{ TEX }

Diagram of an artificial neural network
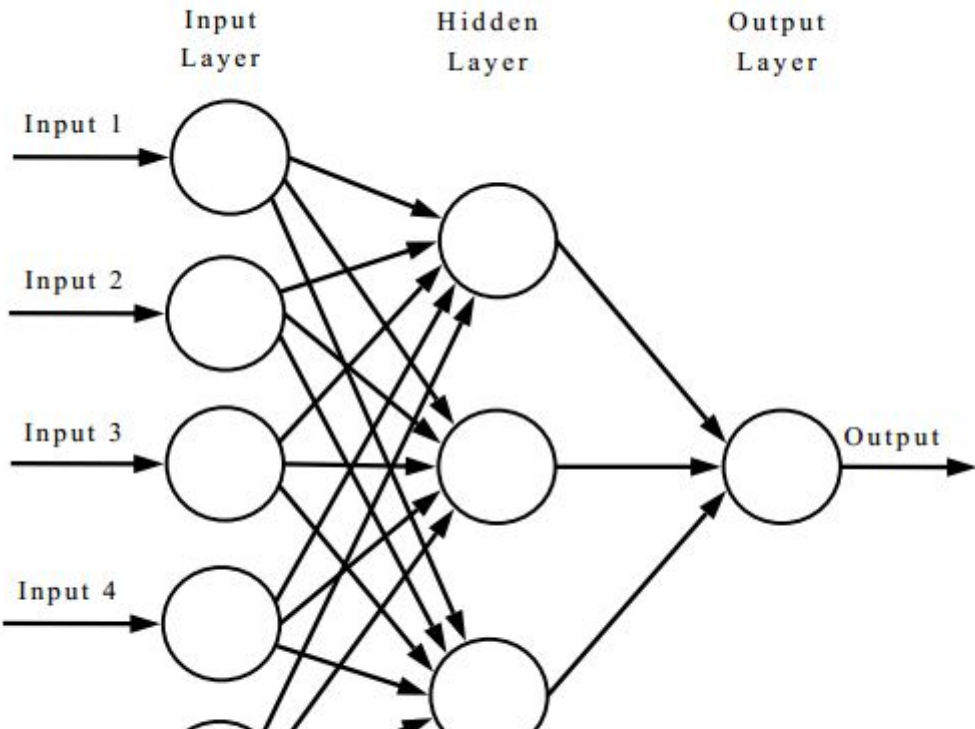
Asked 7 years, 1 month ago   Active 3 years, 8 months ago   Viewed 44k times

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I need draw some picture, but I don't know how do that.

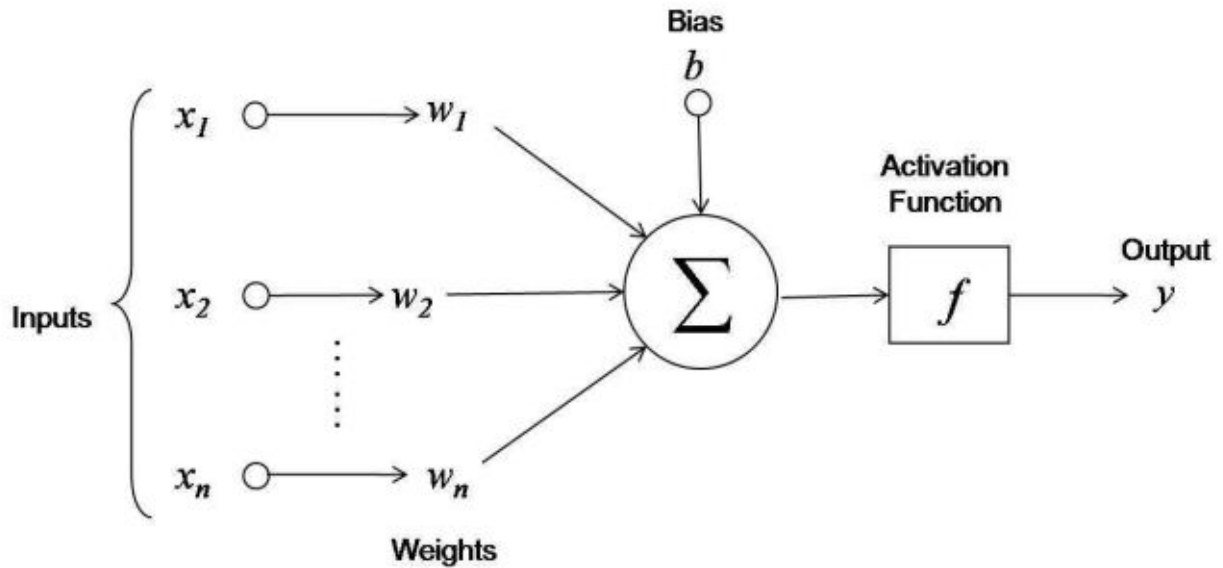First, the simple graph with basic shapes, arrow,....

