$$\begin{pmatrix}c_1\\c_2\end{pmatrix} = \begin{pmatrix}b_1\\b_2\end{pmatrix} - \begin{pmatrix}a_1\\a_2\end{pmatrix}$$

$$\begin{pmatrix}a_1\\a_2\end{pmatrix} + s \cdot \begin{pmatrix}c_1\\c_2\end{pmatrix}$$

$$a$$

$$b$$

$$\begin{pmatrix} \binom{c_1}{c_2} = \binom{b_1}{b_2} - \binom{a_1}{a_2} \\ \binom{a_1}{a_2} + s \cdot \binom{c_1}{c_2} \\ a \end{pmatrix}$$

$$\begin{pmatrix} p_1 \\ p_2 \end{pmatrix} + r \cdot \binom{q_1}{q_2} = \binom{a_1}{a_2} + s \cdot \binom{c_1}{c_2}$$

$$\begin{pmatrix} \binom{c_1}{c_2} = \binom{b_1}{b_2} - \binom{a_1}{a_2} \\ \binom{a_1}{a_2} + s \cdot \binom{c_1}{c_2} \\ a \end{pmatrix}$$

$$\begin{pmatrix} p_1 \\ p_2 \end{pmatrix} + r \cdot \binom{q_1}{q_2} = \binom{a_1}{a_2} + s \cdot \binom{c_1}{c_2}$$

$$p_1 + r \cdot q_1 = a_1 + s \cdot c_1$$

$$p_2 + r \cdot q_2 = a_2 + s \cdot c_2$$

$$\begin{pmatrix}c_1\\c_2\end{pmatrix}=\begin{pmatrix}b_1\\b_2\end{pmatrix}-\begin{pmatrix}a_1\\a_2\end{pmatrix}\\ a$$

$$\begin{pmatrix}a_1\\a_2\end{pmatrix}+s\cdot\begin{pmatrix}c_1\\c_2\end{pmatrix}\\ a$$

$$\begin{pmatrix}p_1\\p_2\end{pmatrix}+r\cdot\begin{pmatrix}q_1\\q_2\end{pmatrix}=\begin{pmatrix}a_1\\a_2\end{pmatrix}+s\cdot\begin{pmatrix}c_1\\c_2\end{pmatrix}$$

$$p_1+r\cdot q_1=a_1+s\cdot c_1$$

$$p_2+r\cdot q_2=a_2+s\cdot c_2$$

 $s = \frac{q_1 \cdot a_2 - q_2 \cdot a_1 + p_1 \cdot q_2 - p_2 \cdot q_1}{c_1 \cdot q_2 - c_2 \cdot q_1}$

$$\begin{pmatrix} c_1 \\ c_2 \end{pmatrix} = \begin{pmatrix} b_1 \\ b_2 \end{pmatrix} - \begin{pmatrix} a_1 \\ a_2 \end{pmatrix}$$

$$\begin{pmatrix} a_1 \\ a_2 \end{pmatrix} + s \cdot \begin{pmatrix} c_1 \\ c_2 \end{pmatrix}$$

$$a$$

$$\begin{pmatrix} p_1 \\ p_2 \end{pmatrix} + r \cdot \begin{pmatrix} q_1 \\ q_2 \end{pmatrix} = \begin{pmatrix} a_1 \\ a_2 \end{pmatrix} + s \cdot \begin{pmatrix} c_1 \\ c_2 \end{pmatrix}$$

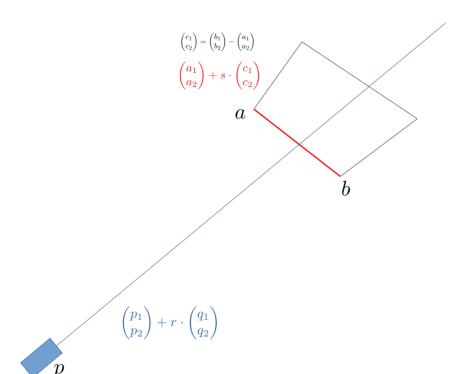
$$p_1 + r \cdot q_1 = a_1 + s \cdot c_1$$

$$p_2 + r \cdot q_2 = a_2 + s \cdot c_2$$

$$s = \frac{q_1 \cdot a_2 - q_2 \cdot a_1 + p_1 \cdot q_2 - p_2 \cdot q_1}{c_1 \cdot q_2 - c_2 \cdot q_1}$$

$$s = \frac{\begin{vmatrix} q_1 & a_1 \\ q_2 & a_2 \end{vmatrix} + \begin{vmatrix} p_1 & q_1 \\ p_2 & q_2 \end{vmatrix}}{\begin{vmatrix} c_1 & q_1 \\ c_2 & q_2 \end{vmatrix}}$$

