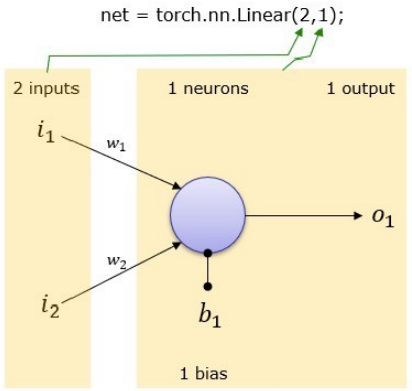
โครงการพัฒนาทักษะการเรียนรู้ของเครื่อง (Machine Learning) ของบัณฑิตเพื่อตอบสนองการพัฒนาประเทศไทย 4.0

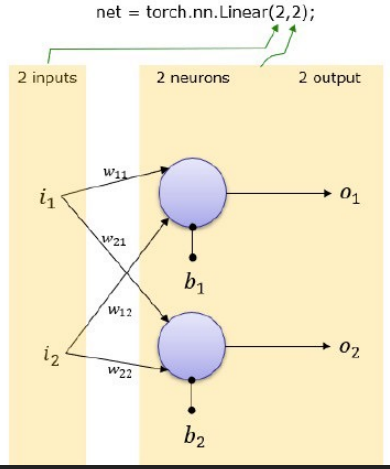
16 และ 23 กุมภาพันธ์ 2566

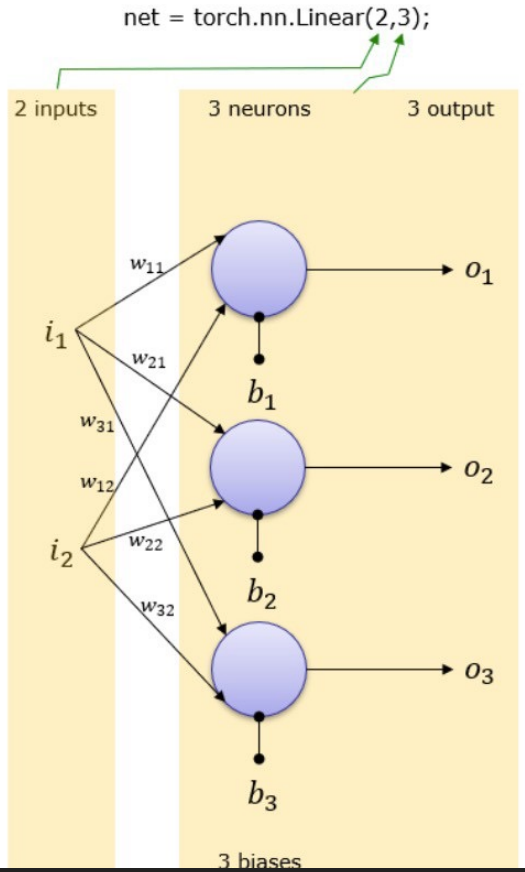
Code

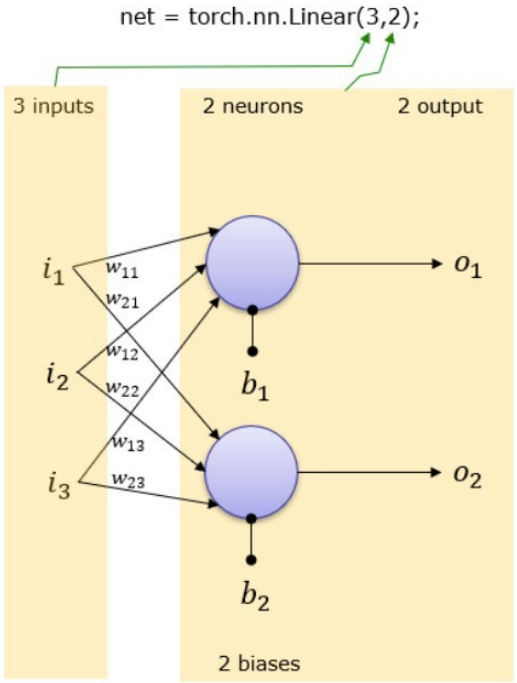
แบบสอบถาม

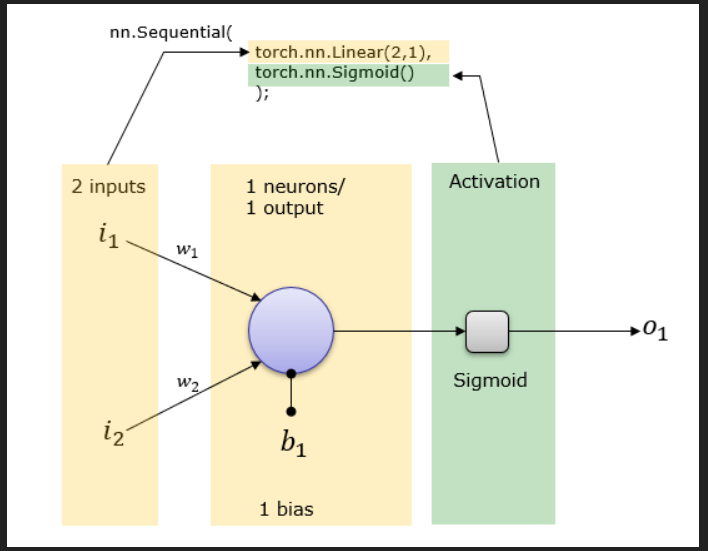
“What are Neural Networks?”

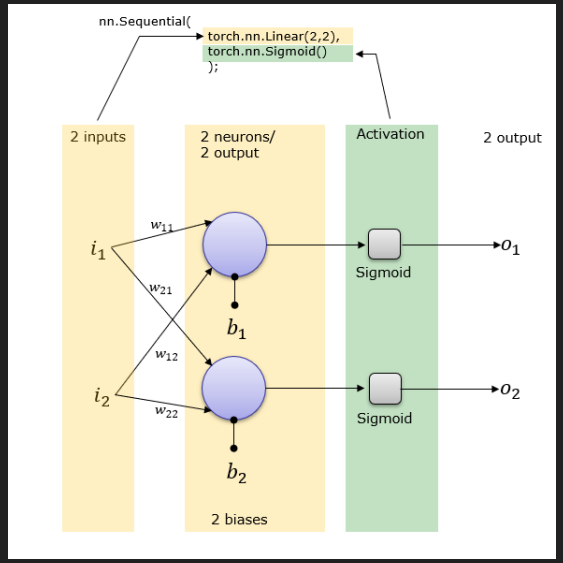

