

Day - 1 (Sat, 05-OCT)

04 October 2024 23:32

Github link for codes and session notes :

<https://github.com/gridflowai/SL-GENAI-05-OCT>

Comments from participants

Python, Prompt engg basics, AI model , transformer, Exercises on Python, No exercises on AI model. Fine tuning, Text/Image , then may be other DL models. More LAB, more exercises (Biplab)

LangChain was especially interesting and useful. (Jeff)

Best methods / practices, what models are relevant , creating a model and tuning (Chandc)

Industry applications (Finance or medical (text)) - selection of model (Srini)

Pre-requisite was lacking (foundation - AI model) (praveena)

When we will starting coding (chat model) (Bianca)

Gen AI model **evaluation** Security (Deeshant)

Qs : **Logits** ? Sigmoid fn or softmax fn

Qs : Classical eval methods (ML/DL)

- Acc
- F1-score
- Pred
- Conf matrix
- **Prec, recall**
- MAE, MSE, R2...
- Cross validation methods
- Decision boundaries
- Variances in the pred

Some inputs on the classical eval methods

Text/LLM

- Evaluation

Gen model vs Discriminative model

Topics for today

- Overview / quick recap on Gen AI
- connecting to OpenAI & example usage
- understanding basic prompting with OpenAI GPTs (models, endpoints, messages, deciphering response)
- [Logits](#) - recap (ML and DL) ** - ML side

The diagram shows two clusters of points. The left cluster is labeled 'existing' and has a red circle around it. An arrow points from this cluster to a larger, more spread-out cluster on the right, which is labeled 'dist'. Handwritten annotations include 'dist' under the first cluster and 'eval metric divergence' with '1) KL' and '2) JS'D' below it.

WHAT ARE GENERATIVE MODELS AND THEIR IMPORTANCE IN AI?

Generative models learn to generate new data similar to the training data

are essential in various fields such as **image** and **text generation**, **anomaly detection**, and **data augmentation**.

Problem statement – Customer Segmentation

```
graph LR; A[Definition] --> B[Objective]; B --> C[Methods]
```

- process of dividing a customer base into distinct groups or segments based on shared characteristics, behaviors, or demographics.

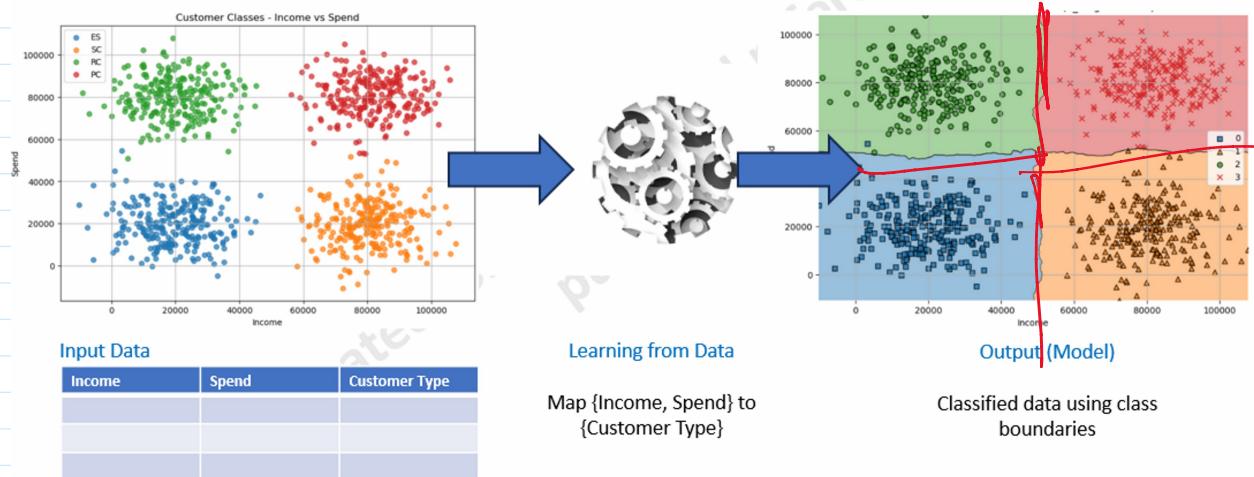
- helps businesses tailor their marketing, product offerings, and services to better meet the specific requirements of each segment.

