Progress Report

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1 Progress

- Following items are listed in order of priority:
- I read paper [1] on multi-temporal image registration, I am still trying to understand the details of it. Authors provide source code on GitHub which we might need for thermal super resolution project. I am trying to understand the code and make it work with Nolan's help.
- I am still working through Jason Brownlee's ML Mastery book, [2]. I am still on day 3 but need to get back to as soon as possible.
- (On pause) I have continued to use Python as much as possible in order to become intimate with the syntax, modules and pipelines. I also need to do some small practice projects using Numpy, Pandas, Scipy, and Matplotlib. I have prioritized learning these fundamental modules over Tensorflow and Pytorch as I believe, long term, it will accelerate my learning and productivity growth rate.
- (On pause) I have continued to read on CNN's and DL in depth. I did not get to it much this week but I am keeping it as a top priority.
- (On pause) Had to put Robotic Perception course on pause.
- (On pause) Had to put Machine Learning course with Andrew Ng on pause.

2 Plans

- Following items are listed in order of priority:

- I will continue to shadow and help Nolan on the SR project. My goal is to build up my foundation and skill set to be able to contribute in the most meaningful way.
- (High priority) Setup an Ubuntu environment.
- (On pause) I will dissect [3] and prepare an in-depth presentation for RVL's paper review on a TBD date.
- (On pause) Resume Robotic Perception course as soon as possible.
- (On pause) Resume Machine Learning course with Andrew Ng as soon as possible.
- (On pause) Need to read [4], [5], [6], and [7]; these papers seem fundamental to understanding the overall picture.
- (On pause) There many common acronyms used in papers referring to known and useful algorithms. I will make list of them and begin investigating learning one by one.
- (On pause) Get intimate with Python, Numpy, Pandas, Scipy, and Matplotlib.
- (On pause) Learn TensorFlow and PyTorch.
- (On pause) Get intimate with Linux Shell, and learn ROS.
- (On pause) (Supremely important) Read on scene understanding, semantic SLAM, graph SLAM, visual odometer, place recognition, and Kalman Filtering. Read Niko Sunderhauf's research publications.

References

[1] Z. Yang, T. Dan, and Y. Yang, "Multi-temporal remote sensing image registration using deep convolutional features," *IEEE Access*, vol. 6, pp. 38544–38555, 2018.

[2] J. Brownlee, *Machine Learning Mastery With Python: Understand Your Data, Create Accurate Models, and Work Projects End-to-End*. Machine Learning Mastery, 2016.

[3] P. Kirsanov, A. Gaskarov, F. Konokhov, K. Sofiiuk, A. Vorontsova, I. Slinko, D. Zhukov, S. Bykov, O. Barinova, and A. Konushin, "Discoman: Dataset of indoor scenes for odometry, mapping and navigation," 2019.

[4] C. Dong, C. C. Loy, K. He, and X. Tang, "Image super-resolution using deep convolutional networks," *CoRR*, vol. abs/1501.00092, 2015.

[5] D. Liu, Z. Wang, N. M. Nasrabadi, and T. S. Huang, "Learning a mixture of deep networks for single image super-resolution," *CoRR*, vol. abs/1701.00823, 2017.

[6] K. Doherty, D. Fourie, and J. Leonard, "Multimodal semantic slam with probabilistic data association," in *2019 International Conference on Robotics and Automation (ICRA)*, pp. 2419–2425, May 2019.

[7] F. Wang, M. Jiang, C. Qian, S. Yang, C. Li, H. Zhang, X. Wang, and X. Tang, "Residual attention network for image classification," *CoRR*, vol. abs/1704.06904, 2017.