 $p_2 + r \cdot q_2 = a_2 + s \cdot c_2$



$$s = rac{egin{array}{c|cc} q_1 & a_1 \\ q_2 & a_2 \end{bmatrix} + egin{array}{c|cc} p_1 & q_1 \\ p_2 & q_2 \end{bmatrix}}{egin{array}{c|cc} c_1 & q_1 \\ c_2 & q_2 \end{bmatrix}}$$

$$c_{\frac{c_1}{c_2}} = \frac{\binom{b_1}{b_2} - \binom{a_1}{a_2}}{\binom{a_1}{a_2} + s \cdot \binom{c_1}{c_2}}$$

$$a \qquad \qquad s = \frac{\begin{vmatrix} q_1 & a_1 \\ q_2 & a_2 \end{vmatrix} + \begin{vmatrix} p_1 & q_1 \\ p_2 & q_2 \end{vmatrix}}{\begin{vmatrix} c_1 & q_1 \\ c_2 & q_2 \end{vmatrix}}$$

$$b \qquad \qquad \begin{vmatrix} c_1 & q_1 \\ c_2 & q_2 \end{vmatrix} = 0 \Rightarrow \begin{vmatrix} c_1 & q_1 \\ c_2 & q_2 \end{vmatrix}$$

$$\begin{vmatrix}c_{1}\\c_{2}\\c_{2}\end{vmatrix} = \begin{pmatrix}b_{1}\\b_{2}\end{pmatrix} - \begin{pmatrix}a_{1}\\a_{2}\end{pmatrix}$$

$$a \qquad \qquad s = \frac{\begin{vmatrix}q_{1} & a_{1}\\q_{2} & a_{2}\end{vmatrix} + \begin{vmatrix}p_{1} & q_{1}\\p_{2} & q_{2}\end{vmatrix}}{\begin{vmatrix}c_{1} & q_{1}\\c_{2} & q_{2}\end{vmatrix}}$$

$$\begin{vmatrix}c_{1} & q_{1}\\c_{2} & q_{2}\end{vmatrix} = 0 \Rightarrow \begin{vmatrix}c_{1} & q_{1}\\c_{2} & q_{2}\end{vmatrix}$$

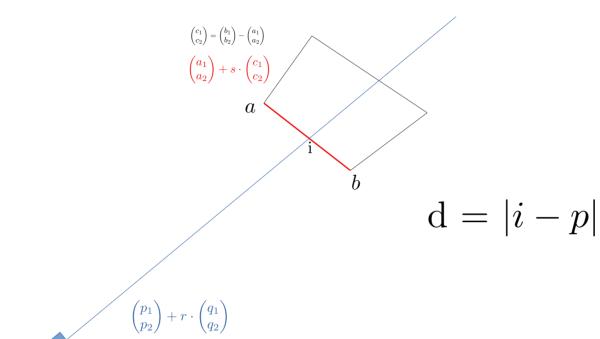
$$egin{pmatrix} inom{p_1}{p_2} + r \cdot inom{q_1}{q_2} \ & ext{s} \geq 0 \land s \leq 1 \Rightarrow \end{pmatrix}$$

$$\begin{vmatrix} c_1 & q_1 \\ c_2 & q_2 \end{vmatrix} = 0 \Rightarrow$$

$$\binom{p_1}{p_2} + r \cdot \binom{q_1}{q_2}$$

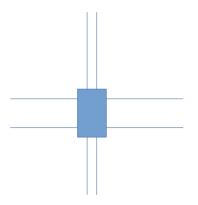
$$s \ge 0 \land s \le 1 \Rightarrow$$

$$s < 0 \ \forall s > 1 \Rightarrow$$



Next Steps

Sensors for each direction



Distance to other vehicles

