Shortest path search for real road networks

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What is *pgRouting*?
Shortest path
Real road networks

How do they look like?
Like this...
...or like this...
...or sometimes like this.
What makes them real?

traffic lights  signs  road marking
How *pgRouting* can help here?
Traffic lights make you slower.

It means we should *increase costs*. 
\[
\begin{align*}
\text{cost}(A) &= \text{cost}(A) + 30\text{sec} \\
\text{cost}(B) &= \text{cost}(B) + 30\text{sec} \\
\text{cost}(C) &= \text{cost}(C) + 30\text{sec} \\
\text{cost}(D) &= \text{cost}(D) + 30\text{sec}
\end{align*}
\]
Signs tell you about restrictions and road types.
cost(A) = length(A)
reverse_cost(A) = \infty
Sometimes the costs have different meaning.
\begin{align*}
\text{cost}(A) &= \text{length}(A) / 2 \\
\text{reverse}_{-}\text{cost}(A) &= \text{length}(A) \times 2 \\
\text{cost}(B) &= \text{length}(B) \times 3 \\
\text{reverse}_{-}\text{cost}(B) &= \text{length}(B) / 3
\end{align*}
Turn restrictions obviously restrict turns.
cost(A) = cost(A) + 1\text{min}

cost(B) = cost(B) + 1\text{min}

cost(C) = cost(C) + 1\text{min}

cost(D) = cost(D) + 1\text{min}

\text{rule}(A) = "D"

\text{to\_cost}(A, D) = \infty
Road type signs can be used for cost calculation.
Not only types, but also conditions.
What about road marking?
It separates lanes, ...
...specifies road types, ...
... and restrictions.

\[
\text{rule}(D) = \text{"A, B"}
\]
\[
\text{to}_\text{cost}(D) = \infty
\]
And you know what's *cool* about pgRouting?
All costs are *dynamic*.

Which is opposite to *pre-calculated*. 
If the road is closed, ...
... there is an accident, ...
... a sign with restrictions limited in time, ...
... bad weather conditions, ...
or an obstacle, ...
You don't need to rebuild and reload your network...
... and wait forever.
You only need to *adjust the cost* for this particular road.

And next search will go another way.
Cost can be virtually anything.
It is possible to use pgRouting with OSM data.
pgRouting can be used for different kinds of networks.
Canals and rivers, ...
... hiking trails, ...
... or any other kind of network.
Now it's *showtime*!
Thanks to *sxc.hu* for being the best free photo stock.

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Just want you to remember

pgrouting.org
georepublic.de
openvrp.com