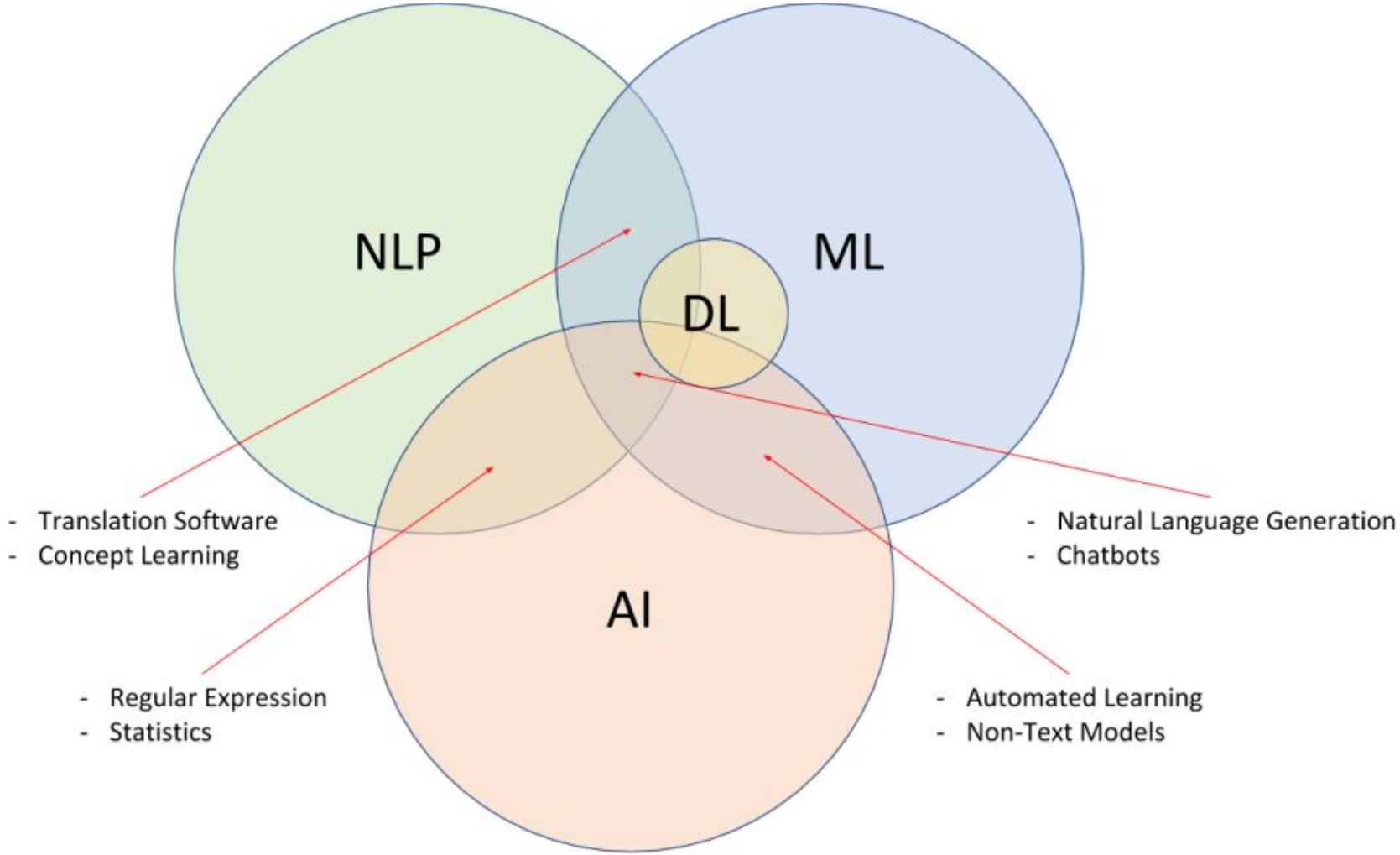
MIDS W207
Applied Machine Learning

Week 9
Live Session Slides


NLP
ML
DL
AI
- Translation Software
- Concept Learning
- Natural Language Generation
- Chatbots
- Regular Expression
- Statistics
- Automated Learning
- Non-Text Models

Sentiment Analysis

My experience so far has been fantastic!

