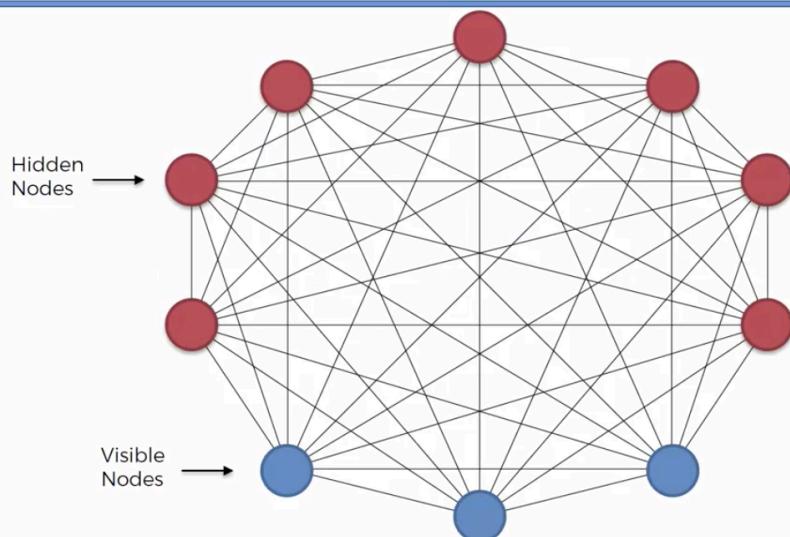


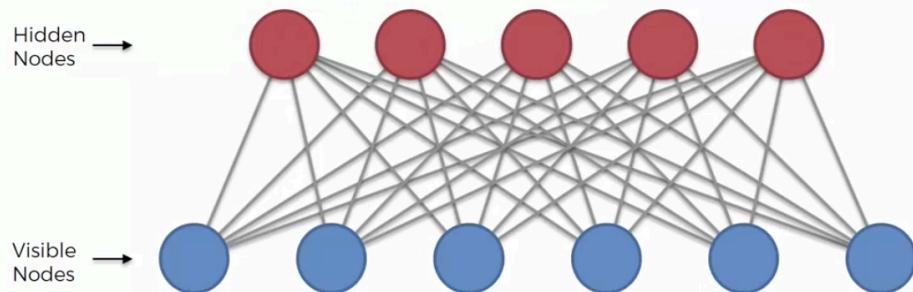
Restricted Boltzmann Machines (RBM)

Boltzmann Machines



In theory, this is a great model, in practice it's really hard to implement and compute it. So different type of architect was proposed:

Restricted Boltzmann Machines (RBM)

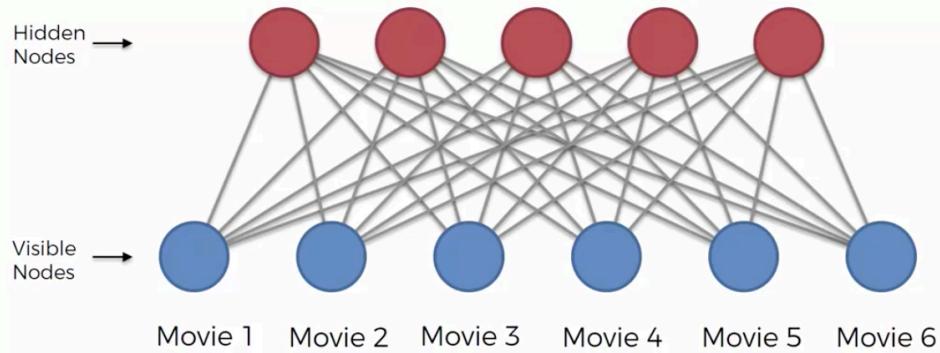


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Restricted boltzmann machine. this is the same, with this different that visible nodes cannot connect to each other. As well as hidden nodes. Other than this everything is same.

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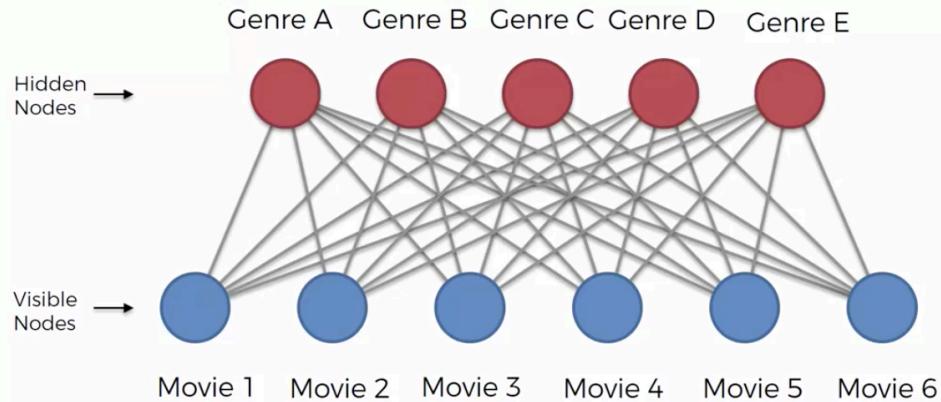


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Let's say our restricted boltzmann machine or our recommender system is going to working on six movies.