net = torch.nn.Linear(2,1);
2 inputs
1 neurons
1 output
i_1
w_1
o_1
w_2
i_2
b_1
1 bias

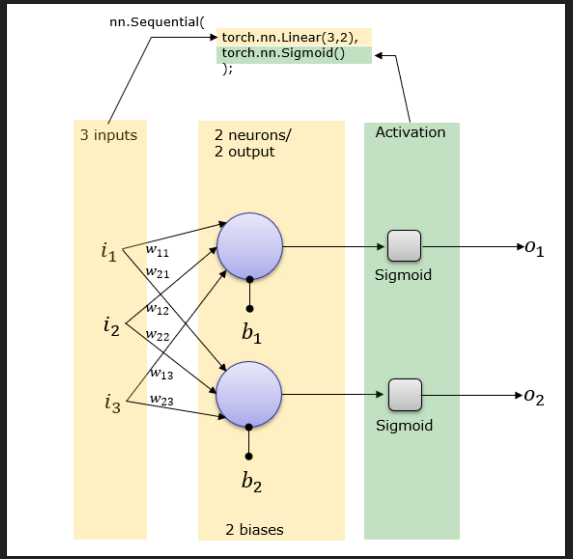

net = torch.nn.Linear(2,2);
2 inputs
2 neurons
2 output
w_{11}
i_1
o_1
w_{21}
b_1
w_{12}
i_2
o_2
w_{22}
b_2

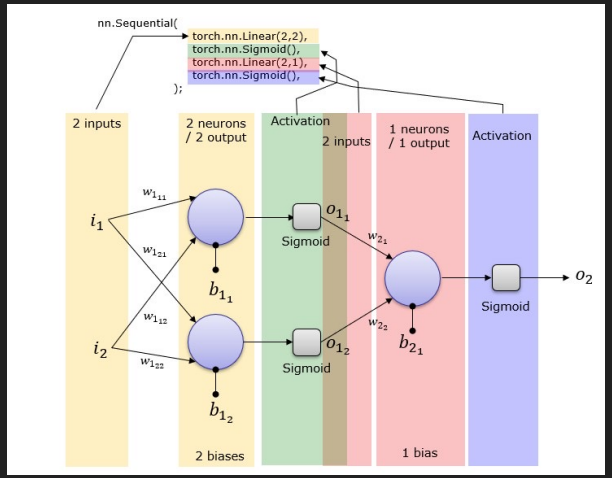

net = torch.nn.Linear(2,3);
2 inputs
3 neurons
3 output
w_{11}
o_1
i_1
w_{21}
b_1
w_{31}
o_2
w_{12}
i_2
w_{22}
b_2
w_{32}
o_3
b_3
3 biases

