Tay Shin

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Education

University of California, Berkeley *Graduation: December 2013*

B.A. Statistics, Concentration in Mathematics and Computer Science

Research Experience

02/17 - Current **Prof. Ed Boyden's Synthetic Neurobiology Group, MIT Media Lab** *Research Affiliate*
Cambridge, MA
- Developing novel nanoscale imaging tools, such as expansion microscopy and its accompanying chemical labels for key biomolecules, for brain mapping – connectomics – research
- Using state-of-art deep learning to connect functional brain data to structural brain data
- Created an automatic detection model to identify signs of diabetic retinopathy in eye images
- Created a model for delineating cancer and reconstructed segmented CT images in 3D

08/15 - 01/17 **Personnel Budget Projection Model, Ministry of National Defense** *Data Scientist*
Seoul, Korea
- Used various time-series machine learning techniques to build a forecasting model (monthly temporal resolution) managing the military's personnel budget (around $15 Billion dollars); implementation of the model has been saving around $20 million dollars annually for the military
- Built a dynamic programming econometrics model for predicting each military personnel's future stay/leave behavior; convinced the policy makers to adopt the model nationwide

02/15 - 07/15 **Estimating the Suicide Risk of Soldiers, Ministry of National Defense** *Data Scientist*
Seoul, Korea
- Created a predictive model for estimating the suicide risk of soldiers based on their physiological data; the model out-performed the original model by 140% AUC-ROC chart basis
- Conducted counselling and surveys across the military to better construct and validate the model

08/13 - 09/14 **Popular music as an economic indicator** *Advisors: Prof. James L. Powell, UC Berkeley*
Berkeley, CA
- Scripted in Python and R to collect and rearrange 1,825,000 values in nine unique characteristics of top-ranked, popular songs in the United States (1960-2010)
- Investigated causal relations by conducting Granger and instantaneous causality test, impulse-reponse analysis, and forecast error variance decomposition analysis; Used vector autoregression techniques to capture the linear interdependencies among multiple time series data

04/13 - 04/14 **Bank credit financial economics** *Advisor: Prof. Raymond J Hawkins, UC Berkeley*
Berkeley, CA
- Developed an evolved model for classifying bank failure by considering 68 accounting variables from balance sheets of 98,540 different banks
- Defined decision boundaries by considering different types of errors of the models obtained by several machine learning and econometric models

Publications

Neuroscience
1. E. Karagiannis, J. S. Kang, T. Shin, et al., Expansion microscopy technologies, in preparation.
2. S. Alon, et al., Expansion microscopy for in-situ sequencing, in preparation.

Economics
3. Tay Shin, et al., Military Personnel Quit Behavior Estimation, in preparation.

Major Awards

2017	Harvard China Forum Startup Competition	*3rd Prize ($10K)*
2016	Minister of National Defense, South Korea	*Ministerial Citation*
2015	Kaggle Data Science Competition: Acquire Valued Shoppers Challenge	*top 1%*
2015	Kaggle Data Science Competition: How much did it rain?	*top 1%*
2015	Kaggle Data Science Competition: Liberty Mutual Group	*top 1%*