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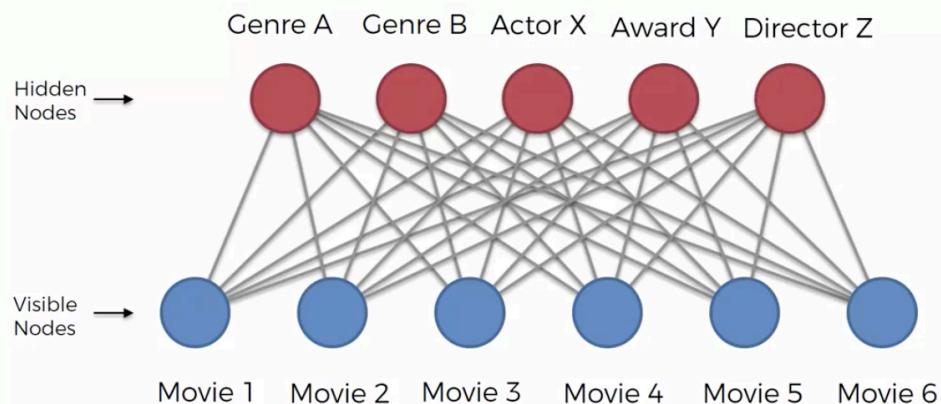


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for example, through the training process, the restricted boltzmann machine might identify that genres are important feature (of course it does not know that these are genres).

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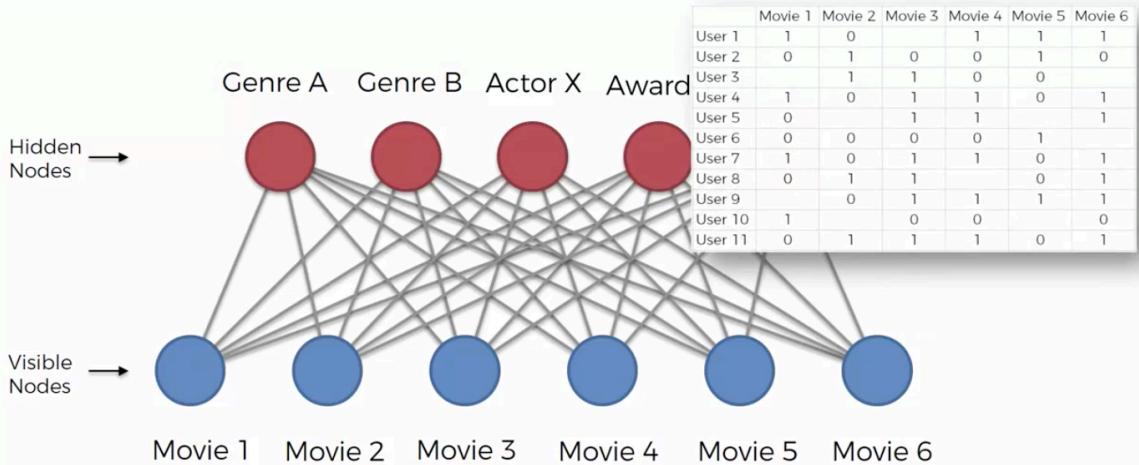


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For example, it can also identify that only genres A and B are important and different features for other nodes.

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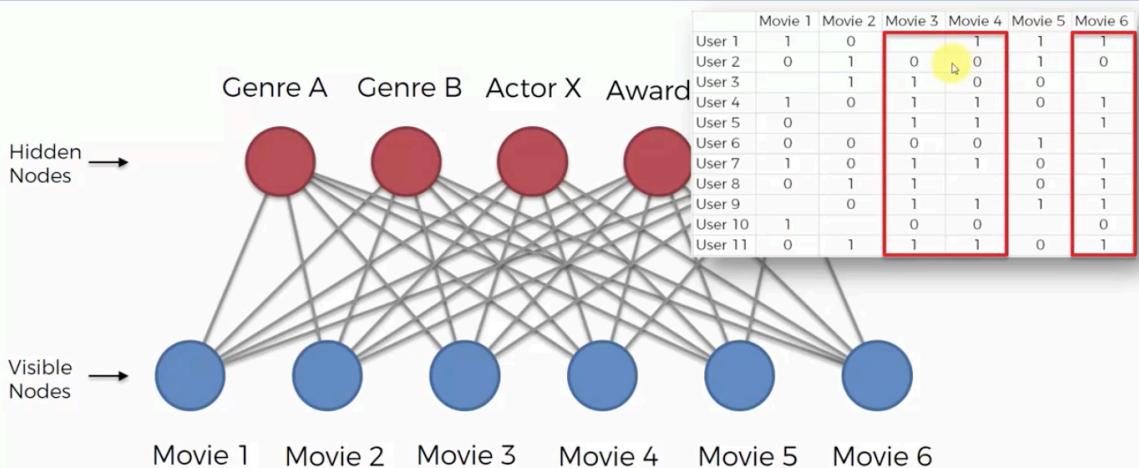


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Let's say our training set looks something like this. Which is rating with 1 means they liked it and 0 they didn't like it. Empty means that person hasn't watched that person yet. The RBM tries to understand better our system and adjust itself to be a better representation of our system and reflect all of the interconnectivity that is present in the data.