POSITIVE

The product is ok I guess

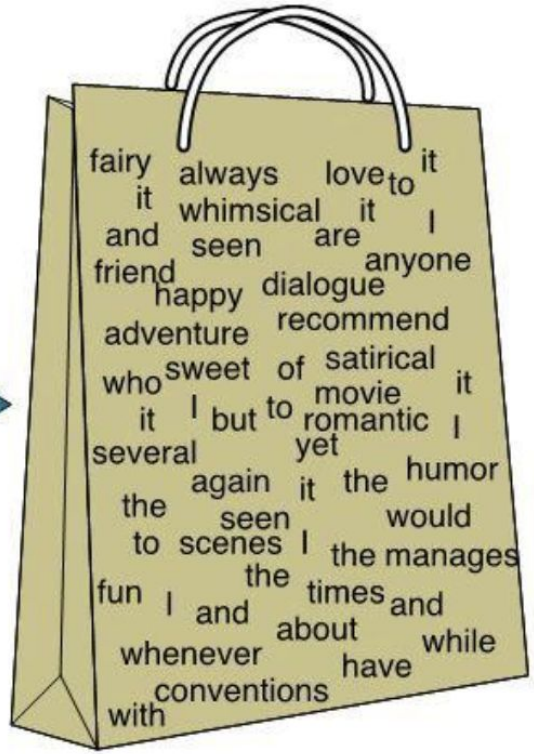
NEUTRAL

Your support team is useless

NEGATIVE

The Bag of Words Representation

I love this movie! It's sweet, but with satirical humor. The dialogue is great and the adventure scenes are fun... It manages to be whimsical and romantic while laughing at the conventions of the fairy tale genre. I would recommend it to just about anyone. I've seen it several times, and I'm always happy to see it again whenever I have a friend who hasn't seen it yet!



it	6
I	5
the	4
to	3
and	3
seen	2
yet	1
would	1
whimsical	1
times	1
sweet	1
satirical	1
adventure	1
genre	1
fairy	1
humor	1
have	1
great	1
…	…

Sentence 1 : He is a good doctor
Sentence 2: She is a good scientist
Sentence 3: Doctor and Scientist are good