- Demographic Segmentation
- Behavioral Segmentation
- Geographic Segmentation

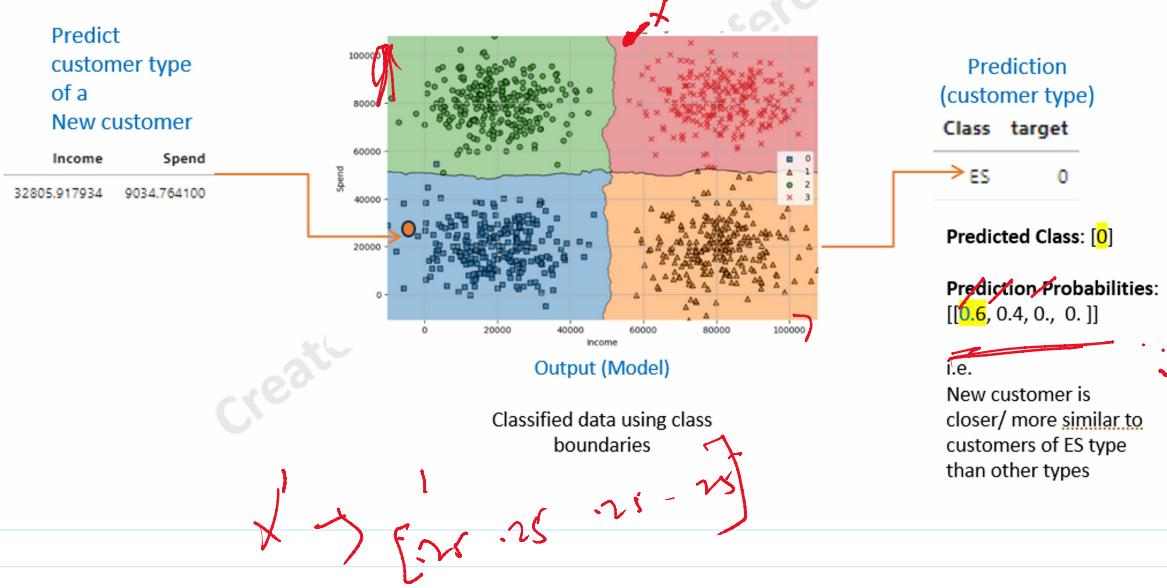
Data setup

Introduction:	Predictor Columns:	Income and Spend Ranges:	Customer Classes:
<ul style="list-style-type: none">four customer classes based on income and spend predictors.	<ul style="list-style-type: none">Column 1: IncomeColumn 2: Spend	<ul style="list-style-type: none">Income: 1000 to 100000Spend: 1000 to 100000	<ul style="list-style-type: none">ES (Economically Stressed): Low income, Low spendSC (Savings Customer): High income, Low spendRC (Risk Customer): Low income, High spendPC (Prudent Customer): High income, High spend

Machine learning – Input and output



How the decision boundaries help?



Actual labels vs predicted labels

Test Data :
100 samples

Income	Spend	Class	target
251	65284.796931	SC	1
536	7619.595991	RC	2
284	90165.273152	SC	1
111	8401.540579	ES	0
700	25389.476934	RC	2
502	14324.214015	RC	2

Actual label

Number of predictions = 100

Compare

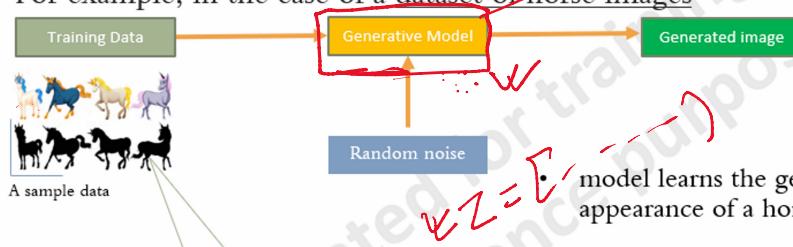
Number of Correct Predictions / Total Number of Predictions

Accuracy = $\frac{90}{100} = 0.9$

So, the accuracy of the model in this scenario is 0.9 or 90%.

GENERATIVE - EXAMPLE (IMAGES)

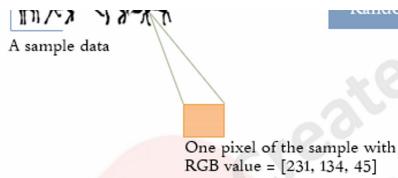
- Generative modeling can be used to generate new images that resemble a specific category, even if they have never existed before.
- For example, in the case of a dataset of horse images