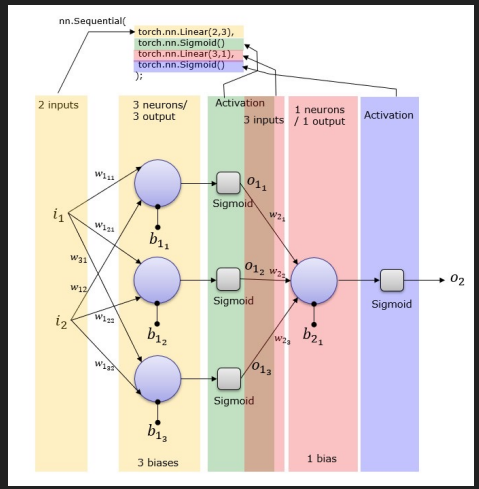

net = torch.nn.Linear(3,2);
3 inputs
2 neurons
2 output
i_1
w_{11}
w_{21}
o_1
i_2
w_{12}
w_{22}
b_1
w_{13}
i_3
w_{23}
o_2
b_2
2 biases


nn.Sequential(
torch.nn.Linear(2,1),
torch.nn.Sigmoid()
);
2 inputs
1 neurons/
1 output
Activation
i_1
i_2
w_1
w_2
b_1
Sigmoid
o_1
1 bias


nn.Sequential(
torch.nn.Linear(2,2),
torch.nn.Sigmoid()
);
2 inputs
2 neurons/
2 output
Activation
2 output
i_1
i_2
w_{11}
w_{21}
w_{12}
w_{22}
b_1
b_2
Sigmoid
Sigmoid
o_1
o_2
2 biases


nn.Sequential(
torch.nn.Linear(3,2),
torch.nn.Sigmoid()
);
3 inputs
2 neurons/
2 output
Activation
i_1
i_2
i_3
w_{11}
w_{21}
w_{12}
w_{22}
w_{13}
w_{23}
b_1
b_2
Sigmoid
Sigmoid
o_1
o_2
2 biases


nn.Sequential(
torch.nn.Linear(2,2),
torch.nn.Sigmoid(),
torch.nn.Linear(2,1),
torch.nn.Sigmoid(),
);
2 inputs
2 neurons
/ 2 output
Activation
2 inputs
1 neurons
/ 1 output
Activation
i_1
i_2
$w_{1_{11}}$
$w_{1_{21}}$
$w_{1_{12}}$
$w_{1_{22}}$
w_{2_1}
w_{2_2}
b_{1_1}
b_{1_2}
b_{2_1}
o_{1_1}
o_{1_2}
o_2
Sigmoid
Sigmoid
Sigmoid
2 biases
1 bias


nn.Sequential(
torch.nn.Linear(2,3),
torch.nn.Sigmoid()
torch.nn.Linear(3,1),
torch.nn.Sigmoid()
);
2 inputs
3 neurons/
3 output
Activation
3 inputs
1 neurons
/ 1 output
Activation
i_1
i_2
$w_{1_{11}}$
$w_{1_{21}}$
$w_{1_{31}}$
$w_{1_{12}}$
$w_{1_{22}}$
$w_{1_{32}}$
w_{2_1}
w_{2_2}
w_{2_3}
b_{1_1}
b_{1_2}
b_{1_3}
b_{2_1}
o_{1_1}
o_{1_2}
o_{1_3}
o_2
Sigmoid
Sigmoid
Sigmoid
Sigmoid
3 biases
1 bias

Three Ways to Build a Neural Network in PyTorch

```python
from torch import nn
from collections import OrderedDict

# define model architecture
model3 = nn.Sequential(OrderedDict([
    ('fc1', nn.Linear(16, 12)),
    ('relu1', nn.ReLU()),
    ('fc2', nn.Linear(12, 10)),
    ('relu2', nn.ReLU()),
    ('fc3', nn.Linear(10, 1)),
    ('sigmoid', nn.Sigmoid())
]))

# print model architecture
print(model3)
```

```
Sequential(
  (fc1): Linear(in_features=16, out_features=12, bias=True)
  (relu1): ReLU()
  (fc2): Linear(in_features=12, out_features=10, bias=True)
  (relu2): ReLU()
  (fc3): Linear(in_features=10, out_features=1, bias=True)
  (sigmoid): Sigmoid()
)
```