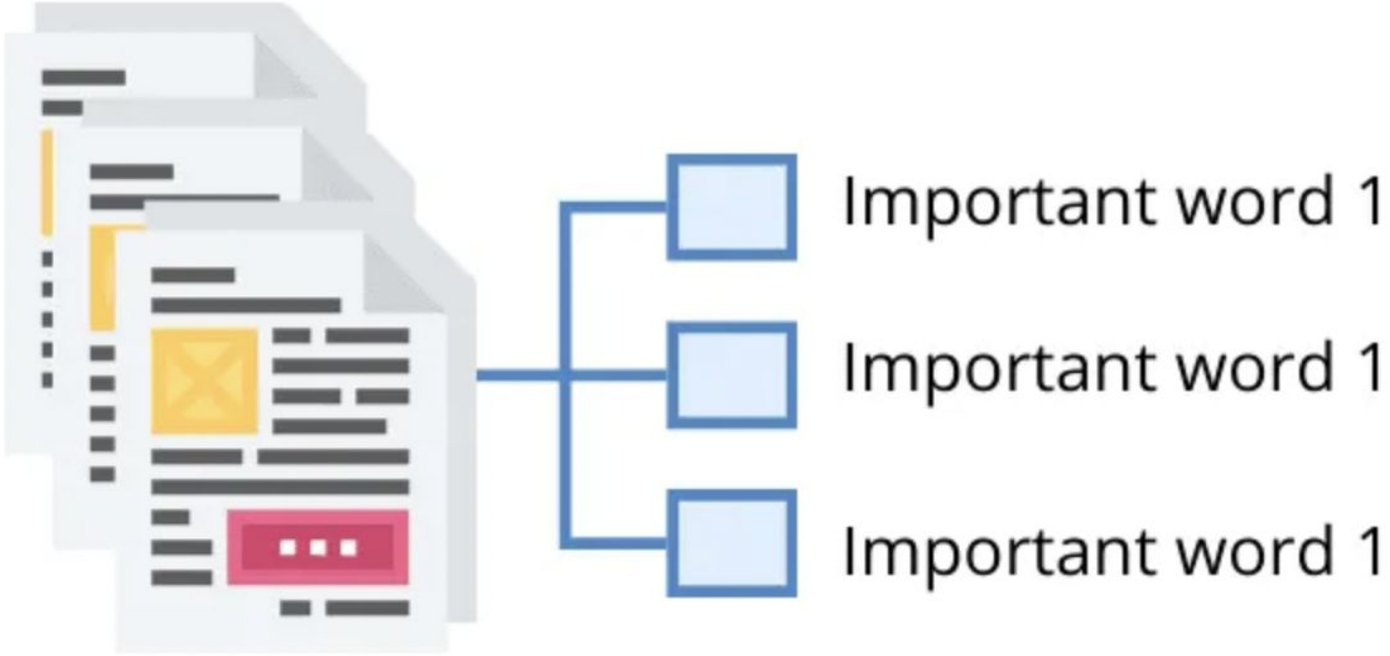
Sentence 1 : good doctor
Sentence 2: good scientist
Sentence 3: doctor scientist good

Words	Frequency
good	3
doctor	2
scientist	2

vectors

	f1	f2	f3	
	good	doctor	scientist	output
Sentence 1	1	1	0	
Sentence 2	1	0	1	
Sentence 3	1	1	1	

TF - IDF



Sentence 1 : good doctor
Sentence 2: good scientist
Sentence 3: doctor scientist good

TF * IDF

Term Frequency= No. of repetitive words in a sentence/ No. of words in a sentence

Inverse Document Frequency= Log (No. of sentences/ No of sentences containing words)

Words	Frequency
good	3
doctor	2
scientist	2

TF

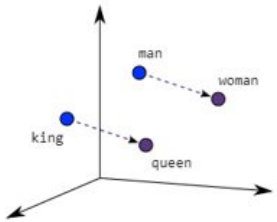
	S1	S2	S3
good	1/2	1/2	1/3
doctor	1/2	0	1/3
scientist	0	1/2	1/3

IDF

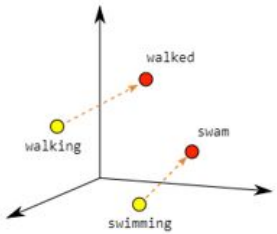
Words	IDF
good	Log (3/3)=0
doctor	Log (3/2)
scientist	Log (3/2)

	f1 good	f2 doctor	f3 scientist	output
S1	0	½ * log (3/2)	0	
S2	0	0	½ * log (3/2)	
S3	0	⅓ * log (3/2)	⅓ * log (3/2)	