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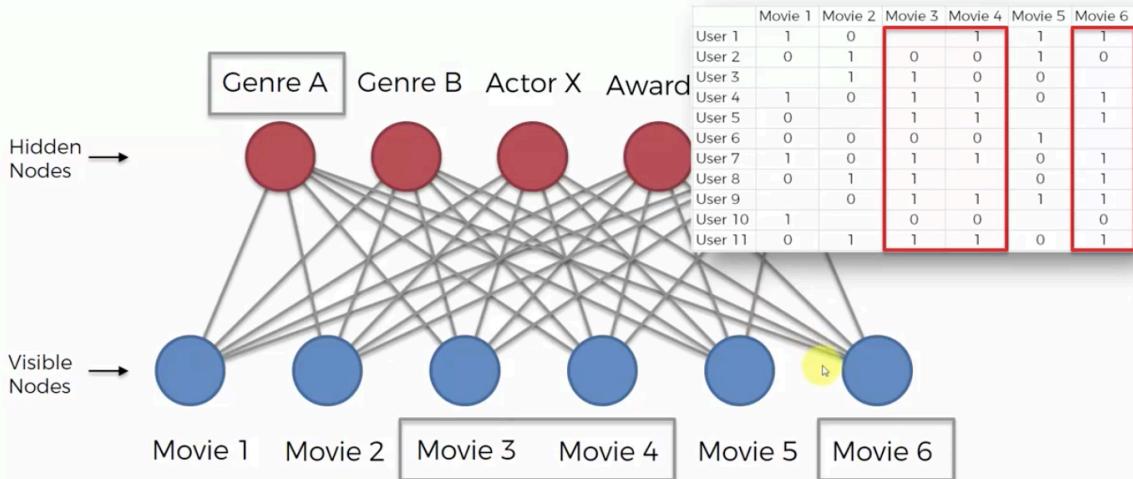


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From our example, it could pick up that movies 3, 4, and 6 have similar rating (not all the time though) which that is, someone who likes/dislikes movie 3 and 4, they also like/dislike movie 6. Or if they like/ dislike movie 3 and 6, they also like/dislike 4 and so on.

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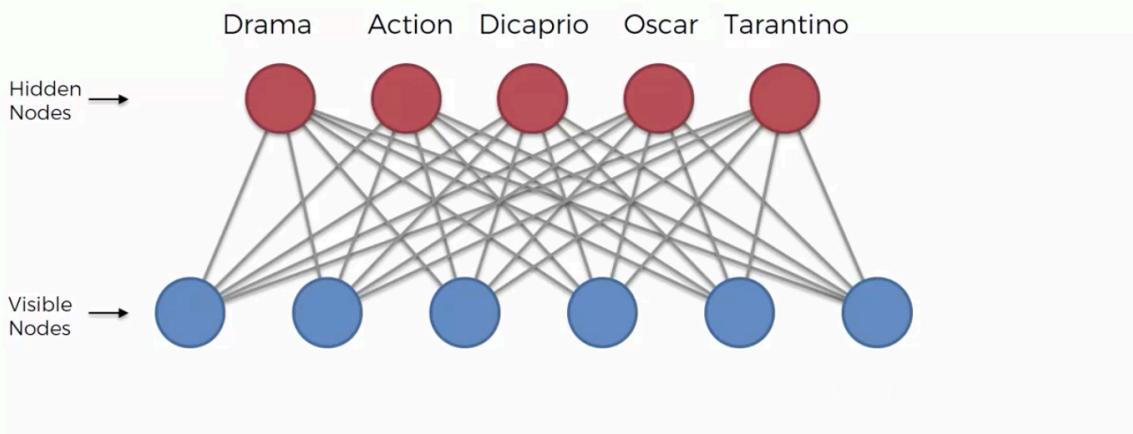


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Then RBM identifies this (squares) in the training. it would assign a node to look out for features and even without knowing what that feature is. What does that mean is that it will find what these three movies have in common that is making people to like them. Which in here without knowing it, the feature is genre.

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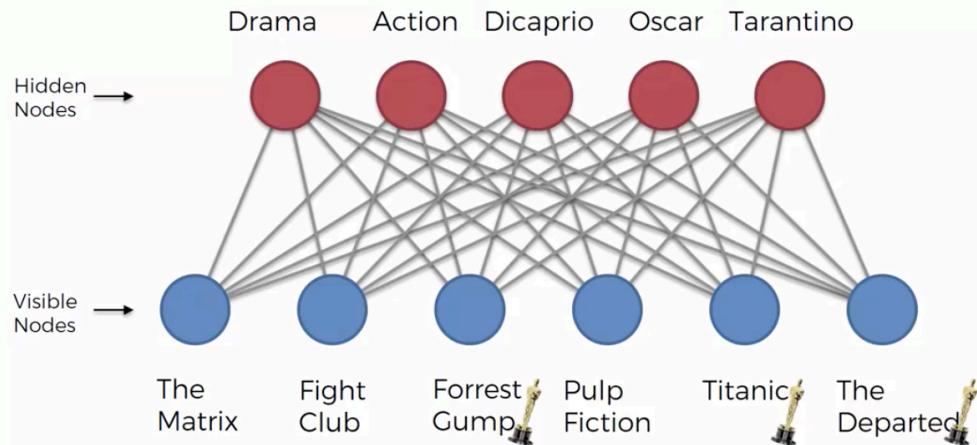


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This is another example. The features are only for our benefit and the machine has no idea what that is.

