

Active Control of Ms.PacMan using SVM learning with human playing data

Jun Ando, Shinichi Shirakawa, Junji Otsuka,
Rina Takahashi, Yasuhiro Totsuka and Tomoharu Nagao
Department of Information Media and Environment
Graduate School of Environment and Information Sciences
Yokohama National University
79-7 Tokiwadai, Hodogaya-ku, Yokohama, 240-8501 JAPAN

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1 How to Run the Program

About files

The files that need to run our program consist of "pacman.exe" and "svm.txt". The pacman.exe is the software to capture data about the environment of the game field of Ms.PacMan from Ms.PacMan window and to make decisions how to move pacman using them by our decision making rule. The files must be in same folder.

How to run it

1. open "WebPacMan: <http://www.webpacman.com/>" and display the Ms.PacMan window (Fig.1)
2. double click "pacman.exe", and capturing window (Fig.3) will open.
3. move the capturing window not to cover Ms.PacMan window.
4. left click on the capturing window, and move cursor to the top and leftest position of the Ms.PacMan window (Fig.2) with keeping pressing it and release it. (Please make sure to do this in the timing of screen Fig.2.)
5. start Ms.PacMan. if the program run properly, you can see that caputered movie from the Ms.PacMan window into the capturing window (like Fig.4) and packman moves automatically (Fig.5 and Fig.6 are failed).

OS

Windows

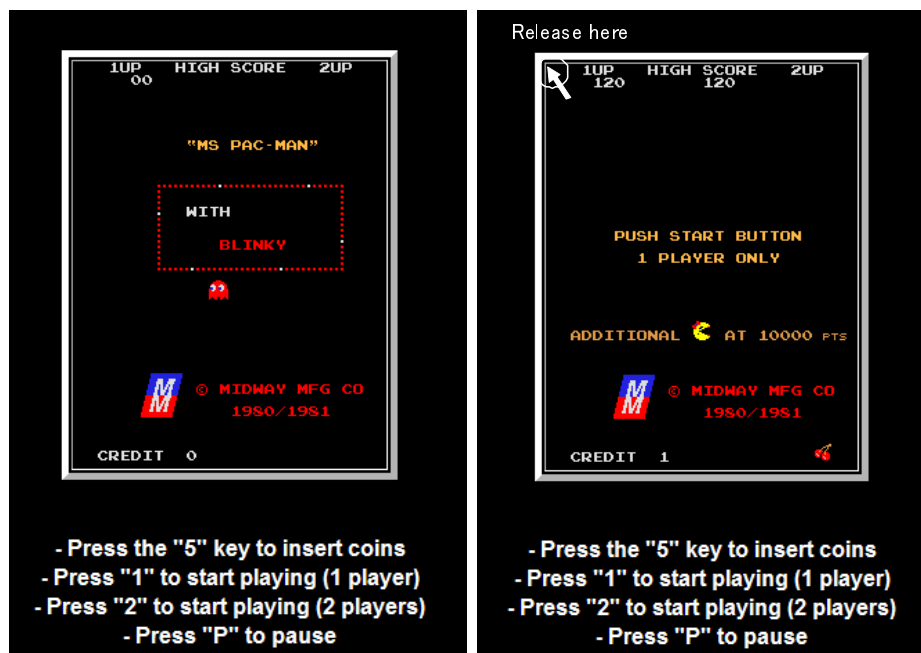


Figure 1: Web Ms.PacMan window.

Figure 2: Release here.



Figure 3: Capturing window.

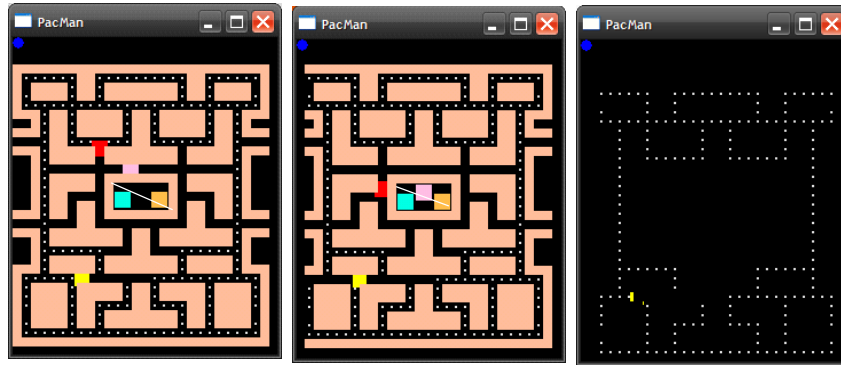


Figure 4: Success capturing window. Figure 5: Left wall is lost. Figure 6: All wall is lost.

2 How our Program Works

Our program has three modes :escape mode, eat mode and SVM mode. If the distance from pacman to nearest enemy is within threshold distance, Escape mode is applied. And if the distance from pacman to nearest edible enemy is within threshold distance, Eat mode is applied. SVM mode is applied in other cases. In our program, all distance is calculated by Euclidean distance.

Escape mode

In this mode, pacman select the direction to move where pacman can get away from the nearest enemy as far as possible.

Eat mode

In Eat mode, pacman select the direction where pacman can approach the the nearest edible enemy as close as possible.

SVM mode

Pacman in this mode select the direction by Support Vector Machine (SVM) [1] learning with human playing data. SVM is supervised learning method used for classification and regression. We input the feature quantities calculated from capturing screen to SVM, and we use the key human pressed as output for SVM. We use pacman position, enemy position, existence of wall and so on as feature quantities.

References

- [1] J.Shawe-Taylor N.Cristianini. *An Introduction to Support Vector Machines and other kernel-based learning methods*. Cambridge University Press, 2000.