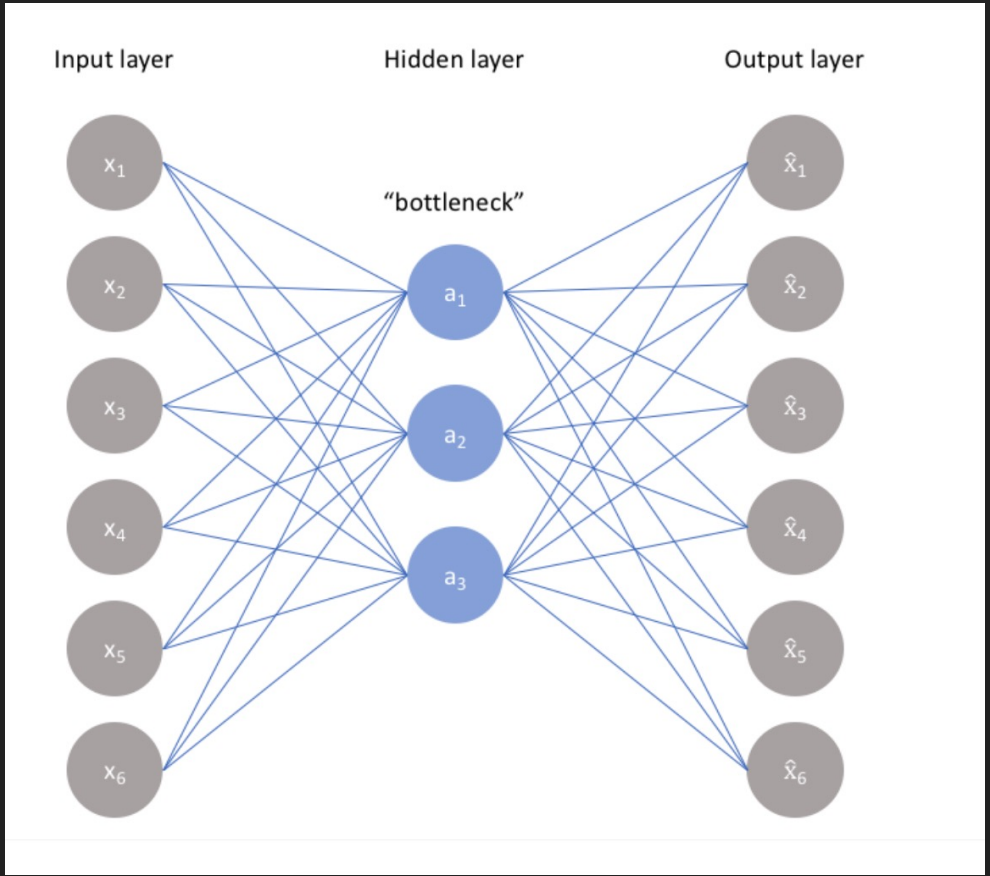

```python
from torch import nn
from collections import OrderedDict

# define model architecture
model3 = nn.Sequential(OrderedDict([
    ('fc1', nn.Linear(16, 12)),
    ('relu1', nn.ReLU()),
    ('fc2', nn.Linear(12, 10)),
    ('relu2', nn.ReLU()),
    ('fc3', nn.Linear(10, 1)),
    ('sigmoid', nn.Sigmoid())
]))

# print model architecture
print(model3)
```

