Assignment – 4

Motka Samarth

202311023

(a) Prepare lists of references containing the data of the four items in 1-3 in the following styles:

(i) IEEE
(ii) ACM
(iii) MLA.

1. Journal

Title: The Living With a Star Space Environment Testbed Payload

IEEE Format:

[1] C. S. Dyer *et al.*, "The Living With a Star Space Environment Testbed Payload," *IEEE Transactions on Nuclear Science*, vol. 70, no. 3, pp. 200–215, Mar. 2023, doi: 10.1109/TNS.2023.3239734.

ACM Format:

[1] C. S. Dyer, K. A. Ryden, P. A. Morris, A. D. P. Hands, P. J. McNulty, J. -R. Vaille, L. Dusseau, G. Cellere, A. Paccagnella, H. J. Barnaby, A. R. Benedetto, R. Velazco, R. Possamai Bastos, D. Brewer, J. L. Barth, K. A. LaBel, M. J. Campola, Y. Zheng, and M. A. Xapsos. 2023. The Living With a Star Space Environment Testbed Payload. *IEEE Transactions on Nuclear Science* 70, 3 (March 2023), 200–215. DOI:https://doi.org/10.1109/TNS.2023.3239734

MLA Format:

Dyer, C. S., et al. "The Living With a Star Space Environment Testbed Payload." *IEEE*

Transactions on Nuclear Science, vol. 70, no. 3, Mar. 2023, pp. 200–15. *IEEE Xplore*,

https://doi.org/10.1109/TNS.2023.3239734.

2. Conference Paper

Title: Self-Driving Car Using Neural Networks and Computer Vision

IEEE Format:

[2] S. Santosh Kumar, K. N. Sunil Kumar, G. Prakasha, H. V. Teja, V. Shrinidhi, and Nisarga, "Self-Driving Car Using Neural Networks and Computer Vision," in *2022 International Interdisciplinary Humanitarian Conference for Sustainability (IIHC)*, Nov. 2022, pp. 1200–1204. doi: 10.1109/IIHC55949.2022.10059593.

ACM Format:

[2] S Santosh Kumar, K N Sunil Kumar, G Prakasha, H V Teja, V Shrinidhi, and Nisarga. 2022. Self-Driving Car Using Neural Networks and Computer Vision. In *2022 International Interdisciplinary Humanitarian Conference for Sustainability (IIHC)*, 1200–1204. DOI:https://doi.org/10.1109/IIHC55949.2022.10059593.

MLA Format:

Communication Technology, Thesis, http://drsr.daiict.ac.in//handle/123456789/909.
Santosh Kumar, S., et al. "Self-Driving Car Using Neural Networks and Computer Vision." *2022 International Interdisciplinary Humanitarian Conference for Sustainability (IIHC)*, 2022, pp. 1200–04, https://doi.org/10.1109/IIHC55949.2022.10059593.

3. Book

Title: PROBABILITY, STATISTICS AND RANDOM PROCESSES

IEEE Format:

[3] T. Veerarajan, *Probability, Statistics and Random Processes*. Tata McGraw-Hill Education, 2008.

ACM Format:

[3] T. Veerarajan. 2008. *Probability, Statistics and Random Processes*. Tata McGraw-Hill Education.

MLA Format:

T. Veerarajan. *Probability, Statistics and Random Processes*. Tata McGraw-Hill Education, 2008.

4. Thesis

Title: Modeling performance and power matrix of disparate computer systems using machine learning techniques (Modeling Compiler Systems Selection)

IEEE Format:

[4] A. Mankodi, "Modeling performance and power matrix of disparate computer systems using machine learning techniques (Modeling Compiler Systems Selection)," Thesis, Dhirubhai Ambani Institute of Information and Communication Technology, 2022. Accessed: Sep. 22, 2023. [Online]. Available: http://drsr.daiict.ac.in//handle/123456789/909

ACM Format:

[4] Amit Mankodi. 2022. Modeling performance and power matrix of disparate computer systems using machine learning techniques (Modeling Compiler Systems Selection). Thesis. Dhirubhai Ambani Institute of Information and Communication Technology. Retrieved September 22, 2023 from http://drsr.daiict.ac.in//handle/123456789/909

MLA Format:

Mankodi, Amit. *Modeling Performance and Power Matrix of Disparate Computer Systems Using Machine Learning Techniques (Modeling Compiler Systems Selection)*. 2022. Dhirubhai Ambani Institute of Information and Communication Technology, Thesis, http://drsr.daiict.ac.in//handle/123456789/909.