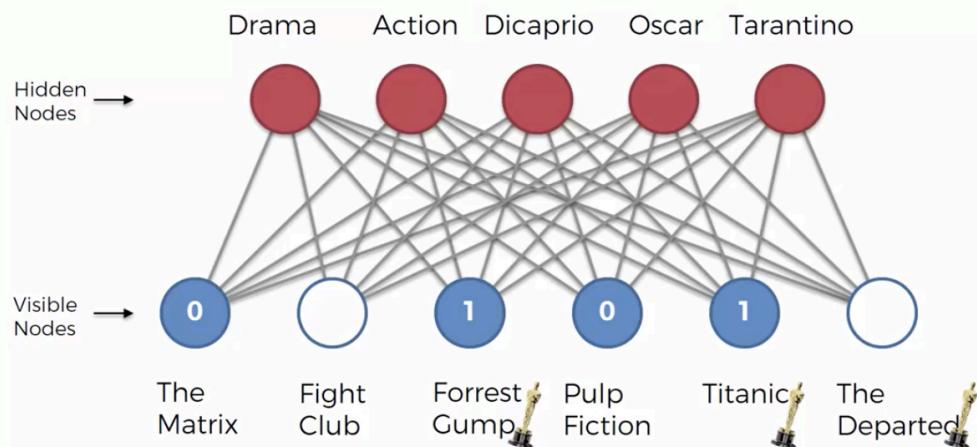
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Restricted Boltzmann Machines (RBM)

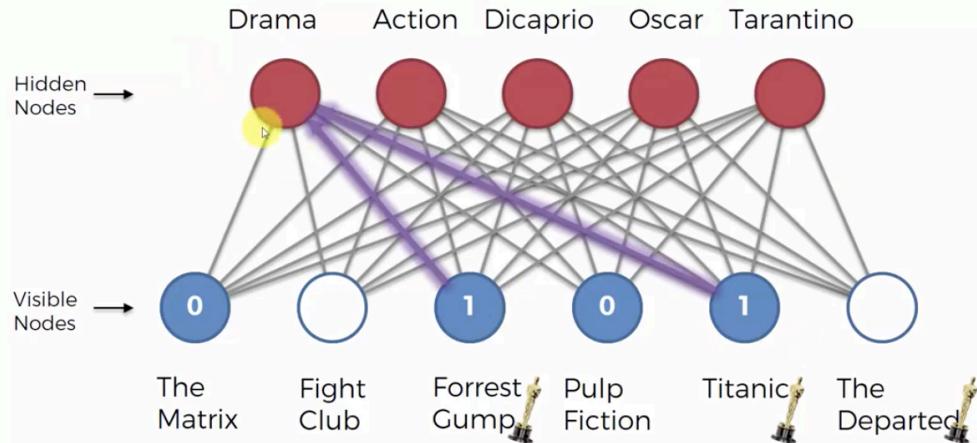


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0 means the person/user didn't like it, 1 means the person/user likes it and white means the person didn't see it. Now we want to make a recommended system for this person. Certain features going to light up, if they are present in this user's taste.

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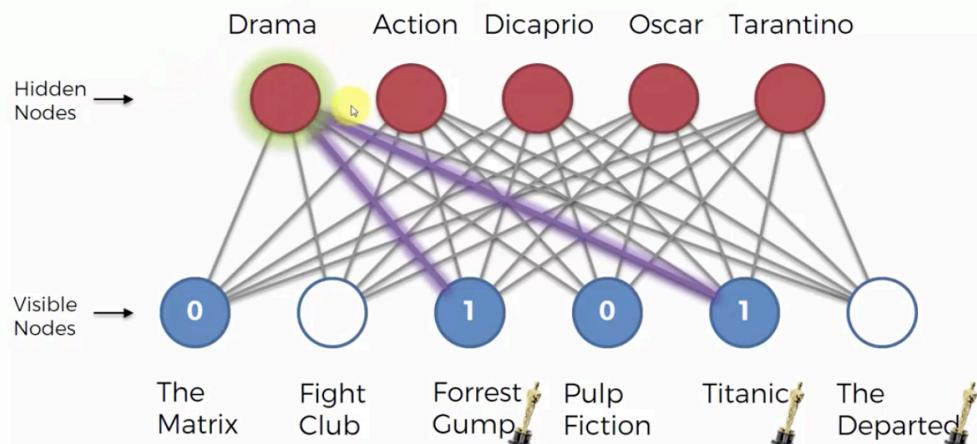


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Forest Gump, Titanic and The Departed are dramas but since we don't have a data from The Departed, then it only learns from the first two option.

