

Walk To Run: Teaching An Intelligent Agent To Play QWOP

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Abstract

We have decided to recreate the game QWOP and create an AI that can sufficiently play the game. In QWOP, a player attempts to control a track runner's thighs and legs using Q and W and calves using O and P to make them run without falling over. Our goal is to create an AI that can play this game and improve at it to eventually be able to travel 100m. We intend to use a combination of approaches that includes a genetic algorithm, a neural network, and reinforcement learning to train the AI to improve its gameplay. Our plan is to develop the AI using milestones such as crawling, standing, walking, etc. We intend to further expand this plan with more specific algorithms, milestones, etc.

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<code>\abovecaption</code>	<code>\abovedisplay</code>	<code>\addevensidemargin</code>	<code>\addsidemargin</code>
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<code>\break</code>	<code>\clearpage</code>	<code>\clip</code>	<code>\columnsep</code>
<code>\float</code>	<code>\input</code>	<code>\input</code>	<code>\linespread</code>
<code>\newpage</code>	<code>\pagebreak</code>	<code>\renewcommand</code>	<code>\setlength</code>
<code>\text height</code>	<code>\tiny</code>	<code>\top margin</code>	<code>\trim</code>
<code>\vskip{-</code>	<code>\vspace{-</code>		

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<code>authblk</code>	<code>babel</code>	<code>cjk</code>	<code>dvips</code>
<code>epsf</code>	<code>epsfig</code>	<code>euler</code>	<code>float</code>
<code>fullpage</code>	<code>geometry</code>	<code>graphics</code>	<code>hyperref</code>
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<code>navigator</code>	<code>pdfcomment</code>	<code>pgfplots</code>	<code>psfig</code>
<code>pstricks</code>	<code>tlenc</code>	<code>titlesec</code>	<code>tocbind</code>
<code>ulem</code>			

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  Author 1, ..., Author n \\
}
\affiliations {
  Address line \\
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}
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\author{
  AuthorOne,\textsuperscript{\rm 1}
  AuthorTwo,\textsuperscript{\rm 2}
  AuthorThree,\textsuperscript{\rm 3}
  AuthorFour,\textsuperscript{\rm 4}
  AuthorFive \textsuperscript{\rm 5}}\\
}
\affiliations {
  \textsuperscript{\rm 1}AffiliationOne, \\
  \textsuperscript{\rm 2}AffiliationTwo, \\
  \textsuperscript{\rm 3}AffiliationThree, \\
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  \{email, email\}@affiliation.com,
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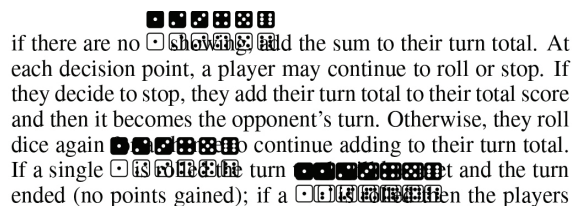
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if there are no \square showing, add the sum to their turn total. At each decision point, a player may continue to roll or stop. If they decide to stop, they add their turn total to their total score and then it becomes the opponent’s turn. Otherwise, they roll dice again \square to continue adding to their turn total. If a single \square turn \square and the turn ended (no points gained); if a \square then the players

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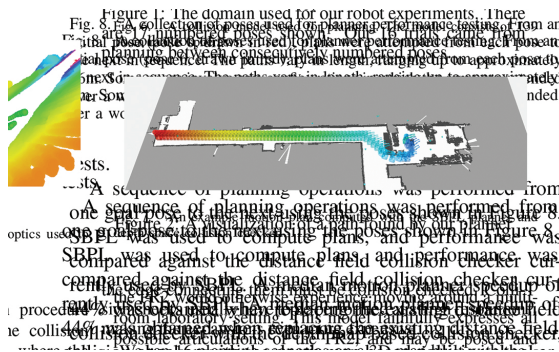


Figure 1: The domain used for our robot experiments. There are 1000 points in the domain, 100 of which are obstacles. The path is a sequence of 100 points, each representing a robot pose. The path is a sequence of 100 points, each representing a robot pose. The path is a sequence of 100 points, each representing a robot pose.