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And then, draw a picture with math symbol or equation in math environment. Like that:

Please help me draw two picture. And if you don't mind, please show me some tools which can help me draw easily and generate to latex code, or some document help me learnt quickly. Thanks for your help

diagrams

2   You can use TikZ to do this. Check out some of the examples in the manual: mirror.math.ku.edu/tex-archive/graphics/pgf/base/doc/generic/... – dustin Sep 9 '13 at 17:30

You can take a look at this question which discusses a number of tools to choose from. Which you choose and want to stick at depends on a number of factors including your need, available time and learning curve option. – Masroor Sep 9 '13 at 17:35

There are plenty of related questions on the site: Fully connected network diagram and Neural Network representation are quite similar (if not duplicates) and have very good answers. – Alan Munn Sep 9 '13 at 18:01 ✎

@dustin's link is now broken. Try this: texample.net/media/pgf/builds/pgfmanualCVS2012-11-04.pdf – daviewales Jun 18 '14 at 2:05

1 Answer

Active   Oldest   Votes

One possibility; the first diagram was drawn using a `matrix` ; the second one, using `chains` :

```latex
\begin{document}

\begin{tikzpicture}[
plain/.style={
  draw=none,
  fill=none,
  },
net/.style={
  matrix of nodes,
  nodes={
    draw,
    circle,
    inner sep=10pt
    },
  nodes in empty cells,
  column sep=2cm,
  row sep=-9pt
  },
>=latex
]

\matrix[net] (mat)
{
|[plain]| \parbox{1.3cm}{\centering Input\\layer} & |[plain]| \parbox{1.3cm}{\centering
Hidden\\layer} & |[plain]| \parbox{1.3cm}{\centering Output\\layer} \\
& |[plain]| \\
|[plain]| & \\
& |[plain]| \\
  |[plain]| & |[plain]| \\
& & \\
  |[plain]| & |[plain]| \\
& |[plain]| \\
  |[plain]| & \\
& |[plain]| \\     };
\foreach \ai [count=\mi ]in {2,4,...,10}
  \draw[<-] (mat-\ai-1) -- node[above] {Input \mi} +(-2cm,0);
\foreach \ai in {2,4,...,10}
{\foreach \aii in {3,6,9}
  \draw[->] (mat-\ai-1) -- (mat-\aii-2);
}
\foreach \ai in {3,6,9}
  \draw[->] (mat-\ai-2) -- (mat-6-3);
\draw[->] (mat-6-3) -- node[above] {Ouput} +(2cm,0);
\end{tikzpicture}

\begin{tikzpicture}[
init/.style={
