

Final Internship Presentation

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Taewon Yoo, Smart Convergence Group



Introducing Myself




Taewon Yoo

Smart Convergence Group, KIST Europe 

Department of Software Convergence, Kyung Hee University 

Email: taewon.yoo@kist-europe.de

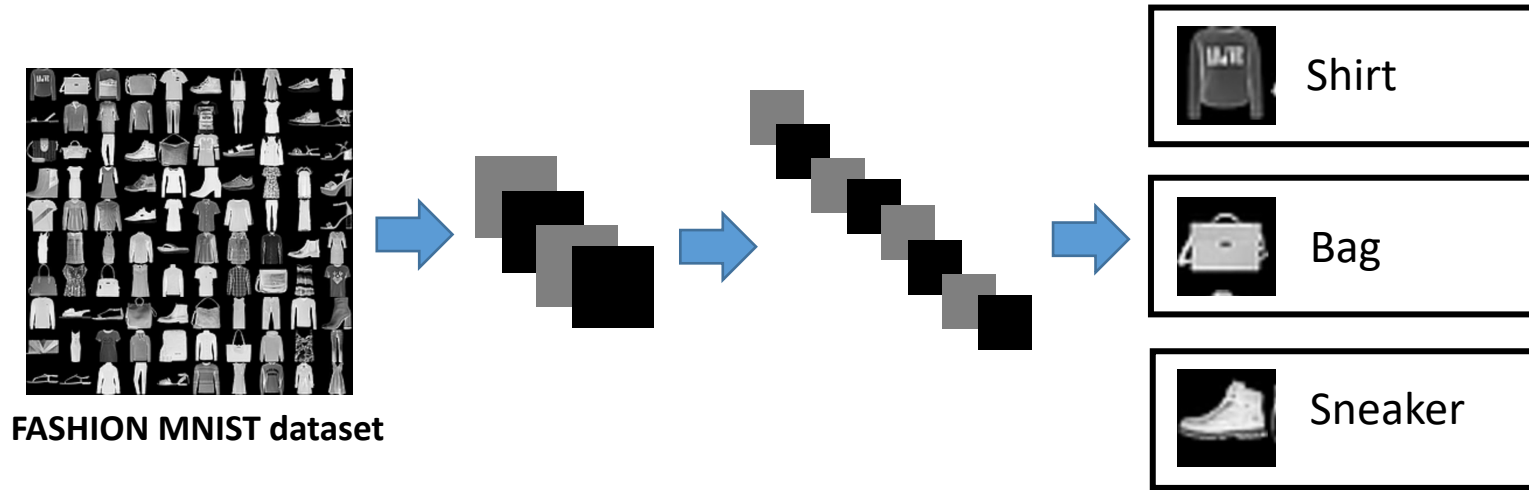
Before I come to KIST Europe

- Research on YouTube - Define and solve the problem from the point of Human-Computer Interaction  YouTube
- Interested in data science and artificial intelligence

What did I expect working in KIST Europe

- Learning and applying state-of-the-art technology in artificial intelligence and data science
- Experiencing Europe traveling around many countries

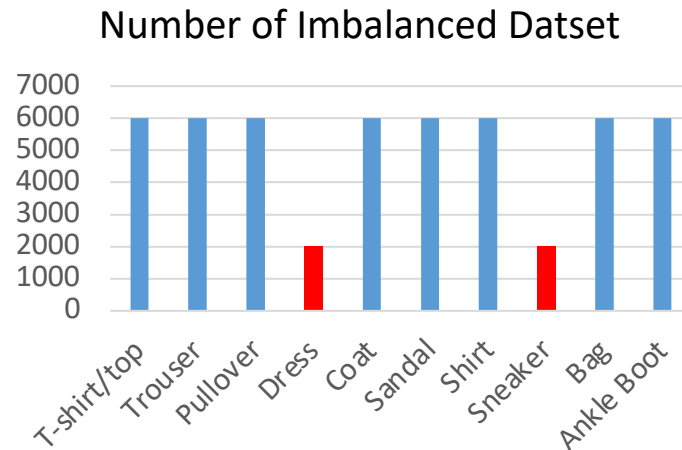
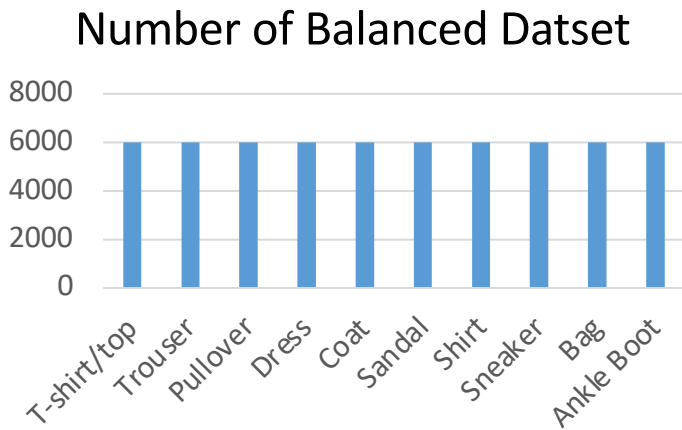
Research Background – Data Imbalance Problem