Grid Search Domain

B. View Selection

In these experiments, we ran our planner on a much larger set of the experiments described here, but with manual selection of views from which depth maps were captured. The only difference between these experiments and the previous ones is that we used a manual selection of views from which depth maps were captured. The only difference between these experiments and the previous ones is that we used a manual selection of views from which depth maps were captured. The only difference between these experiments and the previous ones is that we used a manual selection of views from which depth maps were captured.

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font and size of table captions must be 10 point roman and must be placed beneath the figure. Do not make them smaller, bold, or italic. (Individual words may be italicized if the context requires differentiation.)

Low-Resolution Bitmaps. You may not use low-resolution (such as 72 dpi) screen-dumps and GIF files—these files contain so few pixels that they are always blurry, and illegible when printed. If they are color, they will become an indecipherable mess when converted to black and white. This is always the case with gif files, which should never be used. The resolution of screen dumps can be increased by reducing the print size of the original file while retaining the same number of pixels. You can also enlarge files by manipulating them in software such as PhotoShop. Your figures should be 300 dpi when incorporated into your document.

L^AT_EX Overflow. L^AT_EX users please beware: L^AT_EX will sometimes put portions of the figure or table or an equation in the margin. If this happens, you need to make the figure or table span both columns. If absolutely necessary, you may reduce the figure, or reformat the equation, or reconfigure the table. **Check your log file!** You must fix any overflow into the margin (that means no overfull boxes in L^AT_EX). **Nothing is permitted to intrude into the margin or gutter.**

Using Color. Use of color is restricted to figures only. It must be WACG 2.0 compliant. (That is, the contrast ratio must be greater than 4.5:1 no matter the font size.) It must be CMYK, NOT RGB. It may never be used for any portion of the text of your paper. The archival version of your paper will be printed in black and white and grayscale. The web version must be readable by persons with disabilities. Consequently, because conversion to grayscale can cause undesirable effects (red changes to black, yellow can disappear, and so forth), we strongly suggest you avoid placing color figures in your document. If you do include color figures, you must (1) use the CMYK (not RGB) colorspace and (2) be mindful of readers who may happen to have trouble distinguishing colors. Your paper must be decipherable without

using color for distinction.

Drawings. We suggest you use computer drawing software (such as Adobe Illustrator or, (if unavoidable), the drawing tools in Microsoft Word) to create your illustrations. Do not use Microsoft Publisher. These illustrations will look best if all line widths are uniform (half- to two-point in size), and you do not create labels over shaded areas. Shading should be 133 lines per inch if possible. Use Times Roman or Helvetica for all figure call-outs. **Do not use hairline width lines** — be sure that the stroke width of all lines is at least .5 pt. Zero point lines will print on a laser printer, but will completely disappear on the high-resolution devices used by our printers.

Photographs and Images. Photographs and other images should be in grayscale (color photographs will not reproduce well; for example, red tones will reproduce as black, yellow may turn to white, and so forth) and set to a minimum of 300 dpi. Do not prescreen images.

Resizing Graphics. Resize your graphics **before** you include them with L^AT_EX. You may **not** use trim or clip options as part of your \includegraphics command. Resize the media box of your PDF using a graphics program instead.

Fonts in Your Illustrations. You must embed all fonts in your graphics before including them in your L^AT_EX document.

References

The AAAI style includes a set of definitions for use in formatting references with BibT_EX. These definitions make the bibliography style fairly close to the one specified below. To use these definitions, you also need the BibT_EX style file “aaai21.bst,” available in the AAAI Author Kit on the AAAI web site. Then, at the end of your paper but before \enddocument, you need to put the following lines:

```
\bibliography{bibfile1,bibfile2,...}
```

Please note that the aaai21.sty class already sets the bibliographystyle for you, so you do not have to place any

`\bibliographystyle` command in the document yourselves. The `aaai21.sty` file is incompatible with the `hyperref` and `navigator` packages. If you use either, your references will be garbled and your paper will be returned to you.

References may be the same size as surrounding text. However, in this section (only), you may reduce the size to `\small` if your paper exceeds the allowable number of pages. Making it any smaller than 9 point with 10 point linespacing, however, is not allowed. A more precise and exact method of reducing the size of your references minimally is by means of the following command:

```
\fontsize{9.8pt}{10.8pt} \selectfont
```

You must reduce the size equally for both font size and line spacing, and may not reduce the size beyond `{9.0pt}{10.0pt}`.

