

Reinforcement Learning using Side Information



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Research Topic

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Related Works

What is Reinforcement Learning?

- Learning **what to do**
- How to map situations to **actions**
- Maximizing long-term **reward**

What is Side Information?

- Any information **available** for learning algorithm, but **not used** in general.
- In Reinforcement Learning,
 - Agent can get information from its **environment**.
 - Agent's **action** may affect the information.
- What else?
 - Someone outside can give information.
 - Ex) **Human teacher**

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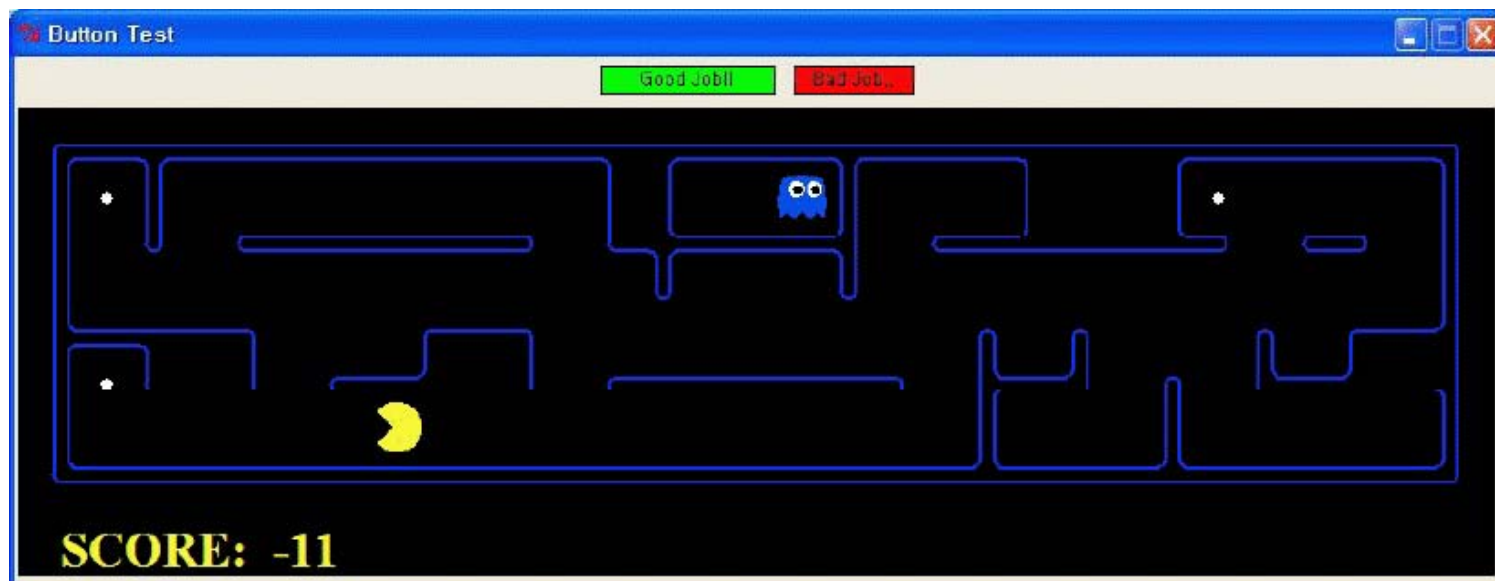
Related Works

Long-term Goal

- How human teacher can help the agent to learn?
 - **What kind of information** is needed by the agent?
 - What kind of information can people give to it?
 - **How** can people give the information?
- Intersection of ML and HCI

Working Domain

- **Pacman** game
 - Easy to apply various ways of interaction.
 - Short game duration for each episode.