Convolutional Neural Networks (CNN)
Classification model

Imbalance Ratio	Accuracy (%)
1:1	89.94
10:1	84.21
20:1	81.31
40:1	77.13

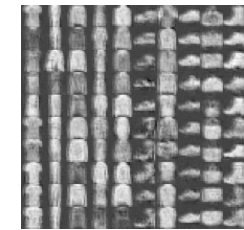
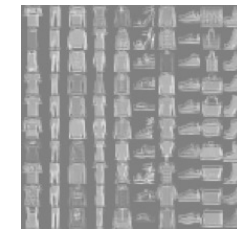
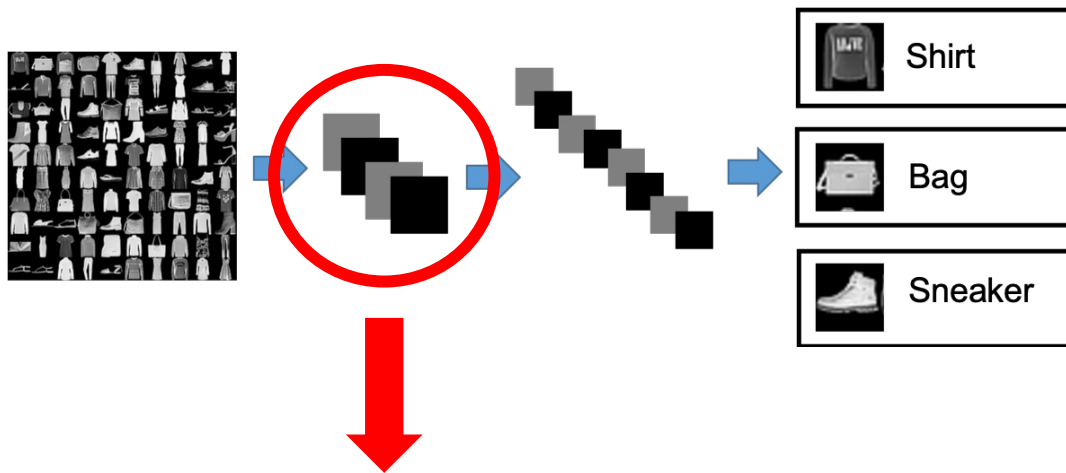
Experiments of FASHION MNIST dataset
Classification accuracy according to imbalance ratio



Need to be balanced!

Methods

Feature Augmentation using Generative Adversarial Networks (GANs)