  draw,
  circle,
  inner sep=2pt,
  font=\Huge,
```

```
    draw,
    inner sep=2pt,
    font=\Large,
    join = by -latex
  },
  start chain=2,node distance=13mm
  ]
  \node[on chain=2]
    (x2) {$x_2$};
  \node[on chain=2,join=by o-latex]
    {$w_2$};
  \node[on chain=2,init] (sigma)
    {$\displaystyle\Sigma$};
  \node[on chain=2,squa,label=above:{\parbox{2cm}{\centering Activate \\ function}}]
    {$f$};
  \node[on chain=2,label=above:Output,join=by -latex]
    {$y$};
  \begin{scope}[start chain=1]
  \node[on chain=1] at (0,1.5cm)
    (x1) {$x_1$};
  \node[on chain=1,join=by o-latex]
    (w1) {$w_1$};
  \end{scope}
  \begin{scope}[start chain=3]
  \node[on chain=3] at (0,-1.5cm)
    (x3) {$x_3$};
  \node[on chain=3,label=below:Weights,join=by o-latex]
    (w3) {$w_3$};
  \end{scope}
  \node[label=above:\parbox{2cm}{\centering Bias \\ $b$}] at (sigma|-w1) (b) {};

  \draw[-latex] (w1) -- (sigma);
  \draw[-latex] (w3) -- (sigma);
  \draw[o-latex] (b) -- (sigma);

  \draw[decorate,decoration={brace,mirror}] (x1.north west) -- node[left=10pt] {Inputs}
  (x3.south west);
  \end{tikzpicture}

  \end{document}
```
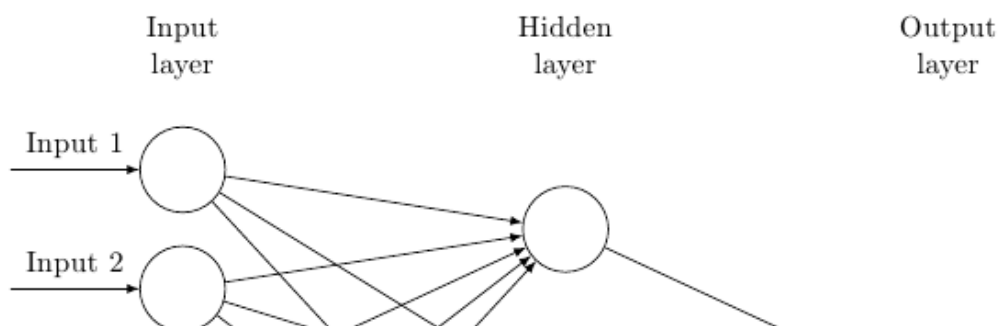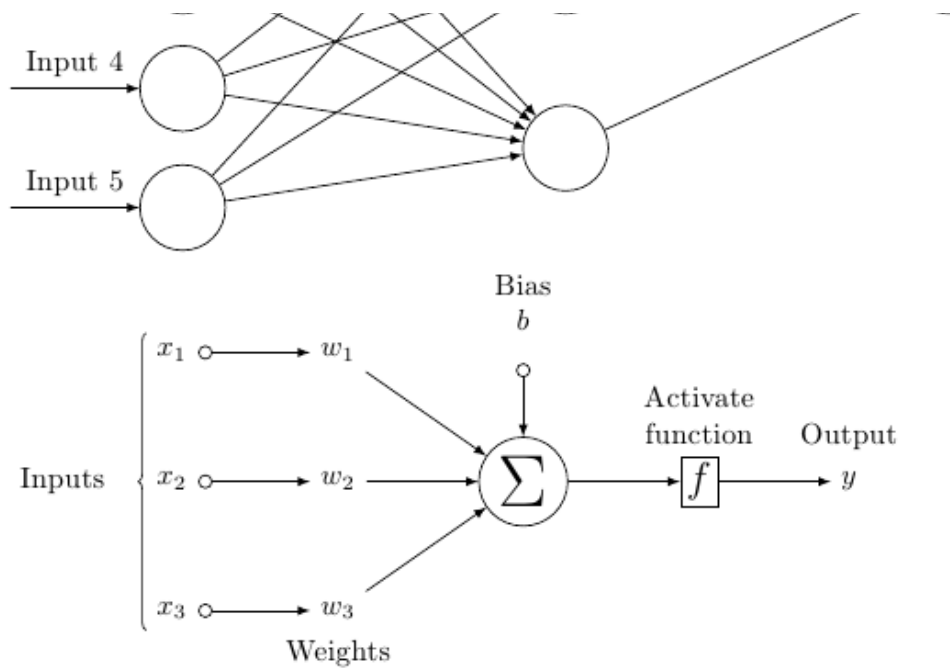
Thanks. can you introduce me some document or software about tikz? – phuong Sep 10 '13 at 6:20

@phuong the pgf manual has numerous examples and some nice inroductory tutorials: mirrors.ctan.org/graphics/pgf/base/doc/generic/pgf/… There's also a shorter document: cremeronline.com/LaTeX/minimaltikz.pdf (I've never used this last one). – Gonzalo Medina Sep 10 '13 at 12:55 ✎

Thanks you for your document. It's very useful. I just need 1 requirement. on the second graph, I want to remove a vertical line of circle. I tried hard but not done. Would you please help me again? – phuong Sep 10 '13 at 17:01 ✎

@phuong Sure! The problem is I am not sure exactly which line you are referring to. Do you want to suppress the arrow going from "Bias b" to the "Sigma"? – Gonzalo Medina Sep 10 '13 at 17:49

No, not bias. I want to remove circles between x_1 & w_1; x_2 &w_2; x_3 and W_3. You can see again my graph on question to know exactly. – phuong Sep 11 '13 at 6:09

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