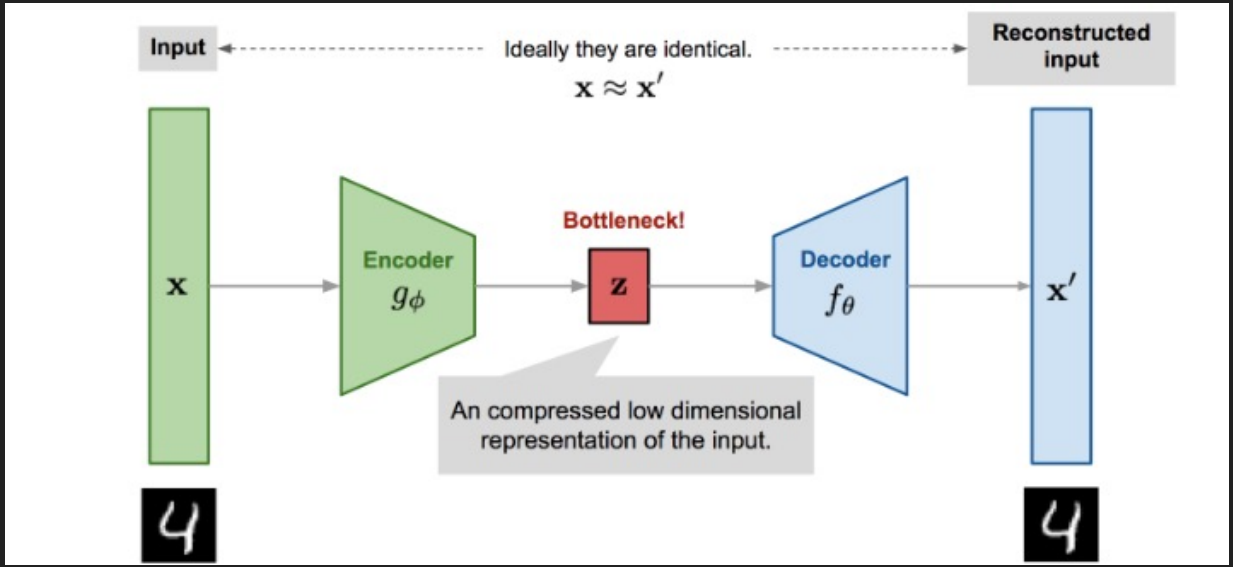
```
Sequential(
  (fc1): Linear(in_features=16, out_features=12, bias=True)
  (relu1): ReLU()
  (fc2): Linear(in_features=12, out_features=10, bias=True)
  (relu2): ReLU()
  (fc3): Linear(in_features=10, out_features=1, bias=True)
  (sigmoid): Sigmoid()
)
```


```python
import torch
import torch.nn.functional as F
from torch import nn

# define the network class
class MyNetwork(nn.Module):
    def __init__(self):
        # call constructor from superclass
        super().__init__()

        # define network layers
        self.fc1 = nn.Linear(16, 12)
        self.fc2 = nn.Linear(12, 10)
        self.fc3 = nn.Linear(10, 1)

    def forward(self, x):
        # define forward pass
        x = F.relu(self.fc1(x))
        x = F.relu(self.fc2(x))
        x = torch.sigmoid(self.fc3(x))
        return x

# instantiate the model
model1 = MyNetwork()

#

print(model1)
```

```
MyNetwork(
  (fc1): Linear(in_features=16, out_features=12, bias=True)
  (fc2): Linear(in_features=12, out_features=10, bias=True)
  (fc3): Linear(in_features=10, out_features=1, bias=True)
)
```