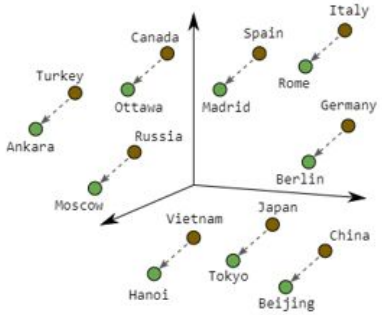
Word2Vec



Male-Female

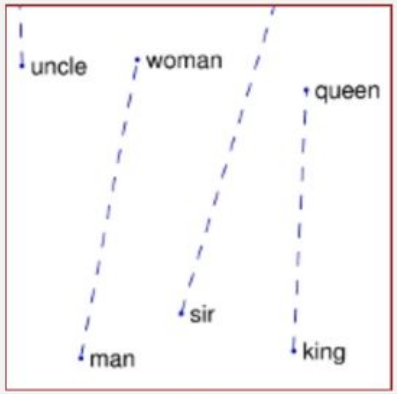


Verb Tense

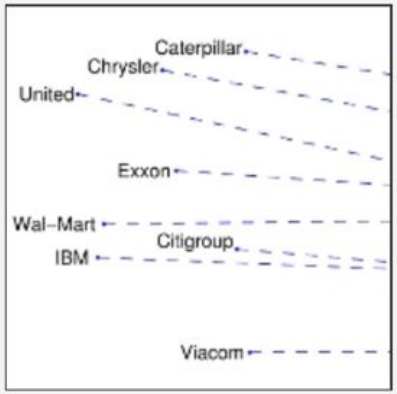


Country-Capital

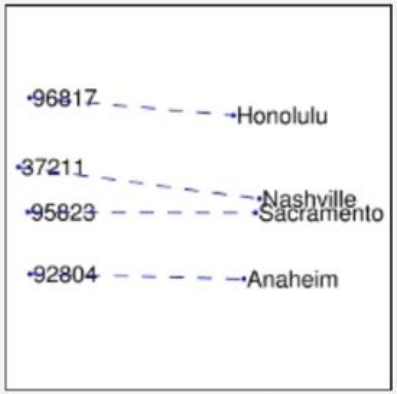
GloVe



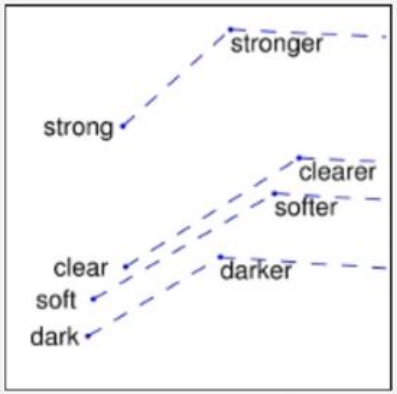
man - woman



company - ceo

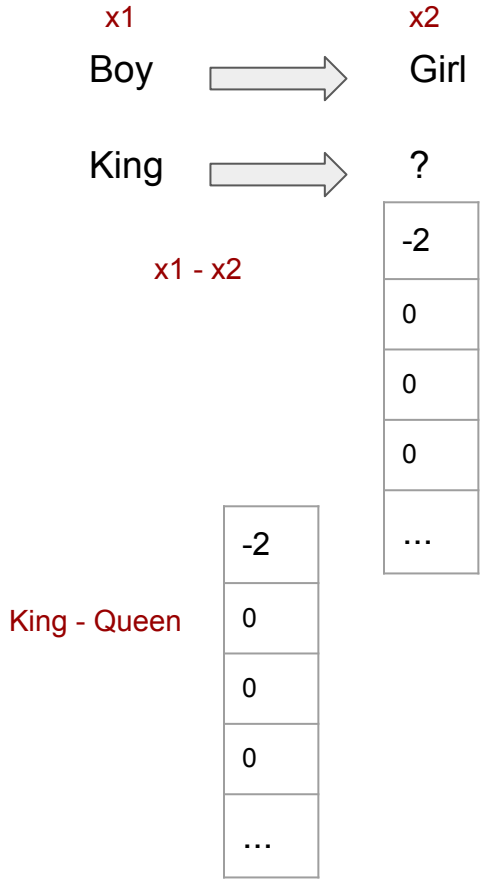


city - zip code

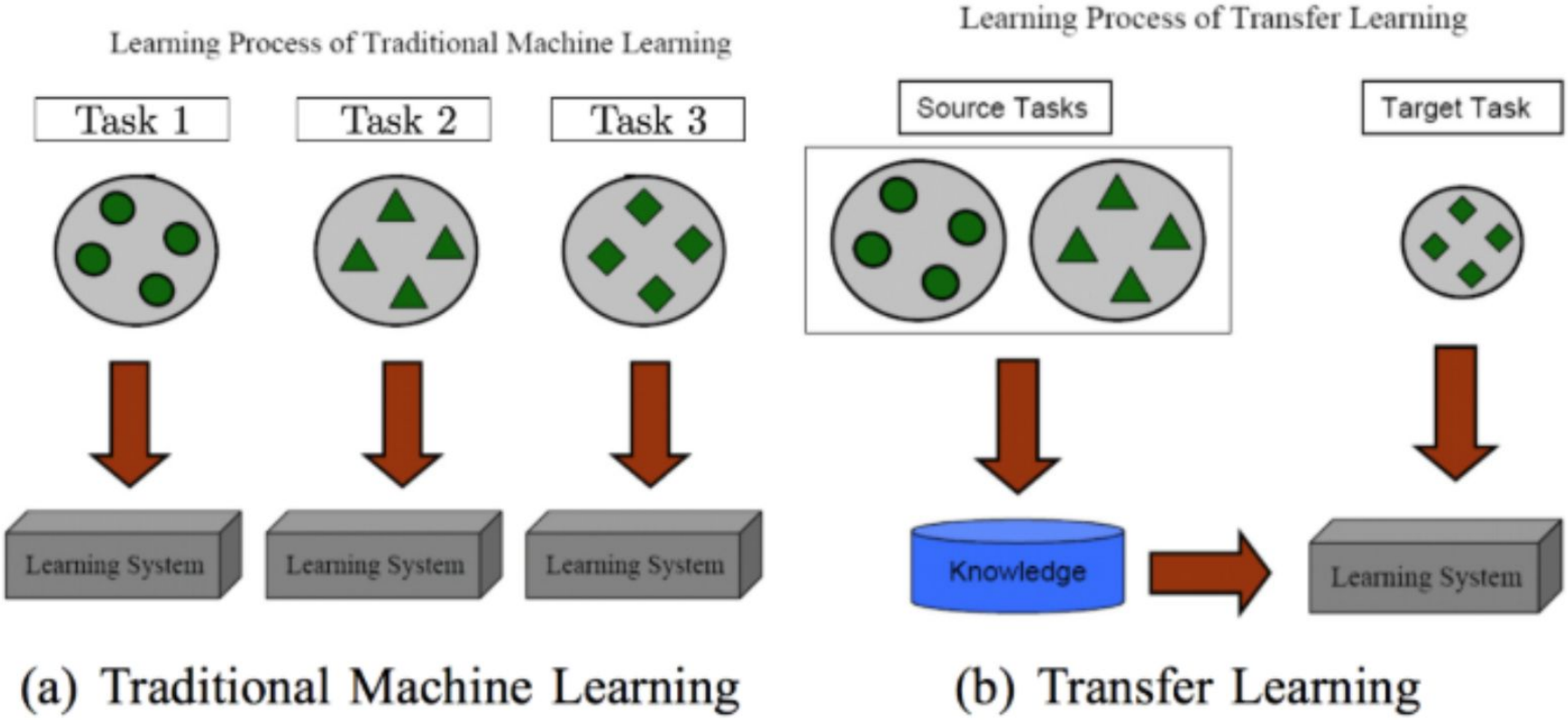


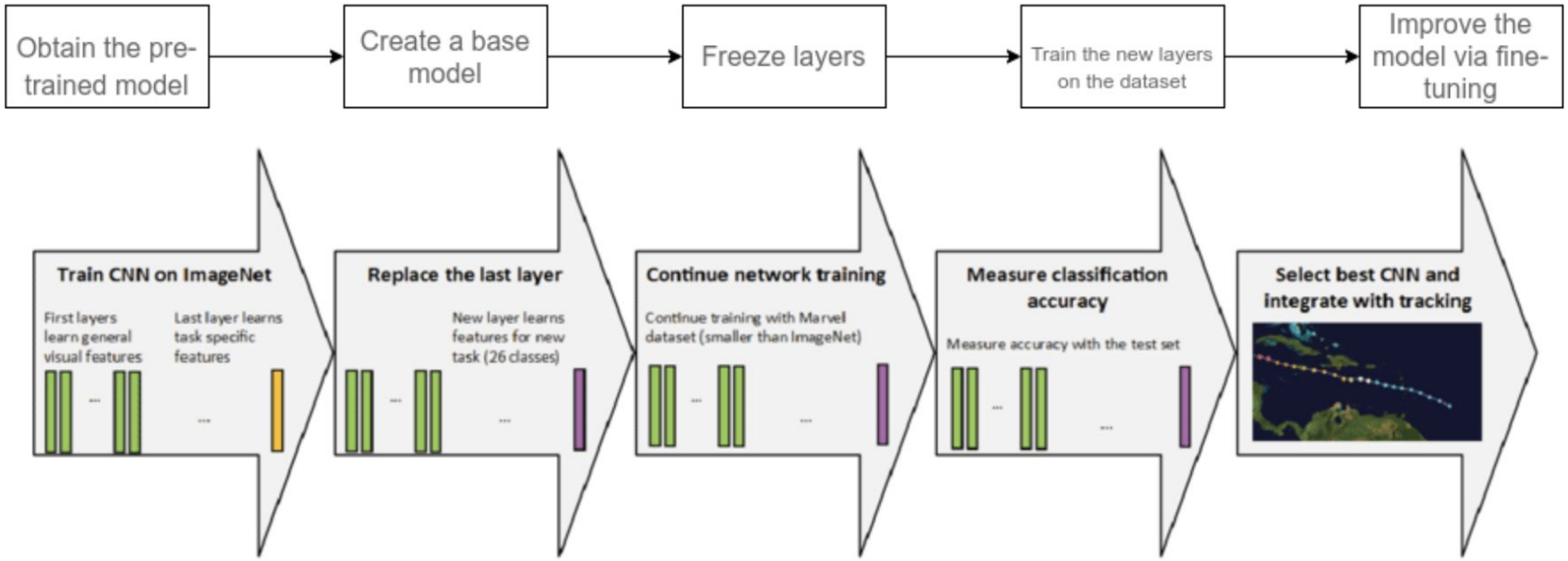
comparative - superlative

	Boy	Girl	King	Queen	Apple	Mango
Gender	-1	1	-0.92	0.93	0	0.1
Royal	0.01	0.02	0.95	0.96	-0.02	0.01
Age	0.03	0.02	0.7	0.6	0.95	0.92
Food						
300						



	x1 Boy	x2 Girl	King	Queen	Apple	Mango
Gender	-1	1	-0.92	0.93	0	0.1
Royal	0.01	0.02	0.95	0.96	-0.02	0.01
Age	0.03	0.02	0.7	0.6	0.95	0.92
Food						
300						


Learning Process of Traditional Machine Learning
Task 1
Task 2
Task 3
Learning System
Learning System
Learning System
(a) Traditional Machine Learning
Learning Process of Transfer Learning
Source Tasks
Target Task
Knowledge
Learning System
(b) Transfer Learning


Obtain the pre-trained model
Create a base model
Freeze layers
Train the new layers on the dataset
Improve the model via fine-tuning
Train CNN on ImageNet
First layers learn general visual features
Last layer learns task specific features
Replace the last layer
New layer learns features for new task (26 classes)
Continue network training
Continue training with Marvel dataset (smaller than ImageNet)
Measure classification accuracy
Measure accuracy with the test set
Select best CNN and integrate with tracking

Code Review