The list of files in the `\bibliography` command should be the names of your BibTeX source files (that is, the `.bib` files referenced in your paper).

The following commands are available for your use in citing references:

`\cite`: Cites the given reference(s) with a full citation. This appears as “(Author Year)” for one reference, or “(Author Year; Author Year)” for multiple references.

`\shortcite`: Cites the given reference(s) with just the year. This appears as “(Year)” for one reference, or “(Year; Year)” for multiple references.

`\citeauthor`: Cites the given reference(s) with just the author name(s) and no parentheses.

`\citeyear`: Cites the given reference(s) with just the date(s) and no parentheses.

Formatted bibliographies should look like the following examples.

Book with Multiple Authors

Engelmore, R., and Morgan, A. eds. 1986. *Blackboard Systems*. Reading, Mass.: Addison-Wesley.

Journal Article

Robinson, A. L. 1980a. New Ways to Make Microcircuits Smaller. *Science* 208: 1019–1026.

Magazine Article

Hasling, D. W.; Clancey, W. J.; and Rennels, G. R. 1983. Strategic Explanations in Consultation. *The International Journal of Man-Machine Studies* 20(1): 3–19.

Proceedings Paper Published by a Society

Clancey, W. J. 1983. Communication, Simulation, and Intelligent Agents: Implications of Personal Intelligent Machines for Medical Education. In *Proceedings of the Eighth International Joint Conference on Artificial Intelligence*, 556–560. Menlo Park, Calif.: International Joint Conferences on Artificial Intelligence, Inc.

Proceedings Paper Published by a Press or Publisher

Clancey, W. J. 1984. Classification Problem Solving. In *Proceedings of the Fourth National Conference on Artificial Intelligence*, 49–54. Menlo Park, Calif.: AAAI Press.

University Technical Report

Rice, J. 1986. Poligon: A System for Parallel Problem Solv-

ing, Technical Report, KSL-86-19, Dept. of Computer Science, Stanford Univ.

Dissertation or Thesis

Clancey, W. J. 1979. Transfer of Rule-Based Expertise through a Tutorial Dialogue. Ph.D. diss., Dept. of Computer Science, Stanford Univ., Stanford, Calif.

Forthcoming Publication

Clancey, W. J. 2021. The Engineering of Qualitative Models. Forthcoming.

For the most up to date version of the AAAI reference style, please consult the *AI Magazine* Author Guidelines at <https://aaai.org/ojs/index.php/aimagazine/about/submissions#authorGuidelines>

Proofreading Your PDF

Please check all the pages of your PDF file. The most commonly forgotten element is the acknowledgements — especially the correct grant number. Authors also commonly forget to add the metadata to the source, use the wrong reference style file, or don’t follow the capitalization rules or comma placement for their author-title information properly. A final common problem is text (especially equations) that runs into the margin. You will need to fix these common errors before submitting your file.

Improperly Formatted Files

In the past, AAAI has corrected improperly formatted files submitted by the authors. Unfortunately, this has become an increasingly burdensome expense that we can no longer absorb). Consequently, if your file is improperly formatted, it will be returned to you for correction.

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If you use L^AT_EX 209 your paper will be returned to you unpublished. Convert your paper to L^AT_EX 2ε.

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We require that you name your L^AT_EX source file with the last name (family name) of the first author so that it can easily be differentiated from other submissions. Complete file-naming instructions will be provided to you in the submission instructions.

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Instructions on paper submittal will be provided to you in your acceptance letter.

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If you have any questions about the preparation or submission of your paper as instructed in this document, please contact AAAI Press at the address given below. If you have technical questions about implementation of the `aaai` style file, please contact an expert at your site. We do not provide technical support for L^AT_EX or any other software package. To avoid problems, please keep your paper simple, and do not incorporate complicated macros and style files.

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Additional Resources

L^AT_EX is a difficult program to master. If you've used that software, and this document didn't help or some items were not explained clearly, we recommend you read Michael Shell's excellent document (testflow doc.txt V1.0a 2002/08/13) about obtaining correct PS/PDF output on L^AT_EX systems. (It was written for another purpose, but it has general application as well). It is available at www.ctan.org in the tex-archive.

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Thank you for reading these instructions carefully. We look forward to receiving your electronic files!