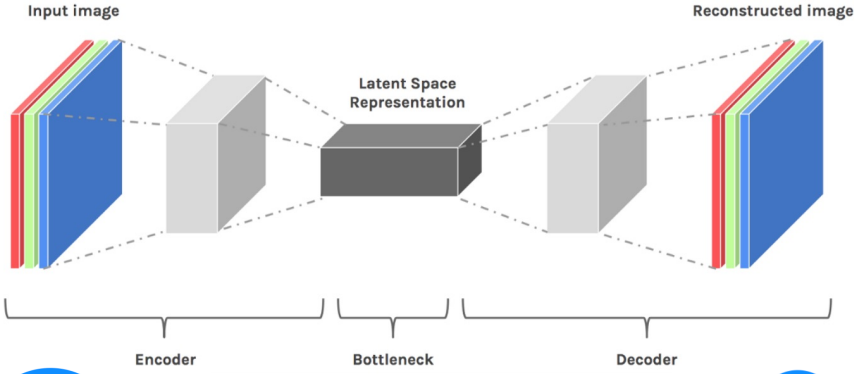
Autoencoders

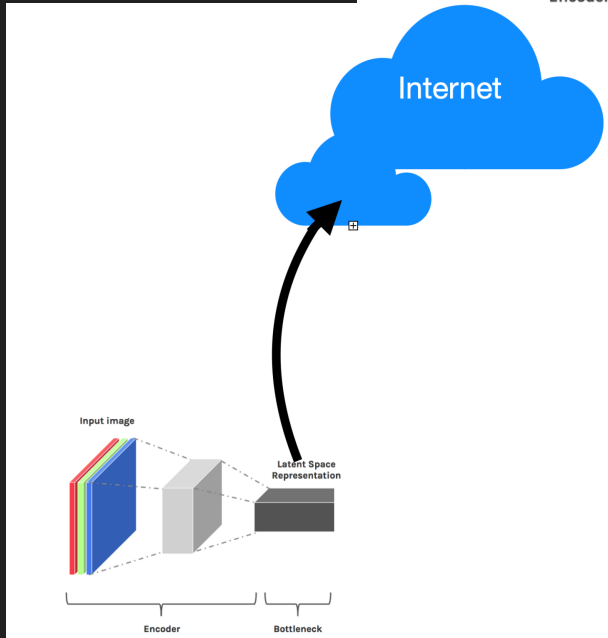

Input layer
Hidden layer
Output layer
"bottleneck"
x_1
x_2
x_3
x_4
x_5
x_6
a_1
a_2
a_3
$\hat{x}_1$
$\hat{x}_2$
$\hat{x}_3$
$\hat{x}_4$
$\hat{x}_5$
$\hat{x}_6$

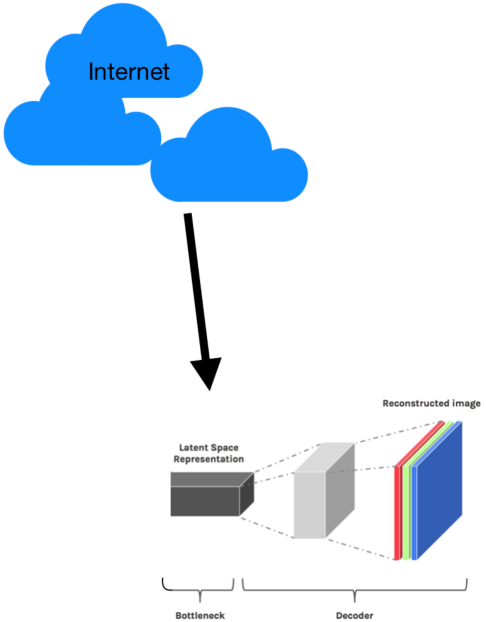


$$L_{\text{AE}}(\theta, \phi) = \frac{1}{n} \sum_{i=1}^{n} (\mathbf{x}^{(i)} - f_\theta(g_\phi(\mathbf{x}^{(i)})))^2$$