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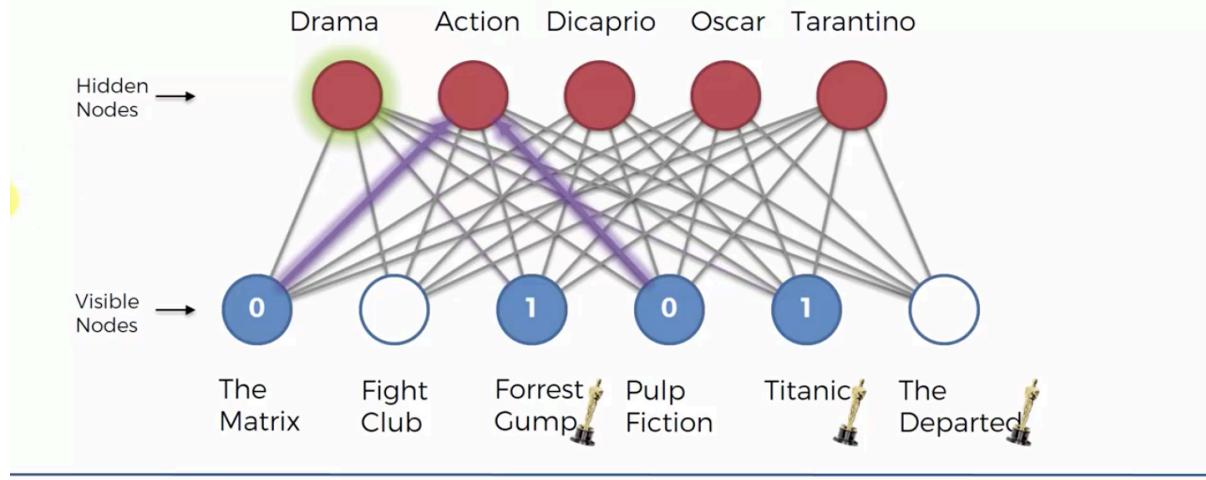


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the node is light up which that means, the person/user likes drama.

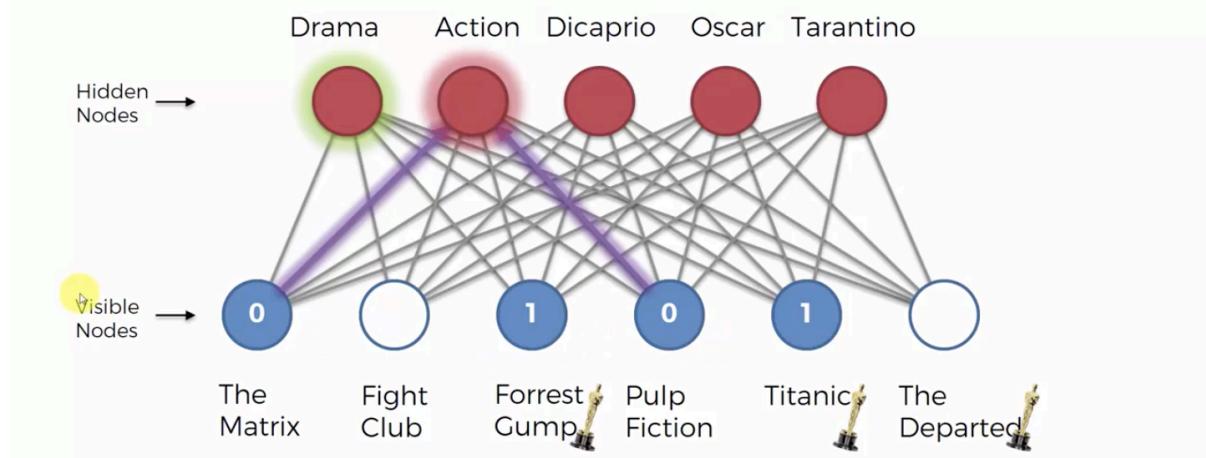
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Restricted Boltzmann Machines (RBM)

