Activity recognition is an important task which can be applied to many real-life problems in pervasive computing. In this work, we propose concurrent activities recognition system based on two layers of inference. The first layer develops a framework for dealing with fusion system through merging different sources of information using evidence theory. The second layer proposes a decision framework under the fuzzy logic formalism. Our experimental results suggest that the fuzzy logic method for the plausibility combinations at the decision level is the best for activities in progress simultaneously but not necessarily involving the user's interaction at the same time steps. It yields high accuracy of 79.7%, regarding experimental results