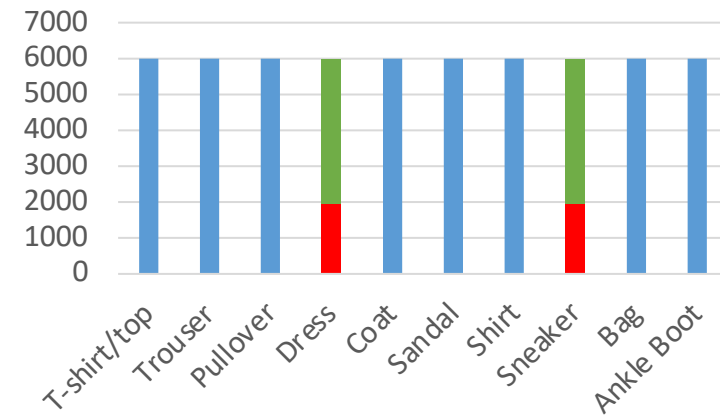


Real Feature Map

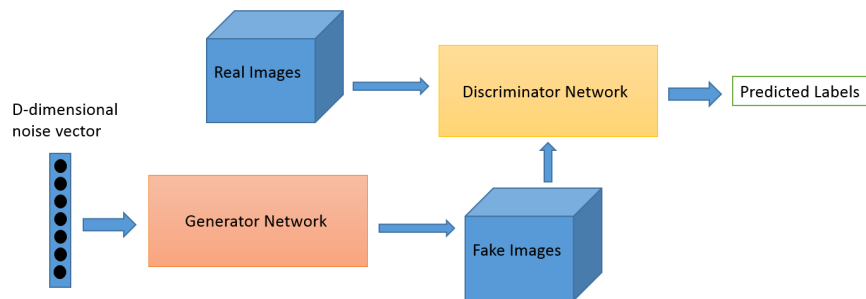
Generated Feature Map



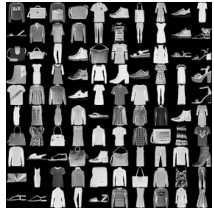
Balanced dataset after generation



Generating of Fake Feature Map using GANs



Results

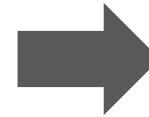


Experiments on
FASHION MNIST dataset

Classification Accuracy Imbalanced (40:1 ratio)

Major Class	Accuracy	Major Class	Accuracy
(0,1)	0.7887	(2,9)	0.7672
(0,2)	0.7756	(3,4)	0.7689
(0,3)	0.7797	(3,5)	0.7691
(0,4)	0.7452	(3,6)	0.7047
(0,5)	0.7938	(3,7)	0.783
(0,6)	0.7752	(3,8)	0.7966
(0,7)	0.7717	(3,9)	0.7926
(0,8)	0.8003	(4,5)	0.7662
(0,9)	0.7507	(4,6)	0.7231
(1,2)	0.7833	(4,7)	0.7426
(1,3)	0.7967	(4,8)	0.7732
(1,4)	0.7875	(4,9)	0.8038
(1,5)	0.8117	(5,6)	0.7108
(1,6)	0.6994	(5,7)	0.8173
(1,7)	0.8072	(5,8)	0.8031
(1,8)	0.802	(5,9)	0.8059
(1,9)	0.7951	(6,7)	0.6995
(2,3)	0.7363	(6,8)	0.7557
(2,4)	0.7999	(6,9)	0.7162
(2,5)	0.7716	(7,8)	0.7827
(2,6)	0.7573	(7,9)	0.8124
(2,7)	0.7386	(8,9)	0.8068
(2,8)	0.7398	Average	0.7713

Major Class: 6000
Minor Class: 150



Classification Accuracy Balanced

Major Class	Accuracy	Major Class	Accuracy
(0,1)	0.818	(2,9)	0.8183
(0,2)	0.855	(3,4)	0.8358
(0,3)	0.8391	(3,5)	0.8818
(0,4)	0.7982	(3,6)	0.8541
(0,5)	0.856	(3,7)	0.8572
(0,6)	0.826	(3,8)	0.8393
(0,7)	0.8305	(3,9)	0.8662
(0,8)	0.8215	(4,5)	0.8218
(0,9)	0.8244	(4,6)	0.813
(1,2)	0.8139	(4,7)	0.8331
(1,3)	0.8339	(4,8)	0.8347
(1,4)	0.8265	(4,9)	0.8468
(1,5)	0.8702	(5,6)	0.7801
(1,6)	0.7921	(5,7)	0.8322
(1,7)	0.8255	(5,8)	0.8367
(1,8)	0.8269	(5,9)	0.86
(1,9)	0.8247	(6,7)	0.792
(2,3)	0.8038	(6,8)	0.8218
(2,4)	0.8464	(6,9)	0.7378
(2,5)	0.8316	(7,8)	0.8578
(2,6)	0.7676	(7,9)	0.8446
(2,7)	0.84	(8,9)	0.8508
(2,8)	0.8531	Average	0.8298

Major Class: 6000
Minor Class: 150 + 5850

What did I learn working in KIST Europe

- Learned state-of-the-art technology on artificial intelligence and deep learning
- Learned end-to-end research process participating research project
- Experienced diverse cultures traveling and meeting many people all around the world

Future Plan

- Keep studying and researching deep learning and generative adversarial networks
- Doing Research about combining artificial intelligence and human-computer interaction
- Getting masters on artificial intelligence

T H A N K Y O U

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KIST Europe Forschungsgesellschaft mbH
Campus E7.1
66123, Saarbrücken, Germany