Bibliography

1. Journal

@article{dyer_living_2023,
title = {The {Living} {With} a {Star} {Space} {Environment} {Testbed} {Payload}},
volume = {70},
issn = {1558-1578},
doi = {10.1109/TNS.2023.3239734},
abstract = {The objectives, instrumentation, methods, and data leading up to launch of the NASA Living With a Star (LWS) Space Environment Testbed (SET) payload onboard the Air Force Research Laboratory Demonstration and Science Experiments (DSX) spacecraft are described. The experiments characterize the space radiation environment and how it affects the hardware performance. The payload consists of a compact space weather instrument and a carrier containing four board experiments.},
number = {3},
journal = {IEEE Transactions on Nuclear Science},
author = {Dyer, C. S. and Ryden, K. A. and Morris, P. A. and Hands, A. D. P. and McNulty, P. J. and Vaille, J. -R. and Dusseau, L. and Cellere, G. and Paccagnella, A. and Barnaby, H. J. and Benedetto, A. R. and Velazco, R. and Bastos, R. Possamai and Brewer, D. and Barth, J. L. and LaBel, K. A. and Campola, M. J. and Zheng, Y. and Xapsos, M. A.},
month = mar,
year = {2023},
keywords = {Atmospheric measurements, Demonstration and Science Experiments (DSX), Extraterrestrial measurements, galactic cosmic rays, Ions, Living With a Star (LWS), Particle measurements, Payloads, Protons, solar energetic particles, Space Environment Testbed (SET), Space vehicles, Van Allen belts},
pages = {200--215},
annote = {Conference Name: IEEE Transactions on Nuclear Science},
file = {IEEE Xplore Abstract Record:C\:\\Users\\samar\\Zotero\\storage\\KUKLLCFZ\\10034806.html:text/html;IEEE Xplore Full Text PDF:C\:\\Users\\samar\\Zotero\\storage\\SM5Y2CC8\\Dyer et al. - 2023 - The Living With a Star Space Environment Testbed P.pdf:application/pdf},
}

2. Conference

@inproceedings{santosh_kumar_self-driving_2022,
title = {Self-{Driving} {Car} {Using} {Neural} {Networks} and {Computer} {Vision}},
doi = {10.1109/IIHC55949.2022.10059593},
abstract = {In recent years, lidar has been one of the most important sensors in autonomous vehicles; nevertheless, its high price makes scale production impractical. As a result, we will describe the operation of a self-driving automobile prototype that makes use of a more cost-effective cameras and computer vision, the major purpose of our prototype is to provide a means to travel across our virtual environment in a manner that is not only secure but also expedient, effective, and comfortable. We have been able to recognize lanes, traffic signals, obstructions, and also have utilised the notion of stereo vision in order to calculate depth. Additionally, trajectory planning and steering control have been incorporated into the system. The proposed work indicate that camera-based autonomous vehicles are feasible, and as a result, our research has the potential to serve as a foundation for all future real-world implementations. The proposed Self Driving Car using Neural Networks and Computer Vision detects lane lines on streets and highways, traffic light detection and front collision avoidance in various climate conditions. Lane detection technique, to a noteworthy degree, improves the security in the independent vehicles. A self-propelled or a self-sufficient vehicle is an independent machine that detects the natural conditions and settles on an appropriate human-like decision. The purpose of this project is to find a feasible solution to detect lanes, traffic light detection and front collision avoidance on a low voltage computer that can be easily powered in a regular auto vehicle.},
booktitle = {2022 {International} {Interdisciplinary} {Humanitarian} {Conference} for {Sustainability} ({IIHC})},
author = {Santosh Kumar, S and Sunil Kumar, K N and Prakasha, G and Teja, H V and Shrinidhi, V and {Nisarga}},
month = nov,
year = {2022},
keywords = {Autonomous automobiles, Cameras, Collision Avoidance, Computer vision, Computer Vision, Lidar, Neural Networks, Prototypes, Self-driving, Stereo vision, Trajectory planning, Virtual environments},
pages = {1200--1204},
file = {IEEE Xplore Full Text PDF:C\:\\Users\\samar\\Zotero\\storage\\M68UEPAP\\Santosh Kumar et al. - 2022 - Self-Driving Car Using Neural Networks and Compute.pdf:application/pdf},
}