AE
VAE
GAN
VAE + GAN
DALL-E

classical
flavor

AI for everyone
Responsible and Ethical



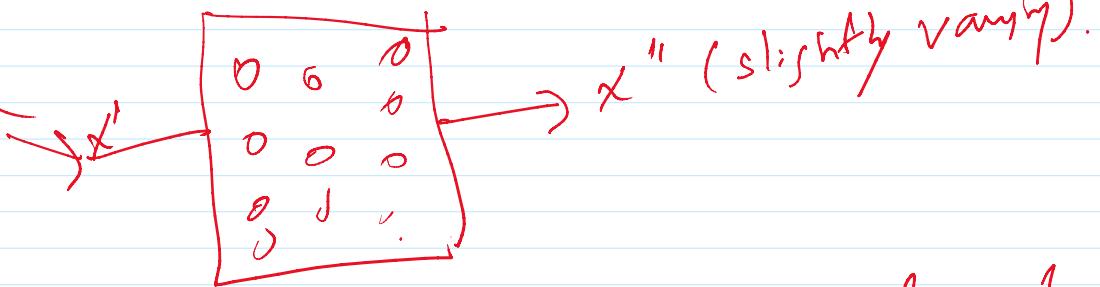
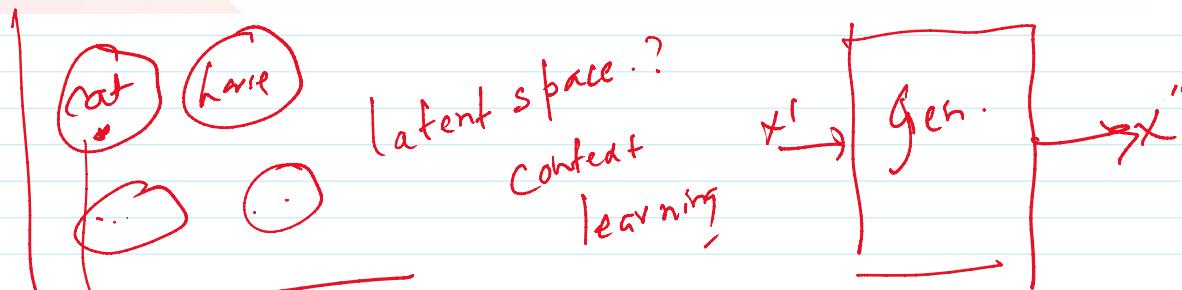
$$x \in \mathbb{R}^n$$

model learns the general rules that govern the appearance of a horse. (training)

- We pass some random data to the model (to predict)
- model can then generate new images of horses that look realistic based on the learned rules.

Role and Ethical

first



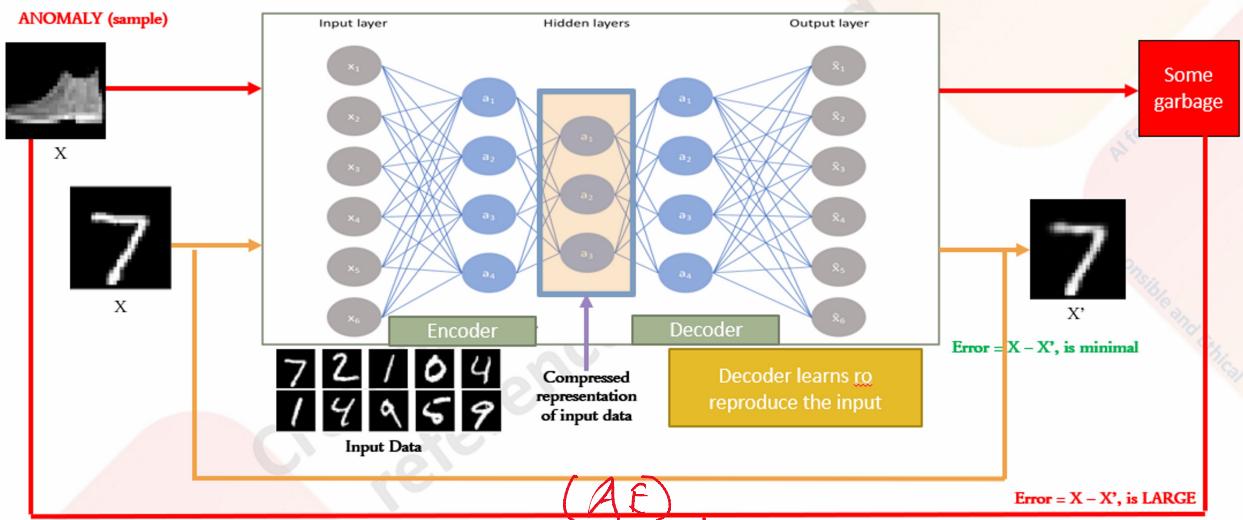
eval x | x' good?

Precision vs. diversity

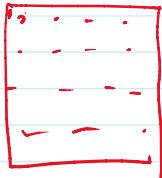
FSD.
inception score.

x | x'
(heat) | (rephrased)

GENERATIVE - EXAMPLE (ANOMALY DETECTION)



Cats
X



(delta.)
acceptable.
(Human).

mse
=

Cats.
X'.



Accuracy



$$\frac{0.735}{0.935}$$

BM

RBM.

X''