



PROJECT **HEXAPOD ROBOT CONTROL SYSTEM**
YEAR-END SUMMARY

DATE

20/01/10

CLIENT

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Summary of previous work

- * Built up the EndNote library
- * Technique chosen
- * Realization of a simple test project

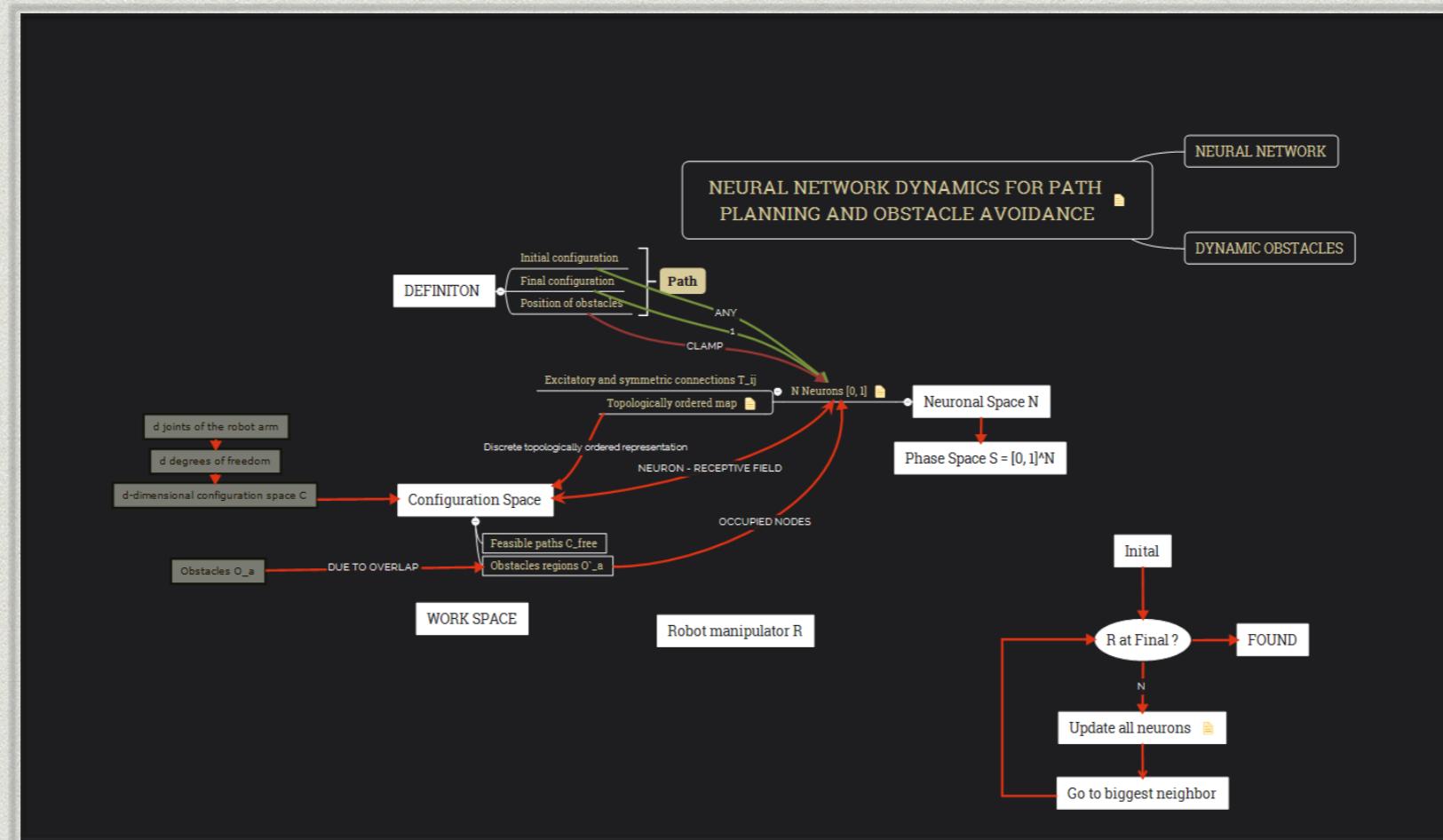
Built up EndNote library

- * Collected a few dozen of papers about the topic

The screenshot shows the EndNote desktop application interface. On the left, the 'My Library' sidebar lists various groups and categories with their respective counts: All References (31), Configure Sync... (0), Recently Added (4), Unfiled (0), Trash (0), My Groups (Gait: 1, Non-intelligent: 1, Review: 3, SelfRecovery: 2, UnknownEnvironment: 1), PathPlanning (FuzzyLogic: 6, Genetic: 1, NeuralNetwork: 8, Q-Learning: 2), GaitPlanning (Hopfield Neural Network: 2, NeuralNetwork: 1), and Find Full Text (0). The main pane displays a list of references, each with a preview icon, author, year, title, and a rating scale from 1 to 5 stars. One reference is highlighted in red: 'RoyGlasiusAndrzejKomodaSt... 1995 Neural Network Dynamics for Path Planning and Obstacle Avoidance'. The 'Clarivate Analytics' logo is visible in the top right corner.

