Balloma Video Game playing Reinforcement Learning Agent.

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Capstone Project Proposal

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Balloma Video Game playing Reinforcement Learning Agent.

Abstract—This work presents a capstone project proposal to achieve a Nanodegree in Machine Learning from Udacity. The objective of this work is to construct a video game playing robot, through the use of Deep and Reinforcement Learning techniques. Also it should provide a methodology for test automation on game develoment process. This document provide descriptions on: *a)* problem to be solved, *b)* objectives, *c)* context, *d)* tools, *e)* metrics and *f)* techniques.

I. INTRODUCTION

Balloma is a single player, android video game, developed by Black River Studios[1] at brasilian SIDIA[2]. During the game development process, after any new features are integrated, regresion and functional tests must be executed in order to validate if new functionalities are properly funcioning and side effects caused by new code have appeared.

Fig. 1. Balloma splash screen.

Currently such tests are executed manually by humans, thus as functionalities' stack increases also does testing complexity and workload. In order to aim testing process this proposal presents a Proof Of Concept method for test automation using Deep Reinforcement Learning techniques.

II. PROBLEM DEFINITION

This will be a revised version of the problem definition in your proposal.

III. PROPOSED SOLUTIONS

This may be a modified version of your proposal depending on previously carried out research or any feedback received.

A. Your first solution

Describe your first solution here.

B. Your second solution

Describe your second solution here.

C. Your third solution

Describe your third solution here.

1) Subsubsection Heading Here: Use the subsubsection command with caution—you probably won't need it at, but I'm including it this an example.

IV. CRITERIA FOR ASSESSING SOLUTIONS

This may be a modified version of your proposal depending on previously carried out research or any feedback received.

V. RESEARCH METHODOLOGY

The main difference between this section and the one in your report proposal is use of verb tense: there you suggested what you will do and here you will describe what you did. Be concise and precise when outlining how you researched your potential solutions. Remember that your research should be guided by:

- Relevance to the context of application
- Your assessment criteria
- Practicality

So it may be worth commenting on your research methodology in light of the above (e.g., justifying a particular approach).

In this section, only describe how you collected data, and explain what you did to test your criteria. *Do not include your findings in this section.*

VI. ANALYSIS AND INTERPRETATION

In this section you will mainly analyze your data in terms of your assessment criteria; e.g., do the data suggest that a particular solution is "cost effective" "environmentally acceptable", "technically feasible" or "affordable"?

Be logical and selective when analyzing/interpreting your research data. For example, if a proposed solution is proven to be far too expensive to realistically implement in your context, is there any value in discussing whether it is "culturally viable" or "technically sustainable"? Perhaps in this case you can focus more attention on solutions that your research suggests are more valid. Do not just throw huge quantities of raw data at your reader and leave them to interpret it. Present enough to

[1]http://blackriverstudios.net/
[2]https://www.sidia.com

	Growth Media				
Strain	1	2	3	4	5
GDS1002	0.962	0.821	0.356	0.682	0.801
NWN652	0.981	0.891	0.527	0.574	0.984
PPD234	0.915	0.936	0.491	0.276	0.965
JSB126	0.828	0.827	0.528	0.518	0.926
JSB724	0.916	0.933	0.482	0.644	0.937
Average Rate	0.920	0.882	0.477	0.539	0.923

TABLE I.   SOME IMPRESSIVE NUMBERS

transparently support any conclusions you draw and make sure that you offer justifications for your analysis.

Be honest and reflective while discussing your data. Your data might be too limited or unclear to interpret with accuracy—explain this, perhaps suggesting how this shortcoming could be addressed. Admitting the above will help you draw more honest and worthwhile conclusions.

Remember that research is an imperfect and ongoing process that should be open to question and verification. Therefore, unless convinced by the absolute strength of your evidence, you should be tentative in your language choice when interpreting/analyzing research results. Selectively use *hedging* (language which indicates a lack of certainty) to modify the tone of your analysis and any conclusions that result from this.

Here are some examples that show differing degrees of certainty:

- it appears that ...
- it can be tentatively concluded that ...
- it is almost certain that ...
- perhaps the evidence indicates ...
- this seems to point to the fact that ...
- this could be interpreted as evidence of ...
- without doubt its application would prove beneficial for ...

Finally, don't introduce any new content (e.g., research methods or solutions) within this section—this will prove confusing for the reader. The reader should clearly understand that you are, based on specific criteria, interpreting the results of your research in order to test the viability of various solutions to remedy a particular problem. The sole function of this part of the report is to openly discuss your research findings in order to set up your conclusions/recommendations.

A reference to Table I.

VII.   CONCLUSIONS AND RECOMMENDATIONS

Conclusion shows what knowledge comes out of the report. As you draw a conclusion, you need to explain it in terms of the preceding discussion. You are expected to repeat the most important ideas you have presented, without copying. Adding a table/chart summarizing the results of your findings might be helpful for the reader to clearly see the most optimum solution(s).

It is likely that you will briefly describe the comparative effectiveness and suitability of your proposed solutions. Your description will logically recycle language used in your assessing criteria (section IV): "Solution A proved to be the most cost effective of the alternatives" or "Solution B, though a viable option in other contexts, was shown to lack adaptability". Do not have detailed analysis or lengthy discussions in this section, as this should have been completed in section X.

As for recommendations, you need to explain what actions the report calls for. These recommendations should be honest, logical and practical. You may suggest that one, a combination, all or none of your proposed solutions should be implemented in order to address your specific problem. You could also urge others to research the issue further, propose a plan of action or simply admit that the problem is either insoluble or has a low priority in its present state.

The recommendations should be clearly connected to the results of the report, and they should be explicitly presented. Your audience should not have to guess at what you intend to say.

APPENDIX A
WHAT GOES IN THE APPENDICES

The appendix is for material that readers only need to know if they are studying the report in depth. Relevant charts, big tables of data, large maps, graphs, etc. that were part of the research, but would distract the flow of the report should be given in the Appendices.

APPENDIX B
FORMATTING THE APPENDICES

Each appendix needs to be given a letter (A, B, C, etc.) and a title. LaTeXwill do the lettering automatically.

REFERENCES

[1]   H. Kopka and P. W. Daly, *A Guide to LaTeX*, 3rd ed.   Harlow, England: Addison-Wesley, 1999.

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[3]   D. Castelvecchi, "Nanoparticles Conspire with Free Radicals" *Science News*, vol.174, no. 6, p. 9, September 13, 2008. [Full Text]. Available: Proquest, http://proquest.umi.com/pqdweb?index=52&did= 1557231641&SrchMode=1&sid=3&Fmt=3&VInst=PROD&VType= PQD&RQT=309&VName=PQD&TS=1229451226&clientId=533. Accessed on: Aug. 3, 2014.

[4]   J. Lach, "SBFS: Steganography based file system," in *Proceedings of the 2008 1st International Conference on Information Technology, IT 2008, 19-21 May 2008, Gdansk, Poland.* Available: IEEE Xplore, http: //www.ieee.org. [Accessed: 10 Sept. 2010].

[5]   "A 'layman's' explanation of Ultra Narrow Band technology," Oct. 3, 2003. [Online]. Available: http://www.vmsk.org/Layman.pdf. [Accessed: Dec. 3, 2003].