*Pattern recognition and computer vision tasks are computationally intensive, repetitive, and often exceed the capabilities of the CPU, leaving little time for higher level tasks. We present a novel computer architecture which uses multiple, commodity computer graphics devices to perform pattern recognition and computer vision tasks many times faster than the CPU. This is a parallel computing architecture that is quickly and easily constructed from readily available hardware. It is based on parallel processing done on multiple Graphics Processing Units (GPUs). An eigenspace image recognition approach is implemented on this parallel graphics architecture. This paper discusses methods of mapping computer vision algorithms to run efﬁciently on multiple graphics devices to maximally utilize the underlying graphics hardware. The additional memory and memory bandwidth provided by the graphics hardware pro- vided for signiﬁcant speedup of the eigenspace approach. We show that graphics devices parallelize well and pro- vide signiﬁcant speedup over a CPU implementation, pro- viding an immediately constructible low cost architecture well suited for pattern recognition and computer vision.*