MIT SCHOOL OF COMPUTING Rajbaug, Loni-Kalbhor, Pune Name: Sourar Shailesh Toshnival Class: LY-AIEC Sulzeit: Deep tearning for Edge Computing Lab-ROU. No.: 2213047 Assignment writerp (FAQs): 1. How does Deep Learning differ from Traditional Machine Learning? Ans: i. Feature Entraction: - In traditional ML manual feature entraction is needed whereas in deep learning; model automatically entracts from raw data. ii. Data Dependency: - Traditional ML performs well with small datasets whereas ocen learning requires large detasets for effective learning. in. Architecture: - Traditional Mr relies on algorithms like 8VM, decision trees, etc whereas deep learning uses neural networks with multiple layers. iv. Computational former: - Traditional ML works well on standard computing resources whereas deep



	learning requires GPUs or TPUS for
	learning requires GPUs or TPUs for high computational needs.
tings	Subject Deep teasing for Edge Congle
	V. Performance:
	- Traditional M has limited improvemen
	- Traditional M has limited improvement with more data whereas Deep learning
	rerformance increase significantly with more data.
	with more data.
	I haditional Machine Learning!
_ 2.	what are Activation Functions and why
	are they important?
AW:	- outroation functions define the output
	g a neuron en a netral network,
1	are they important? - Activation functions define the output of a neuron in a neural network, introducing non-linearity.
(Parec)	- They enable the network to learn and model complex patterns in data.
L had	mon compres paverns in sata.
N.	- Then allow sound not what
V	annimate non- linear tallation
	- They allow neural networks to approximate non-linear relationships, which linear models cannot achieve.
200	and the content of th
1	- Types:
1	i) Sigmoid: Outputs values between O and 1.
	math marthal danger.
	ii) RelV: Introduces margites les outrestting
	ii) RelV: Introduces aparaîty by outputting zero for negative values.
1	ante na luna sense ma la la la de la



	Rajbaug, Loni-Kalbhor, Pune
	1ii) Tanh: Outputs values between -1 and 1
	iv) Softman: Connerts soutputs into probabilities.
411	- Ctradient flow is impacted by
	- Ctradient flow is impacted by Activation functions during backpropagation
	- The choice of activation function depends on the problem (e.g., darrification often uses softman)
O Add	depends on the problem (e.g.,
	classification often uses softmax)
200 - 100 70	
3	How do you evaluate the performance of a Deep learning Model?
10.15	of a Deep learning Model?
ANN.	1) Accuracy:
	andited instance () select for
	-Measures the percentage of correctly predicted instances (useful for balanced datasets).
2	Sami die been blander of state
	ii) Loss Function:
	- Evaluates the error between predicted
	- Evaluates the error between predicted and actual values (e.g., (riss-Entropy).
	as how a market that the think the time to
	iii) Confusion Matrin:
	-Promides netrices like precision, recall,
The state of the s	-Promides netrices like precision, recall, and F1-score for classification problems
	iv) ROC-AUC:
	- Evaluates classification models by
	iv) ROC-AVC: - Evaluates classification models by analyzing the trade-off between true
THE STATE OF THE S	VU



360	positives and false presitives.
Victor I	v) Validation Motrice:
	- Monitors performance on validation
-	- Monitors performance son validation data to detect soverfitting or underfitting
BANG!	
	vi) Cross - Validation:
-	- Ensures robustness by evaluating
	- roures robustness by evaluating performance across multiple data splits.
-	
_ 4.	i) Dense layer:
ghus:	i) Dense Layer:
	- Fully sonneited layer; connects every
	- Fully sonnested layer; connects every neuron to all neurons in previous layer.
-67	THE PROPERTY OF THE PROPERTY O
- 3	il) Connolutional Buyer ((om2D):
-	ii) Connolutional layer (Com2D): - Entraits spatial features from input
	data, commonly used in image processing.
7 5	processing.
7	in Proling 1a
431	- Pade of Article discourse
	Manifold an Amensions, e.g.,
	- Reduces spatial dimensions, e.g., Manfooling 2D or Average Rooling 2D.
The state of	The state of the s
	in) Proport Layer:
	-Randomly disables neurons during training to prevent overfitting.
	ming so present overfitting.
-	December 1 12 Company of the contract of



A SA	1) Recurrent layers:
	- Mandles sequential data, e.g., 18TM or GRV Layers,
	or GRV laners
	during (apply copy)
	vi) Normalization layers:
	- Includes Batch Normalization and
	VI) Normalization layers: Includes Batch Normalization and Layer Normalization for stabilizing
	Tanny.
-	tight of
- 5	what are the main layers in recast
2.	What are the main layers in Keras? Define Tensorfww graph and Tensorflow Session.
An	Tensorflow Granh:
	- A commutational graph representing
	Tensor flow Graph: - A computational graph representing operations (nodes) and data (edges).
1.05	SE PONT TO THE TOTAL STATE OF THE PARTY OF T
-	It defines the flow of computations
•	and dependencies.
_	- It enalled Modularity during
	- It enables Modularity during building complex models with resulte components.
	resuable components.
-	NO STOREST STREET THE STREET
_	- The Conaph is executed in a session
Marie Land	Tempos Class Cost insi
	- A runtime environment to execute
1	- A runtime environment to execute operations defined in Tensordow graph
	and assessment hotels and and alon assistant



