Re: measuring distance between two cars using infrared circuits

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From: Robert Monsen (*rcsurname_at_comcast.net*)
Date: 01/24/05

Date: Sun, 23 Jan 2005 20:14:55 −0800

Ken Smith wrote:
> *In article <pan.2005.01.22.09.23.03.387634@example.net>,*
> *Rich Grise <richgrise@example.net> wrote:*
> *[...]*
>
>*>People have mentioned triangulation. Does a license plate retroreflect*
>*>laser pointer light?*
>
>
> *Why not just image the plate with a camera and measure the image size with*
> *software? When the cars get further apart the image of the plate gets*
> *smaller. No LEDs needed.*
>

That is a pretty good idea. I'm not sure it's workable as is, though.

A license plate is a foot across. Thus, the function of angle given
distance is

f(x) = 2*arcsin(.5/x)

At 50', that translates to about 0.02 radians. Not too bad. However,

f'(x) = about 1/x^2

For a change of 1 foot at 50', that would be an angular change of
1/2500. It's better at 10', where a foot change would cause 1/100 change
in angle. If the maximum width were 500 pixels, then you could detect a
foot change (ie, 1/500 = 1 pixel) at 22 feet.

However, another possibility would be to use the camera to measure the
entire car width. You could use the license plate as a standard measure,
and measure the width in license plates (which are 1 foot in width in
the US.) That way, you could use the wider angles, but also have an
absolute measure. Also, that way you could autozoom the camera without
losing registration, and get better angular resolution for longer distances.

One problem is that license plates change colors, so identification
might be an issue. Thankfully, they are almost always in the same place
on the vehicle.

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Regards,
   Robert Monsen
"Your Highness, I have no need of this hypothesis."
     - Pierre Laplace (1749-1827), to Napoleon,
        on why his works on celestial mechanics make no mention of God.
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