3. Book

@book{Probability, statistics and random processes_2008, place={New Delhi, New Delhi}, edition={4}, publisher={Tata McGraw-Hill Publishing}, year={2008}}

4. Thesis

@phdthesis{mankodi_modeling_2022,
type = {Thesis},
title = {Modeling performance and power matrix of disparate computer systems using machine learning techniques ({Modeling} {Compiler} {Systems} {Selection})},
url = {http://drsr.daiict.ac.in//handle/123456789/909},
abstract = {In the last couple of decades, there has been an exponential growth in the processor, cache, and memory features of computer systems. These hardware features play a vital role in determining the performance and power of a software application when executed on different computer systems. Furthermore, any minor alterations in hardware features or applications can alter and impact the performance and power consumption. Compute intensive (compute-bound) applications have a higher dependence on processor features, while data-intensive (memory-bound) applications have a higher dependence on memory features. To match the customized budgets in performance and power, selecting computer systems with appropriate hardware features (processor, cache, and memory) becomes extremely essential. To adhere to user-specific budgets, selecting computer systems requires access to physical systems to gather performance and power utilization data. To expect a user to have access to physical systems to achieve this task is prohibitive in cost; therefore, it becomes essential to develop a virtual model which would obviate the need for physical systems. Researchers have used system-level simulators for decades to build simulated computer systems using processor, cache, and memory features to provide estimates of performance and power. In one approach, building virtual systems using a full-system simulator (FSS), provides the closest possible estimate of performance and power measurement to a physical system. In the recent past, machine learning algorithms have been trained on the above-mentioned accurate FSS models to predict performance and power for varying features in similar systems, achieving fairly accurate results. However, building multiple computer systems in a full-system simulator is complex and an extremely slow process. The prob lem gets compounded due to the fact that access to such accurate simulators is limited. However, there is an alternative approach of utilizing the open-source gem5 simulator using its emulation mode to rapidly build simulated systems. Unfortunately, it compromises the measurement accuracy in performance and power as compared to FSS models. When these results are used to train any machine learning algorithm, the predictions would be slightly inaccurate compared to those trained using FSS models. To make this approach useful, one needs to reduce the inaccuracy of the predictions that are introduced due to the nature and design of the gem5 functionality and as a consequence of this, the variation introduced due to the types of applications, whether it is compute-intensive or data-intensive. This dissertation undertakes the above-mentioned challenge of whether one can effectively combine the speed of the open-access gem5 simulated system along with the accuracy of

aphysical system to acquire accurate machine learning predictions. We proposed a scaling technique that can establish an application-specific scaling factor using a correlation coefficient between hardware features and performance/power. This scaling factor would capture the difference and apply it to a set of predicted values to conform to those of the physical system. The results demonstrate that for selected benchmark applications the scaling technique achieves a prediction accuracy of 75\%-90\% for performance and 60\%-95\% for power. The accuracy of the results validates that the scaling technique effectively attempts to bring predicted performance and power values closer to that of physical systems to enable the selection of an appropriate computer system(s). Another method to achieve better prediction values is to develop a model based on the existing transfer learning technique. To use the transfer learning method, we train the decision tree algorithm based on two sets of data; one, from a simulated system and the second from a closely matching physical system. Using trained models, we attempt to predict the performance and power of the target physical system. The target system is different from the source physical system used for training the machine learning algorithm. This model uses performance and power from a source physical system during training to bring predicted values closer to that of the target system. The results from the transfer learning technique for selected benchmark applications display the mean prediction accuracy for different target systems to be between 10\% to 50\%. In this work, we have demonstrated that our proposed techniques, scaling and transfer learning, are effective in estimating fairly accurate performance and power values for the physical system using the predicted values from a machine learning model trained on a gem5 simulated systems dataset. Therefore, these techniques provide a method to estimate performance and power values for physical computer systems, with known hardware features, without a need for access to these systems. With estimated performance and power values coupled with hardware features of the physical systems, we can select system(s) based on userprovided budget/s of performance and power.},
	language = {en},
	urldate = {2023-09-22},
	school = {Dhirubhai Ambani Institute of Information and Communication Technology},
	author = {Mankodi, Amit},
	year = {2022},
	annote = {Accepted: 2020-09-22T14:33:51Z},
	file = {Full Text PDF:C\:\\Users\\samar\\Zotero\\storage\\6SIXTQQ6\\Mankodi - 2022 - Modeling performance and power matrix of disparate.pdf:application/pdf},
}