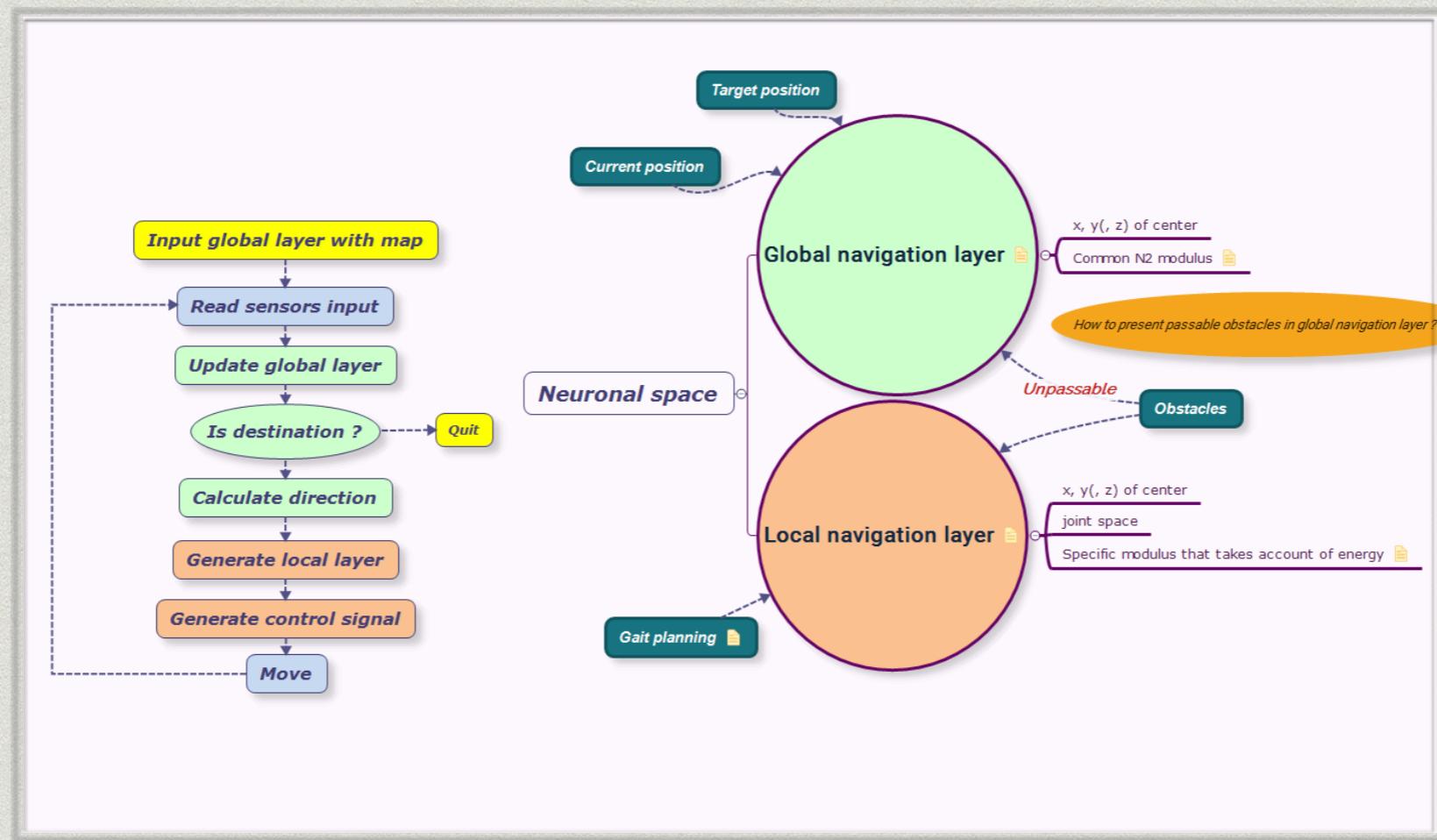
Author	Year	Title	Rating
Altendorfer, R.; Moore, N.; K...	2001	Mobile Robot Navigation and Obstacle Avoidance Techniques: A Review	★★★
RoyGlasiusAndrzejKomodaSt...	1995	Mobile Robot Navigation and Obstacle Avoidance Techniques: A Review	★★★
Chai, X.; Gao, F.; Qi, C. K.; P...	2017	Using Genetic Algorithm for a Mobile Robot Path Planning	★★★
		RHex: A biologically inspired hexapod runner	★★★
		Obstacle avoidance for a hexapod robot in unknown environment	★★★
Chen, C. H.; Wang, C. C.; Wa...	2017	Fuzzy Logic Controller Design for Intelligent Robots	★★★
Kai-Hui Chi	2011	Obstacle avoidance in mobile robot using Neural Network	★★★
Cully, A.; Clune, J.; Tarapore...	2015	Robots that can adapt like animals	★★★
Gavrilov, A. V.; Lee, S.	2007	An architecture of hybrid neural network based navigation system for mobil...	★★
Hong, J.; Tang, K. Q.; Chen, C...	2017	Obstacle Avoidance of Hexapod Robots Using Fuzzy Q-Learning	★★
Hong, J.; Tang, K. Q.; Chen, C...	2017	Obstacle Avoidance of Hexapod Robots Using Fuzzy Q-Learning	★★
Hong, J.; Tang, K. Q.; Chen, C...	2017	Obstacle Avoidance of Hexapod Robots Using Fuzzy Q-Learning	★★
I. Engedy; G. Horváth	2010	Artificial neural network based local motion planning of a wheeled mo...	★★★
Huang, B. Q.; Cao, G. Y.; Guo...	2005	Reinforcement learning neural network to the problem of autonomous mobil...	★★
Huang, B. Q.; Cao, G. Y.; Guo...	2005	Reinforcement learning neural network to the problem of autonomous mobil...	★★
