Another model, yet not different from the models in [3, 15, 16] has been proposed by Serre et al [9]. It is also based on the standard model of object recognition and is part of the feed-forward family of models inspired by the visual cortex. Unlike the models proposed in [3, 16], this model has more than 2 layers of the S and C cells which perform the same tasks as explained in [3, 16].

Models that are based on the feed-forward model of visual system have provided some good results. However, these results are only obtained when recognizing objects in scenes that have little amount of clutter and zero occlusion during the first glimpse. We human sometimes cannot recognize objects in the first glimpse in clear scenes, and therefore, if there was clutter in the scene, it will be hard for us to recognize all objects. Hence, feed-forward mechanism of object recognition is not the best solution since it cannot handle all situations, even in [17] it was mentioned that the performance of the feed-forward model dropped from 90% to 74% when the amount of clutter increased in the scenes that were used for testing.

Another process that has been discovered in neuroscience is the feedback process in the visual system. In fact, both feed-forward and feedback are two processes that complement each other to help human and primates to recognize objects [23]. Visual attention is associated with feedback, where it is a function that enables us to focus our attention on a region then explore and recognize the objects in that region. Similarly, the biologically inspired models in [22] and [23] are recognizing or categorizing objects using the same mechanism and the results were good as well.

Although the current models that are depending on feedback process are quiet good, however, neuroscience evidence shows the importance of recognizing objects by integrating both feed-forward and backward processes in order to get a better result and mimic the ability of the human and primates visual systems.

3 Bio-inspired Model

We present a model of object recognition (Figure 6) that integrates certain functions of the feed-forward and feedback mechanisms in the human visual system. The model

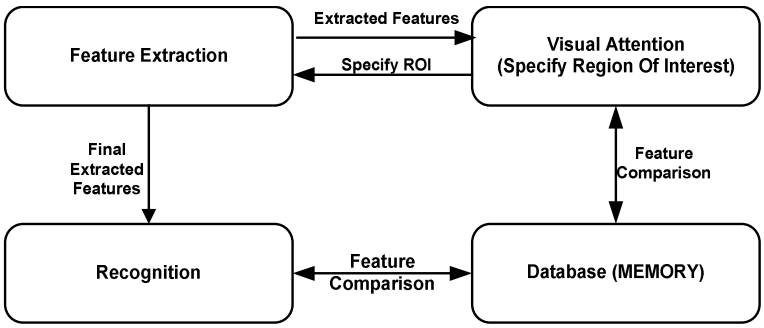

Fig. 6. The Proposed Bio-Inspired Model of Object Recognition