

## **AI algorithm estimation localization**

We use the AI localization method to establish a mapping scheme between position and measurement through machine learning algorithms and neural networks, thus achieving localization.

One of the algorithms is the ELM algorithm, which is currently a type of deep learning. ELM randomly selects the weight of the input layer and the bias of the hidden layer, and the weight of the output layer is calculated analytically based on the (Moore Penrose, MP) generalized Inverse matrix theory by minimizing the Loss function composed of the training error term and the regular term of the weight norm of the output layer. Extreme learning machine has the advantages of less training parameters, fast learning speed and strong generalization ability.

In addition, for Track-8, we will also use new deep learning algorithms to help improve model estimation and positioning results.

The preliminary steps are as follows:

1. Firstly, inverse distance interpolation is used to obtain the estimated position;
2. Data enhancement, expansion of data set, facilitating follow-up training;
3. Obtain new features;
4. Train machine learning and deep learning models;
5. Add Kalman filter;
6. Estimating user positioning;