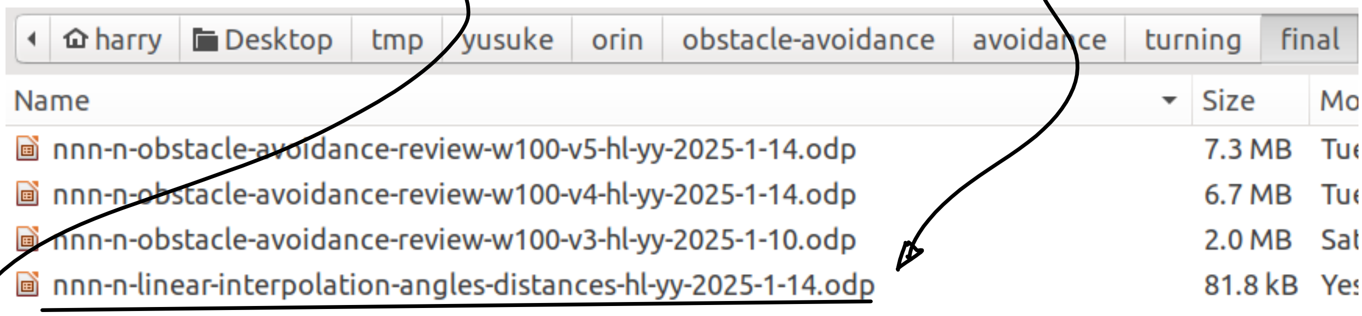
Collision Avoidance, HL
2025-1-16 Th.

Given the Setting of W100, the clear path using Linear interpolation (see File Name below)



So W100 Reaches the New Location, And Driving Angle to ROI_u is in Green. (Fig.1).

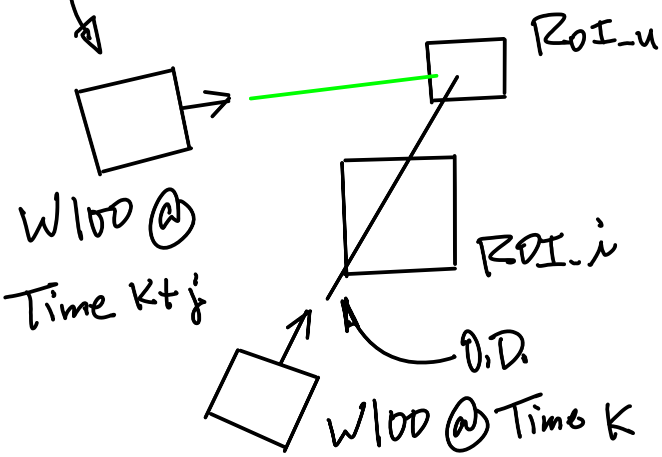


Fig.1.

The original direction OD is the direction from W100 to RoI_u (user).

After Turning and Driving, W100 moved to the New Location whose Directional Angle is illustrated in Green.

Algorithm 1. Collision Avoidance 1

Step 1. Prerequisit Location & Direction.

In connection with Turning Algorithm (Collision Path Prediction Algorithm, 2025-1-14) and Driving to

Step 2.

Turn W100 in the Counter direction of the previous turning away O.D. direction, e.g., if turning O.D. Away By α to Avoid collision, Now, turn $-\alpha$ in terms of Sub-sub-regions.

Note, in the PPT nnn-n-obstacle-avoidance-review-w100-hl-2025-1-14.odp.

We have α Angle Computed by Eqn(5) or Eqn(6).

PP.14

$$N_{sub,Ruk} = \frac{X_{uk} - 0}{\Delta} = \frac{X_{uk}}{\Delta} \quad \ldots(5)$$

~~for~~ if on the left half.

OR $$= \frac{M - X_{uk}}{\Delta} \quad \ldots(6)$$ if on the right.

The Turning Step is defined the Same as before in nnn-n-0 save-avoidance-review-w100-hl-2025-1-14.odp.

e.g.

$$\beta/18\Big|_{\beta=52^\circ} = 52/18 = 2.89^\circ \quad \ldots(1)$$

Field of View

So, As the Turning Range is estimated as

$$N_{sub,Ruk} + \Delta N_{sub,Rub} \quad \ldots(2)$$

where $\Delta N_{sub,Rub} \triangleq \gamma N_{sub,Ruk}$

$\gamma \simeq 0.1$ for 10%, 0.2 for 20% etc.

Which can be determined and fine tuned Experimentally.

at Turning Step 1. Image $I(x,y;t=1)$ is inspected to search for ROI_u.

If ROI_u is found, then $(x_{u1}, y_{u1}, w_{u1}, h_{u1})$ is used to calculate the angle to Drive W100 face the user, ROI_u, so

$$N_{sub,Ru} = \frac{X_u - M/2}{\Delta} \quad \ldots(3)$$

where

Δ is defined in the Previous Notes, e.g.

$$\Delta = M/18 \quad \ldots(4)$$

nnn-n-0 save-avoidance-review-w100-hl-2025-1-14.odp.

Drive W100 in One Sub-sub-region, then Scan the Image $I(x, y, k)$

Note: $I(x, y; k)$, $I(x, y; t)$

$\uparrow$ Time $\quad \uparrow$ Time

the k is used for discrete time, t for Continuous time.

But we do not need to make distinguishment

Compute

$$N_{sub, R_{uk}} = \frac{x_{uk} - M/2}{\Delta} \quad \cdots (5)$$

Compare Eqn(5) with Eqn(3).

You should have

$$N_{sub, R_{uk}} < N_{sub, R_u} \quad \cdots (6)$$

If Eqn(6) holds good, then, Continue Step 2. Till reach to Stopping Creteria: pp. 13.

nnn-n-0 save-avoidance-review-w100-hl-2025-1-14.odp.

heme, $\|x_u - \frac{M}{2}\| \leq C$

Constant C, $\cdots (1)$

Such as $C = \gamma M$, $\gamma = 0.1$, Chrome

10% of No. of Image $I(x, y)$ Col. M.

Note: Stopping Criteria Leads to Drive W100 to the position/Direction where the ROI_u is at the central region of $I(x, y)$, e.g. the user is at the central region.

Now, Start Facial Recognition Based Self Driving. Done.

Note:

if Eqn(6) does not hold, then Something went wrong. We will have to Revisit the Algorithm. //

(END)