the swimmer detected through the video camera, the swimmer' s condition is automatically analyzed. Such automated video analysis includes building the visual

15 background model of the pool, detecting the presence of swimmers in the monitored areas, estimating the number of swimmers inside the monitored area, tracking the swimmers and analyzing the behavior of each tracked swimmer in terms of body orientation, moving direction and motion patterns.

20 In addition, the microphone array is deployed to pick up audio signals originating from distress calls. Once the system detects the presence of a potential drowning, both visual and audio alarms will be activated to draw the attention of the person in charge for further confirmation

25 and if necessary to provide necessary follow-up rescue actions.

Figure 10