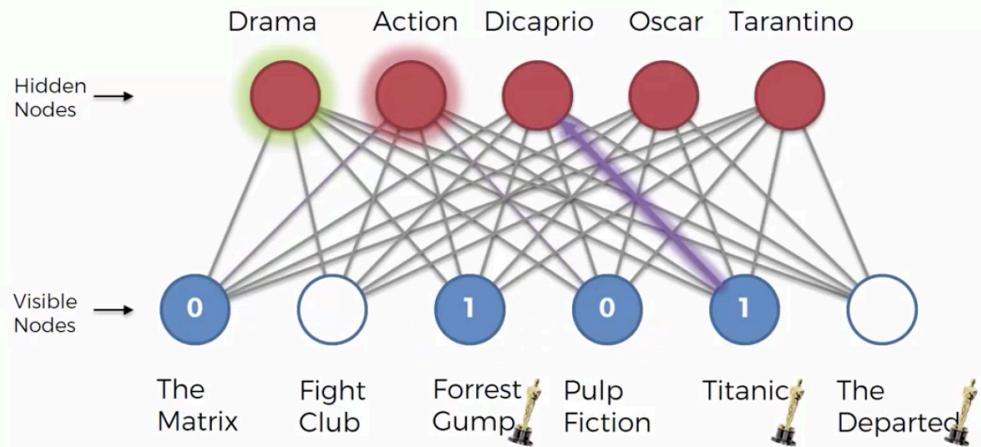


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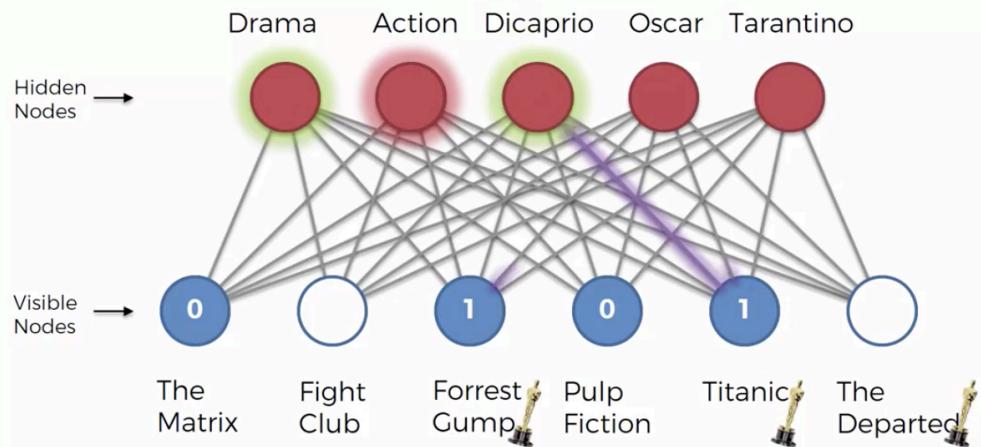
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The person doesn't like action so it's going to light up to red.

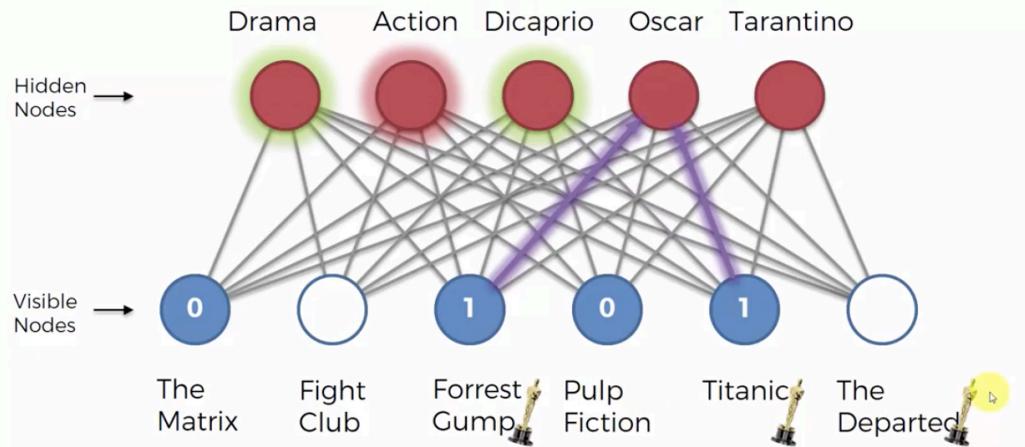
Restricted Boltzmann Machines (RBM)



Restricted Boltzmann Machines (RBM)