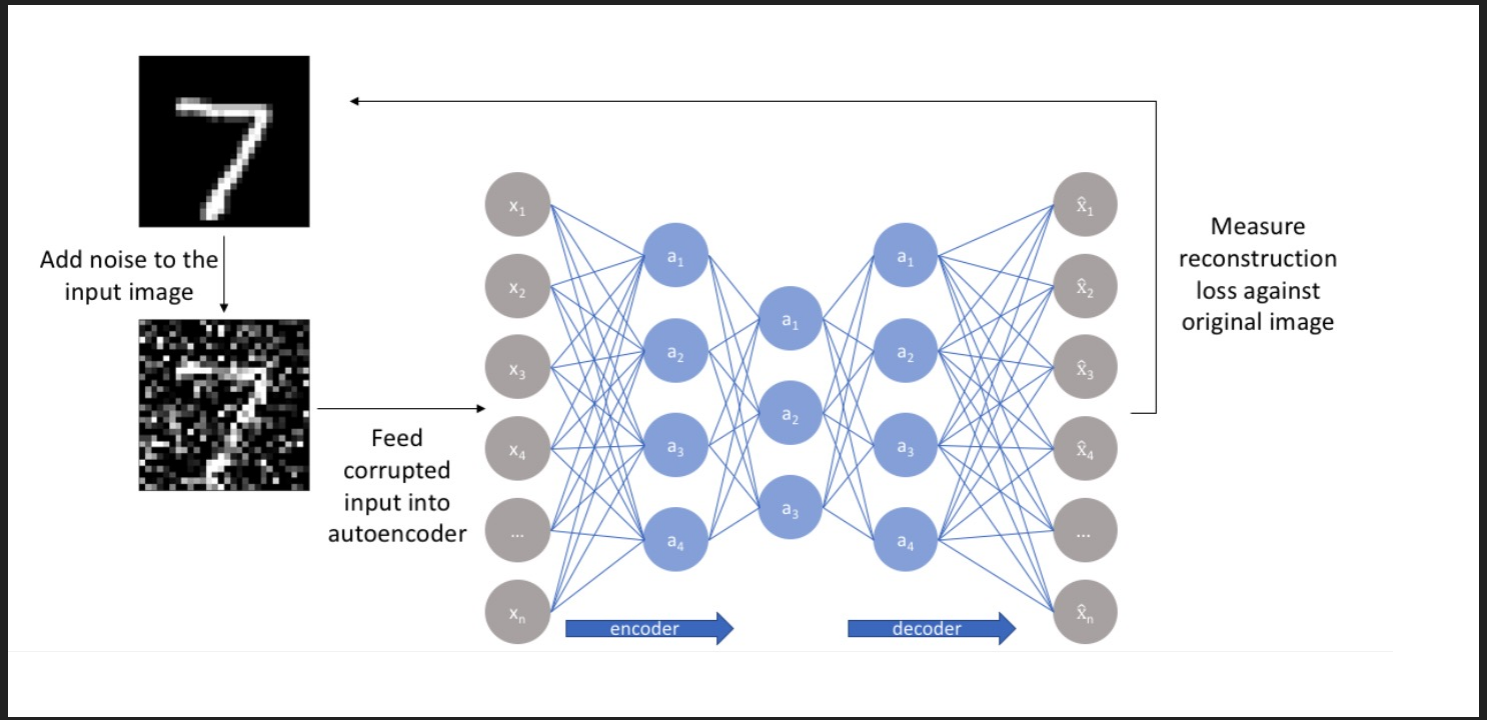
Data compression

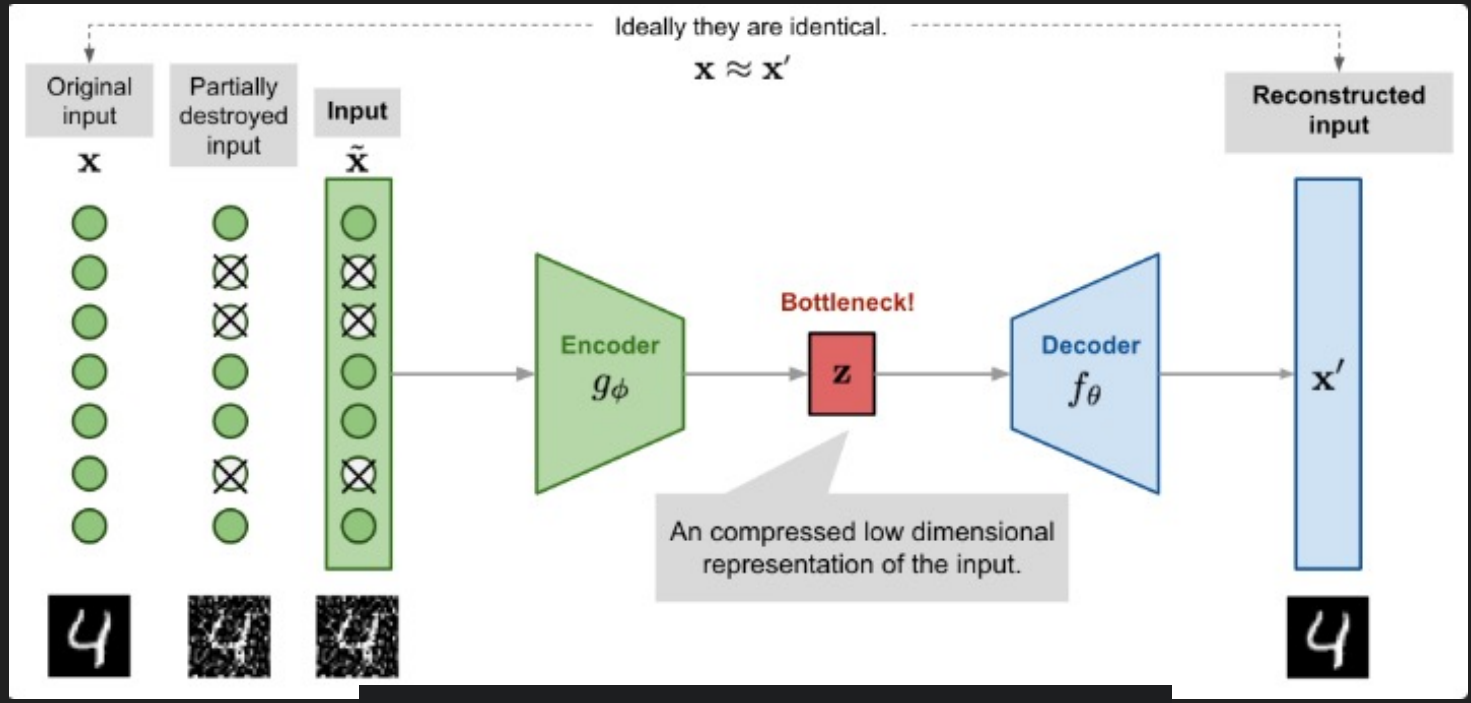






Denoising data



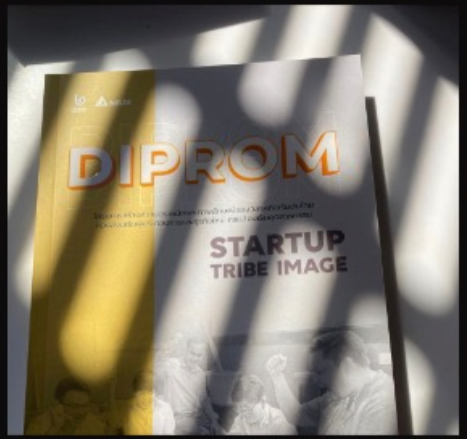


$$\tilde{\mathbf{x}}^{(i)} \sim \mathcal{M}_{\mathcal{D}}(\tilde{\mathbf{x}}^{(i)}|\mathbf{x}^{(i)})$$

$$L_{\text{DAE}}(\theta, \phi) = \frac{1}{n}\sum_{i=1}^{n}(\mathbf{x}^{(i)} - f_\theta(g_\phi(\tilde{\mathbf{x}}^{(i)})))^2$$


DELTA x DIPROM ANGEL FUND


Monitor content
Mental health social listening


DIPROM
STARTUP
TRIBE IMAGE


DIPROM
STARTUP
TRIBE IMAGE


DIPROM
+5 STARTUP
TRIBE IMAGE
14 / 09 / 2022


Monitor content
Mental health social listening
TEAM ANO
ความเชี่ยวชาญ
Healthcare solutions
AssistMe
TEAM AssistMe
ความเชี่ยวชาญ
Deep tech and IoT
28
29


HRC
BDMS HEALTH
RESEARCH CENTER
ศูนย์วิจัยสุขภาพบีดีเอ็มเอส

Mentor : Khun Niran Pravithana (CEO of Ava Alpha Lab)
Intern : Dr. Tuchsanai Ploysuwan (School of Information Technology, KMITL)

พัทนัย พลอยสุวรรณ
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โครงงานเชิงวิจัย

Intelligent Investment Adviser by Stock Similarity Search

1. Problem

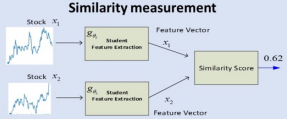
Investor need investment opportunities for maximizing profit with financial knowledge. Similarity score in time series of stock prices is an important feature to conform economic similarity of company stocks to interested target stock