Specific Topic

- The following factors will affect learning quality or speed.
 - **Familiarity on Input media**
 - Keyboard
 - Touch-pad
 - Joystick
 - **User Interface**
 - Learning from Demonstration
 - Learning from Advising

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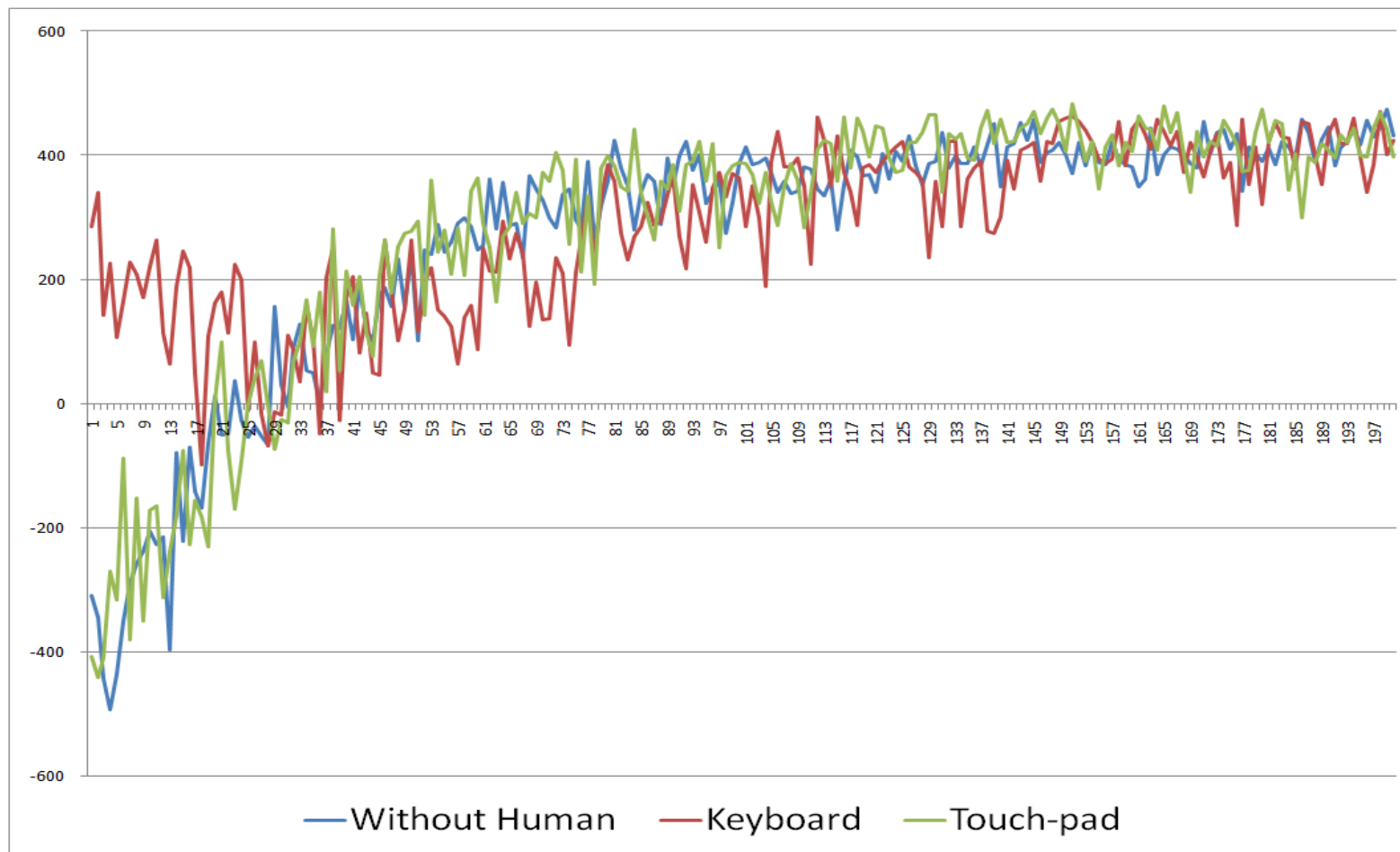
Progress

Related Works

Simple Experiment

- Comparison for learning speed and quality
 - Without human teacher
 - With human teacher using keyboard input
 - With human teacher using touch-pad input

Result



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Related Works

- Learning from side information
 - Distance metric learning
 - Clustering
 - Kernel learning
- Combining human feedback to RL
- Learning methodology
 - Learning from Demonstration
 - Learning from Advising

Any question?





THE END

Thank you very much!