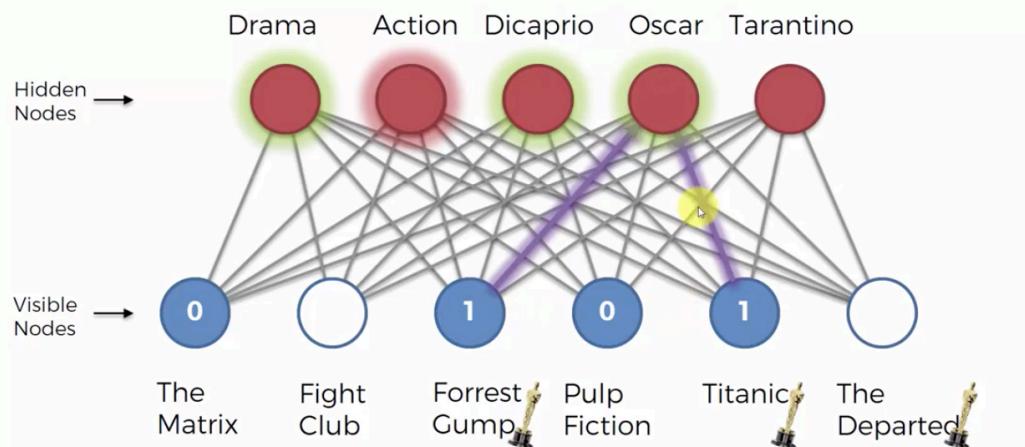
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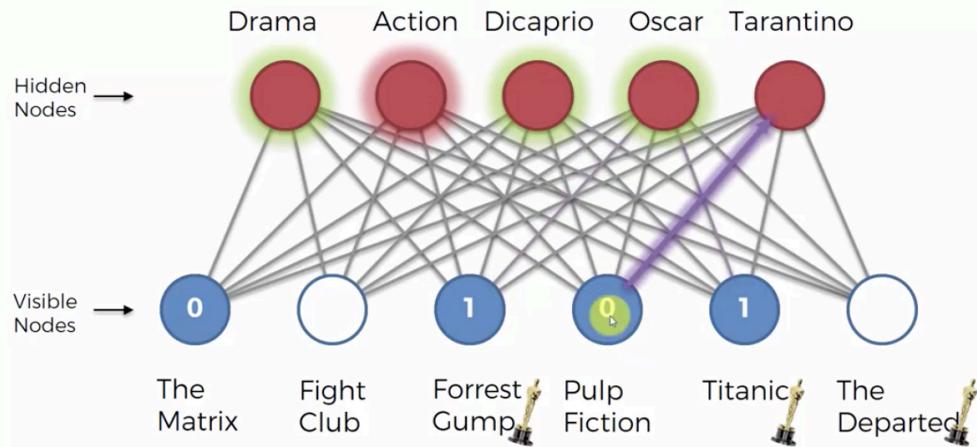
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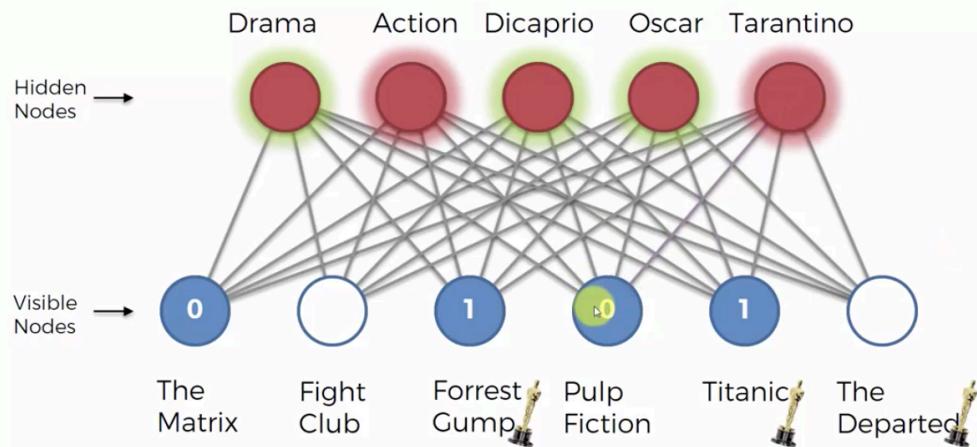
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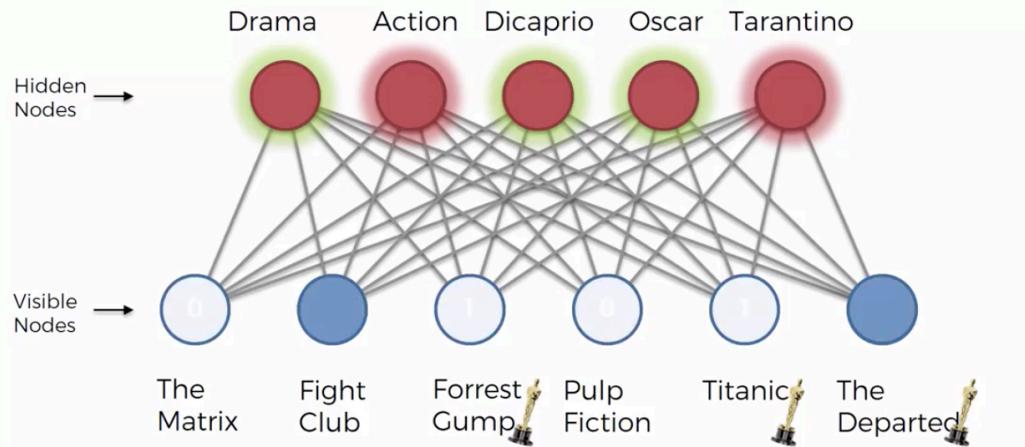
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Tarantino is name of the director.

Now backward pass happens. Now our RBM tries to reconstruct our input.