Hwangbo, J.; Lee, J.; Dosovits...	2019	Learning agile and dynamic motor skills for legged robots	★★★
Kuindersma, S.; Deits, R.; F...	2016	Optimization-based locomotion planning, estimation, and control desi...	★★★
Li, Z. J.; Xiao, S. T.; Ge, S. S....	2016	Constrained Multilegged Robot System Modeling and Fuzzy Control W...	★★★
Motlagh, O.; Nakhaeinia, D.; T...	2014	Automatic navigation of mobile robots in unknown environments	★★★
Najmurokhman, A.; Kusnand...	2018	Design and Implementation of Fuzzy Logic Controller for A Class of Hexapo...	★★★
Ni, J.; Wu, L.; Fan, X.; Yang,...	2016	Bioinspired Intelligent Algorithm and Its Applications for Mobile Robot...	★★★
Marc Boumeidine Montaner*	1998	Fuzzy Knowledge-Based Controller Design for Autonomous Robot Na...	★★★
Patrick Reignier	1994	Fuzzy logic techniques for mobile robot obstacle avoidance	★★★
Xiao, H. R.; Liao, L.; Zhou, F. Y.	2007	Mobile robot path planning based on Q-ANN	★★
Yang, S. X.; Meng, M.	2001	Neural network approaches to dynamic collision-free trajectory generation	★★★
Zhang, Y. N.; Wang, J.	2004	Obstacle avoidance for kinematically redundant manipulators using a dual n...	★★
Zhao, X. C.; Luo, Q. S.; Han,...	2008	Research on the Real Time Obstacle Avoidance Control Technology of...	★★★
Zhao, Y.; Chai, X.; Gao, F.; Q...	2018	Obstacle avoidance and motion planning scheme for a hexapod robot...	★★★
Zhu, A. M.; Yang, S. X.	2007	Neurofuzzy-based approach to mobile robot navigation in unknown environ...	★★★
Zou, A. M.; Hou, Z. G.; Fu, S....	2006	Neural networks for mobile robot navigation: A survey	★★★