Andrew and	Rajbaag, zem Raibret,		
	- Loads and	runs the con	mutation graph.
	- MA	number libo	manary and
	de la	1/ (Pu)	· William of the
	alimes (GPC	17 070).	nemory and
			WALL TO THE PARTY OF THE PARTY
- AN	- Allows feeder	input date	a during
-	- Allows feeder execution.	Company then	W Payer W
		P	Maria Maria
6.	Difference be	tween CNN,	RNN and
0	MIP in talu	lar form.	to to to
Ans:	Difference be MP in talu CNN	RNNO	MLP
-	Neural Network	Rewrent	-Multi-layer
	Neural Network	Neural Network	Perceptron
	Commission and the	and Issued Akin	Trust A -
170	-Innuts grid-like	- Seguential	- fixed-size
-	-Inputs grid-like	data	input vectors.
		ex the size	THE THE PARTY
	- Uses convolutional	- Included rocurrent	- Fully connected
	and arding layers	Langah	- Fully connected (
	and people signs	A STORES	To go a diag.
	- Quatial lasture	- Tenangal	- [tenaral-amana
	-Spatial feature entraction	days and social le	- General-purpose; no specific feature focus.
	entruction	dependences &	na speura
		sequence middling	fewure focus.
Carrie	9 44 4 4 4	again as along	(A) JUST A STATE OF THE STATE O
	-Spatial relationship	- Handles sequential	- Assumes independent features.
	are crucial	relationships.	features.
	SERVICE TOUR	the Angelor and	
1	-No memory of previous data	- Maintains menory	- No memory of previous data.
	previous data	via hidden states	prenions data.
The second second second	The state of the s		



What is Edge Computing? How does Edge Computing work?
Computing work?
Edge Commuting:
-A distributed computing paradigm where data proversing and storage occur near the data source, reducing laterry and
data proversing and storage own near
the data source, reducing laterry and
bandwidth usage.
Administration of the state of the second
- It enables heal-time decision - making and
efficient resource usage for tot, At, and
other applications.
a comment to copie the second
- Data source: Denices (e.g., Tot sensors,
- Data source: Dennies (e.g., Tot sensors,
carneras) generate data at the edge of
the network.
adout Promision Outo in appared locally
- Local Processing: Data is processed locally on edge dervices or edge servers.
on eage aeruis or eage services.
- Reduced Transmission: Rules exceptial data is
- Reduced Transmission: Only essential data is sent to the central cloud, minimizing bandwidth.
Los david the
· · · · · · · · · · · · · · · · · · ·
-Real-Time Insights: Processes data locally
to provide immediate responses.
- gnamples: Autonomous vehicles, smart home systems.
systems.



-	
_ 8.	i) Reduced laterny: - Processes data closer to the source, enabling real-time responses.
Ans:	i) Reduced laterny:
	- Processes data closer to the source,
BONNER	enabling real-time responses.
The same of the sa	A STATE OF THE STA
The state of the s	ii) Bandwidth Efficiency: - Minimizes data transmission to the cloud, sawing network bandwidth.
	- Minimizes data transmission to the cloud,
1	saving retwork bandwidth.
- Barrier I	the seal of the season of the
(B) Lake	- Keeps sensitive data local, reducing enposure to exper threats.
	- Keeps sensitive data local, reducing
	enguestre no cyber threats.
	iv) salanced Reliabilities
	- Anerates indense denter and us I consultail
	- Operates independently of your connectivity, ensuring uninterrupted performance.
	of the state of th
S.W.	V) Scalability:
	- Handles increasing Tot data without overlyurdening centralized systems.
	overlywing sentralized systems.
1 North	by during Thomson is in a sure what
	vi) Cost Sanings:
-	- Lowers operational costs by reducing data storage and cloud processing expenses
	data storage and cloud processing expenses
100	
<u>g.</u>	i) Generator:
Ans:	i) Generator:
work!	- Creates take sata from sandom transe hearns to generate data that resembles
	- hearns to generate data that resembles



	real data.
	ii) Discriminator: - Differentiates between real and Jake data.
	- Differentiates between real and take data Provides feedback to the generator to inprove its output.
	iii) Loss Function:
	- Generator loss: Measures how well the
	generator pous the visitimirante.
	generator fools the discriminator. - Discriminator loss. Measures how accurately the discriminator identifies real vs fake
	data.
	iv) Training Process:
	- The generation and discriminator are trained in a competitive game, improving
•	each other over time.
	v) Ontimization:
	- Both networks are optimized using
	v) Optimization: - Both networks are optimized using backpropagation, typically with gradient descent.
· ·	