Lecture 17 Scene Graphs and Graph Convolutions

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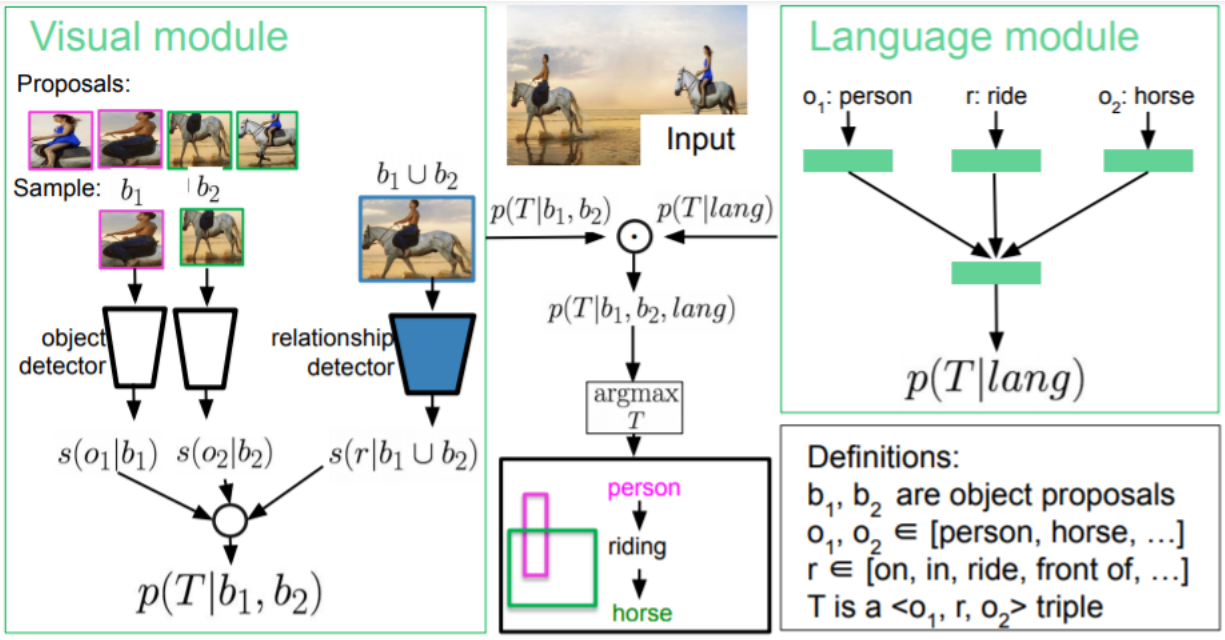
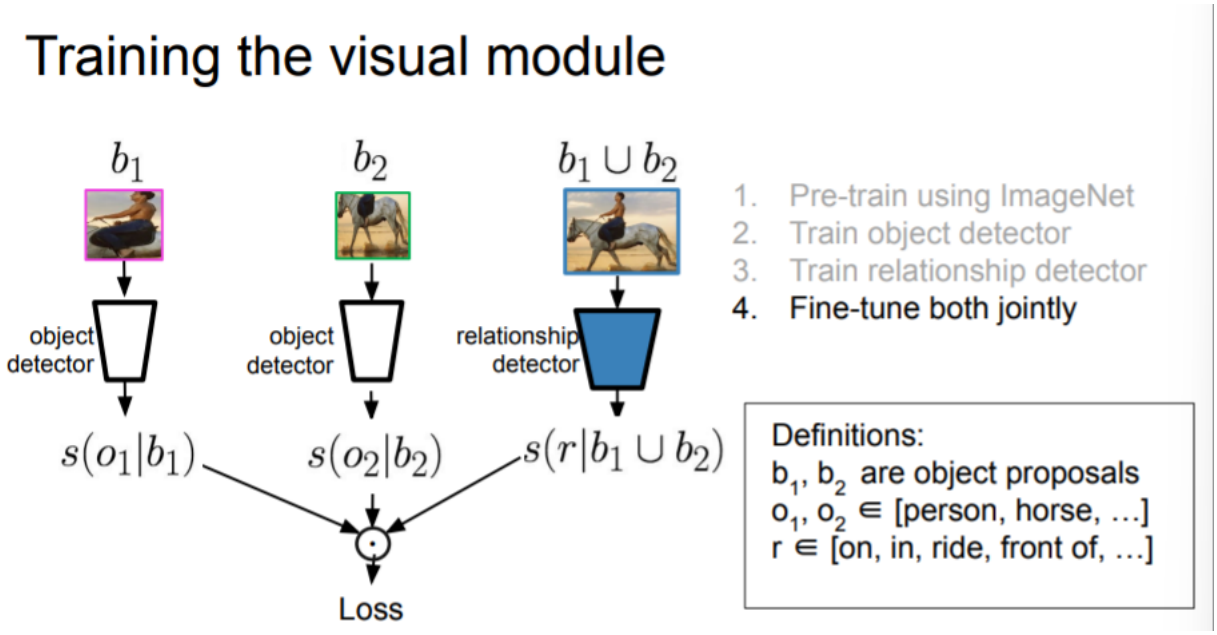
1 Scene Graph