Technique chosen



- * Chosen the Hopfield network as the technique

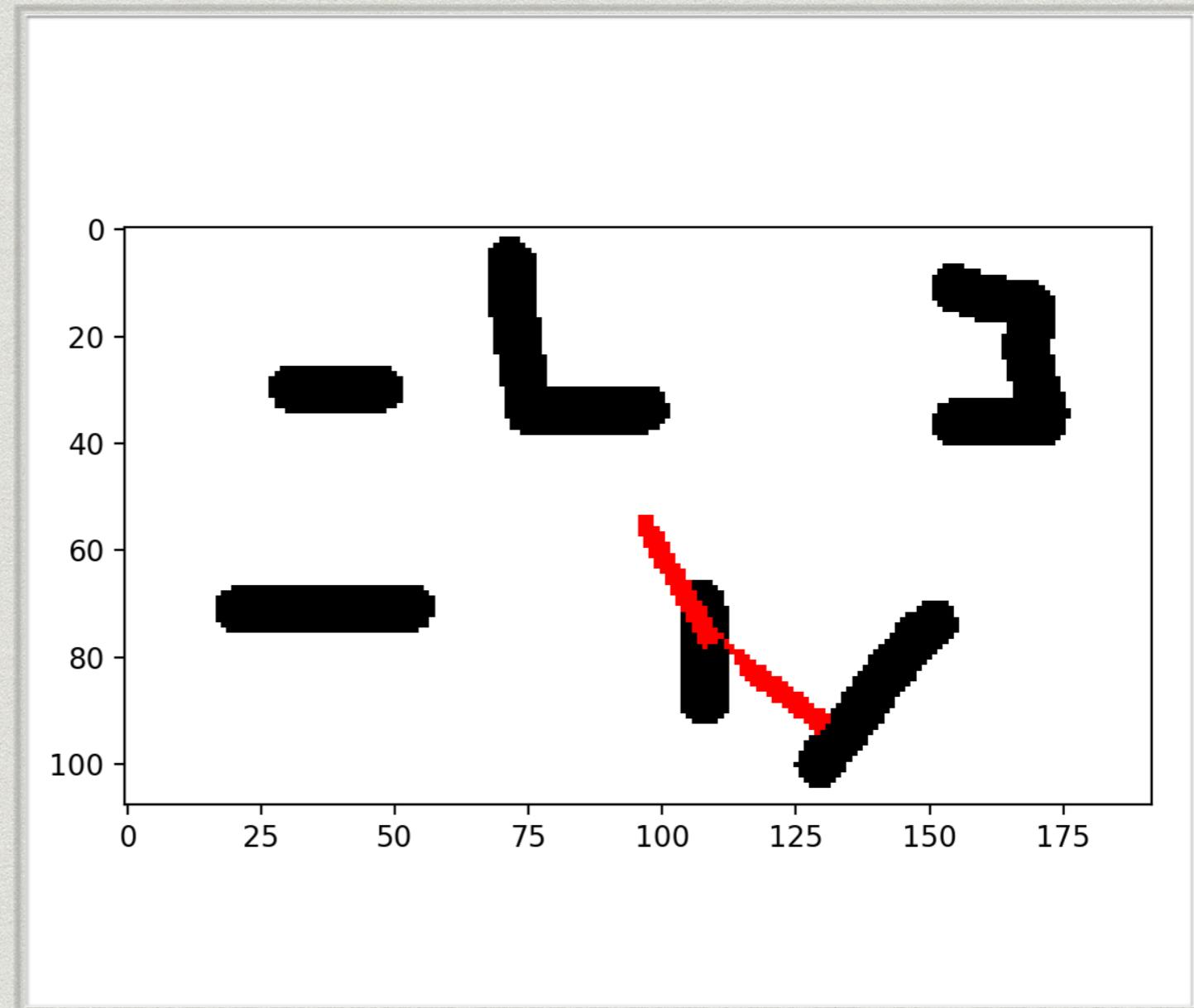
Technique chosen



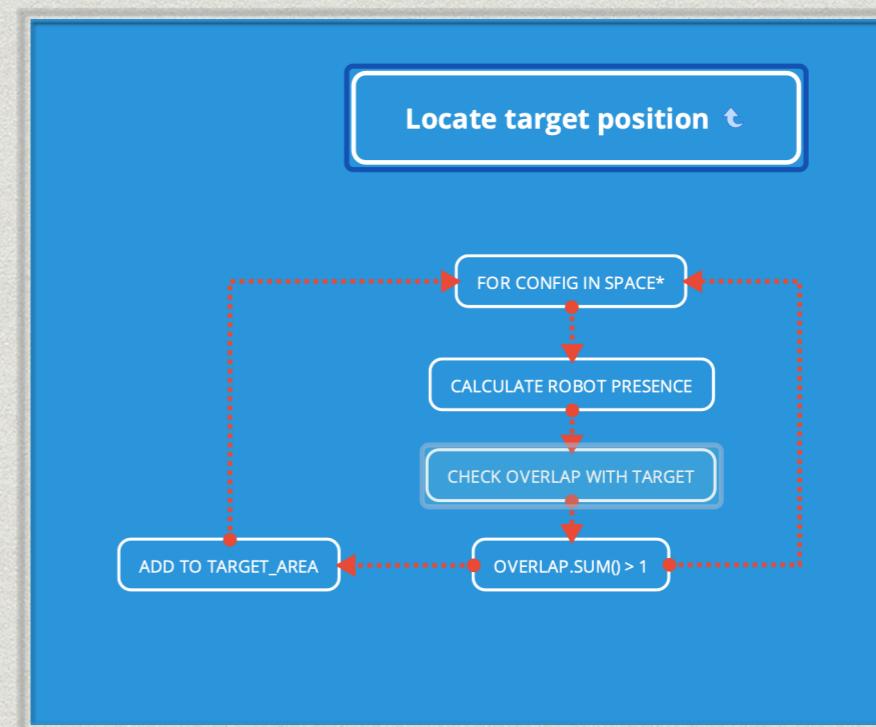
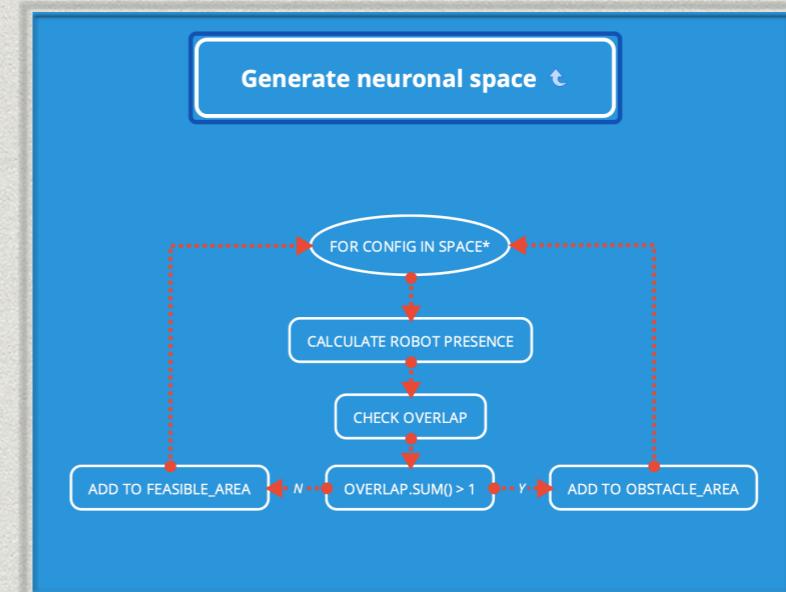
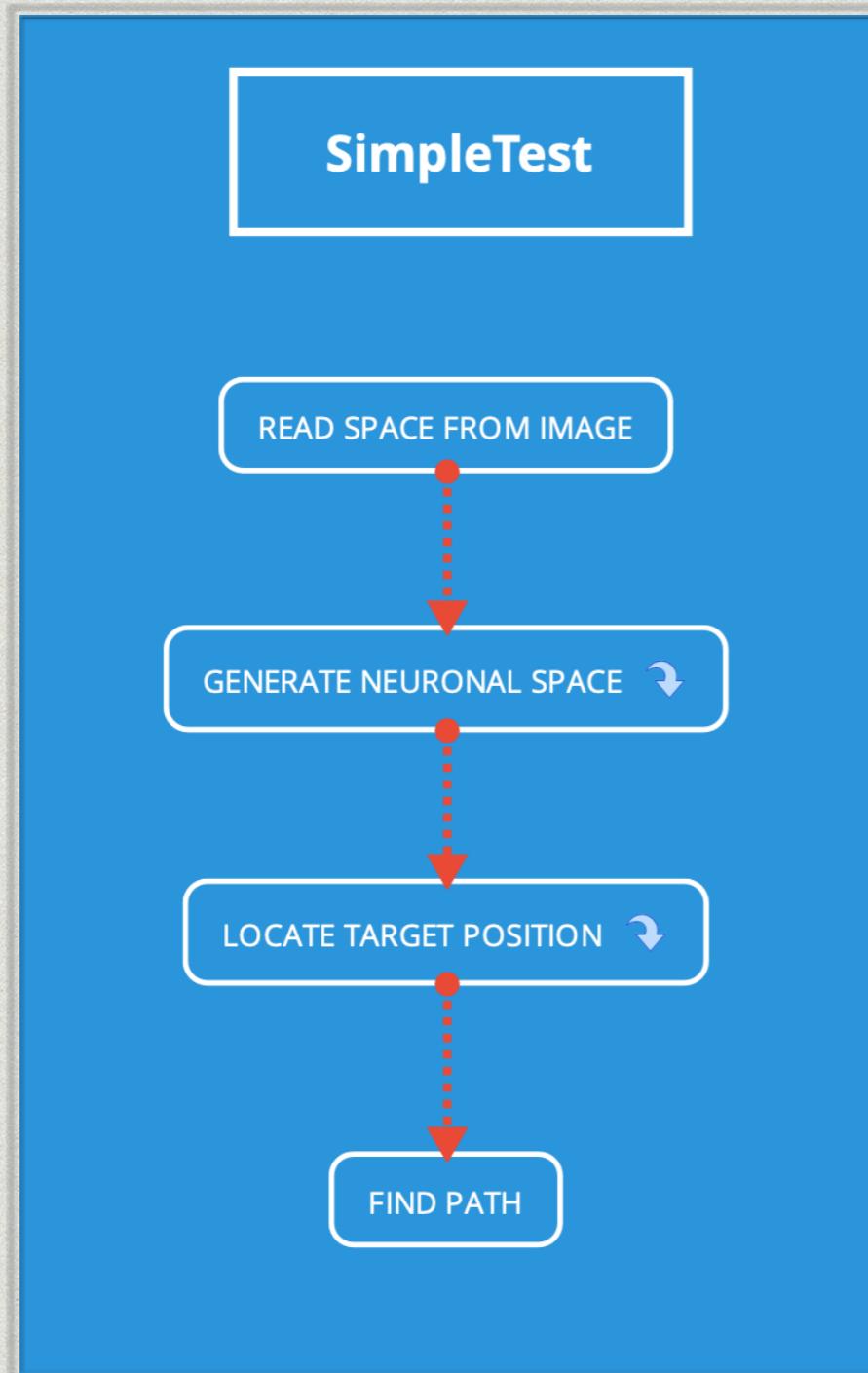
- * Based on the paper, developed a possible system

Realization of a simple test project

- * 3 degrees of freedom
- * Robot arm
- * Plane space



Realization of a simple test project



Holiday work arrangement

- * Finish up the simple project
- * Optimization
- * Prepare the hexapod information for the complete project

Current optimization ideas

- * Use pre-calculated coordinates to reduce time consumed while generation of neuronal
- * Use matrix to replace loops to use GPU acceleration (100~1000x more rapid)
- * Prevent complete generation, skip unnecessary parts