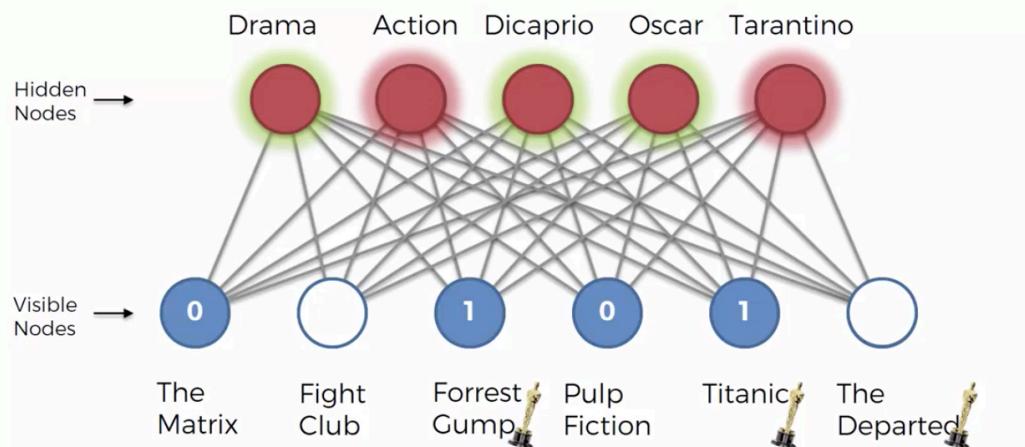
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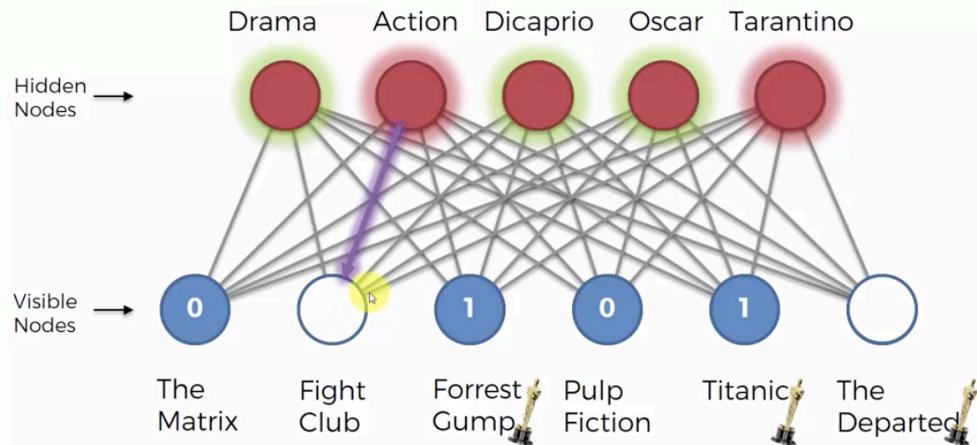
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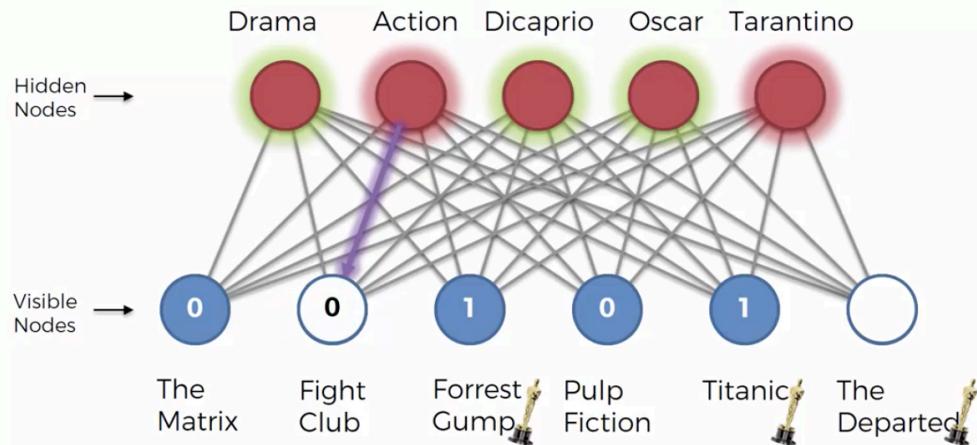


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Now we want to decide about the fight club which has connection only to the action.

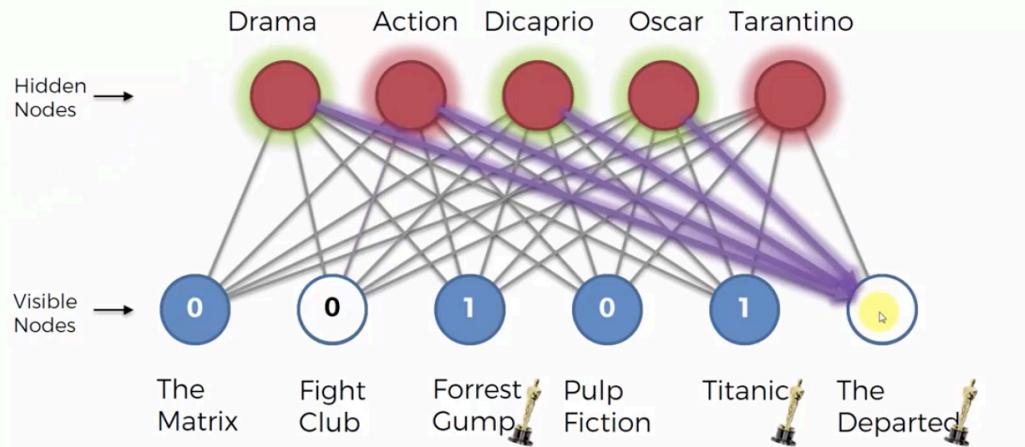
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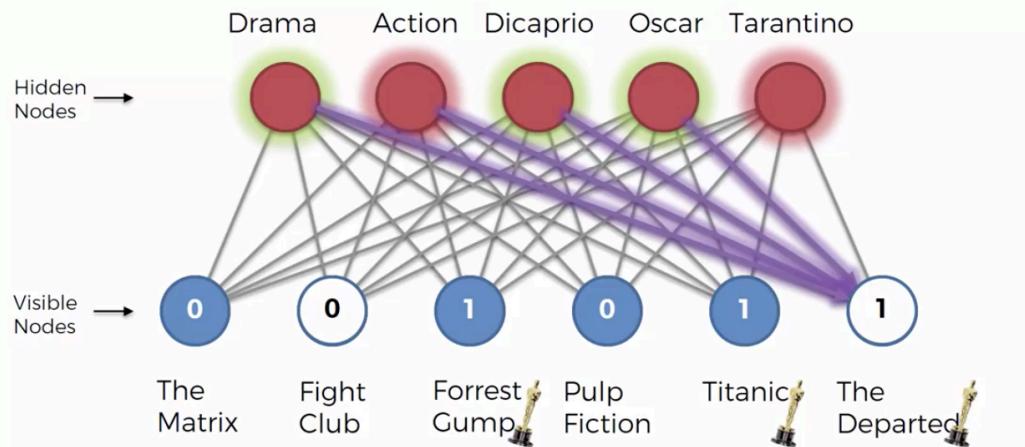
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