2. Objectives

- Search listed time series company stocks period in Thailand stock market match up to target stock
- Sorted similarity score stocks from highest to low with target stock

Linkedin

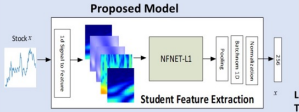
Similarity measurement



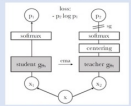
2. Research method

- Proposed 1d stock signal feature extraction from 1d to multi dimension signal
- NFNet-L1 256*256 is used for Backbone
- Applied student and teacher for training model to create entropy loss.
- Sorted similarity score by K nearest neighbor

Proposed Model

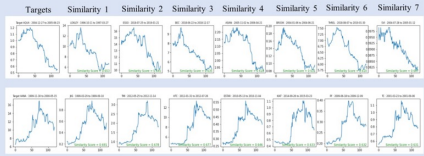


Student Feature Extraction



Loss : Self-Supervised Vision Transformers with DINO

3. Experiment Results



4. Conclusion

The new method was applied to search listed of Stock Similarity with student and teacher for training model

Demo Code

ดร.ทัศนัย พลอยสุวรรณ

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ปริญญาตรี

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ปริญญาโท

วศ.ม. (วิศวกรรมไฟฟ้า) จุฬาลงกรณ์มหาวิทยาลัย, 2547

ปริญญาเอก

วศ.ด. (วิศวกรรมไฟฟ้า) จุฬาลงกรณ์มหาวิทยาลัย, 2552