Many Vision tasks share a similar underlying structure:Objects, Attributes, Relationships.
Attributes and Relationships are processed independent of Objects.

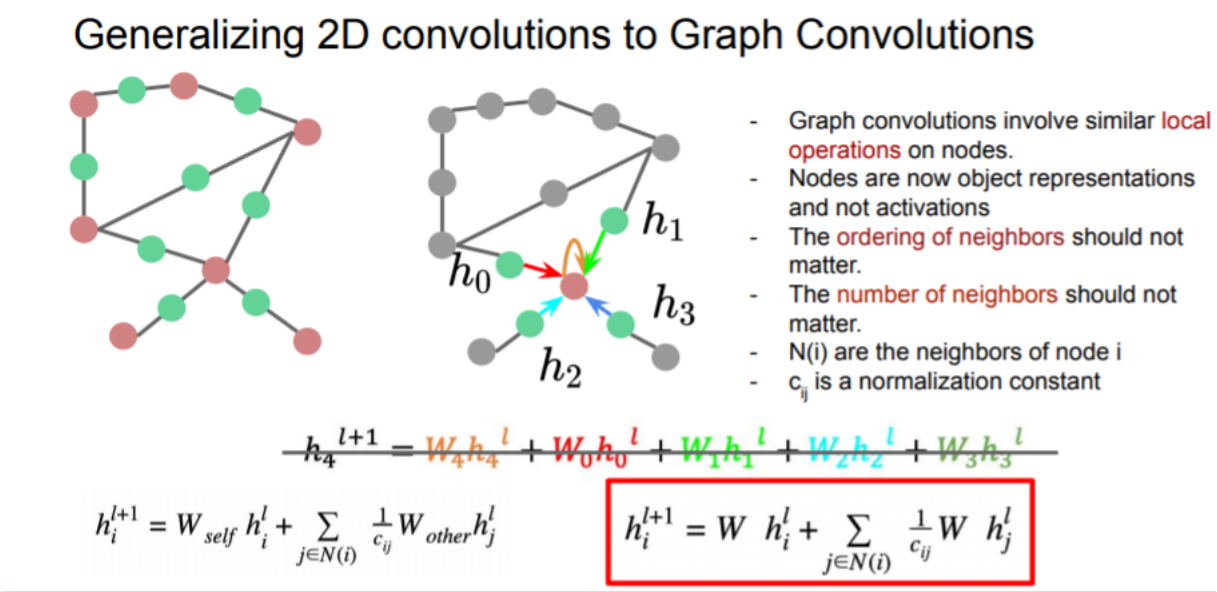




But doesn't consider other relationships when making predictions.

2 Generalizing 2D convolutions to Graph Convolutions

Take relationships as Nodes in Scene Graph.



Increase receptive fields with increasing depth
Implement Attention

3 GCN

提取图的特征:两种层:
1,node level: 不改变图的结构，只改变图节点的值;
2,graph level:通过某种形式的pooling改变图的结构。
每一个隐藏层可以写成函数：$H^{(l+1)} = f(H^(l), A)$论文中采用的是

$$f(H^(l), A) = \sigma(\hat{D}^{-\frac{1}{2}}\hat{A}\hat{D}^{-\frac{1}{2}}H^{(l)}W^{(l)})$$

A是邻接矩阵加单位矩阵，用于保存自己节点的特征；D对A做一个对称的归一化。
具体推导见：https://zhuanlan.zhihu.com/p/107162772