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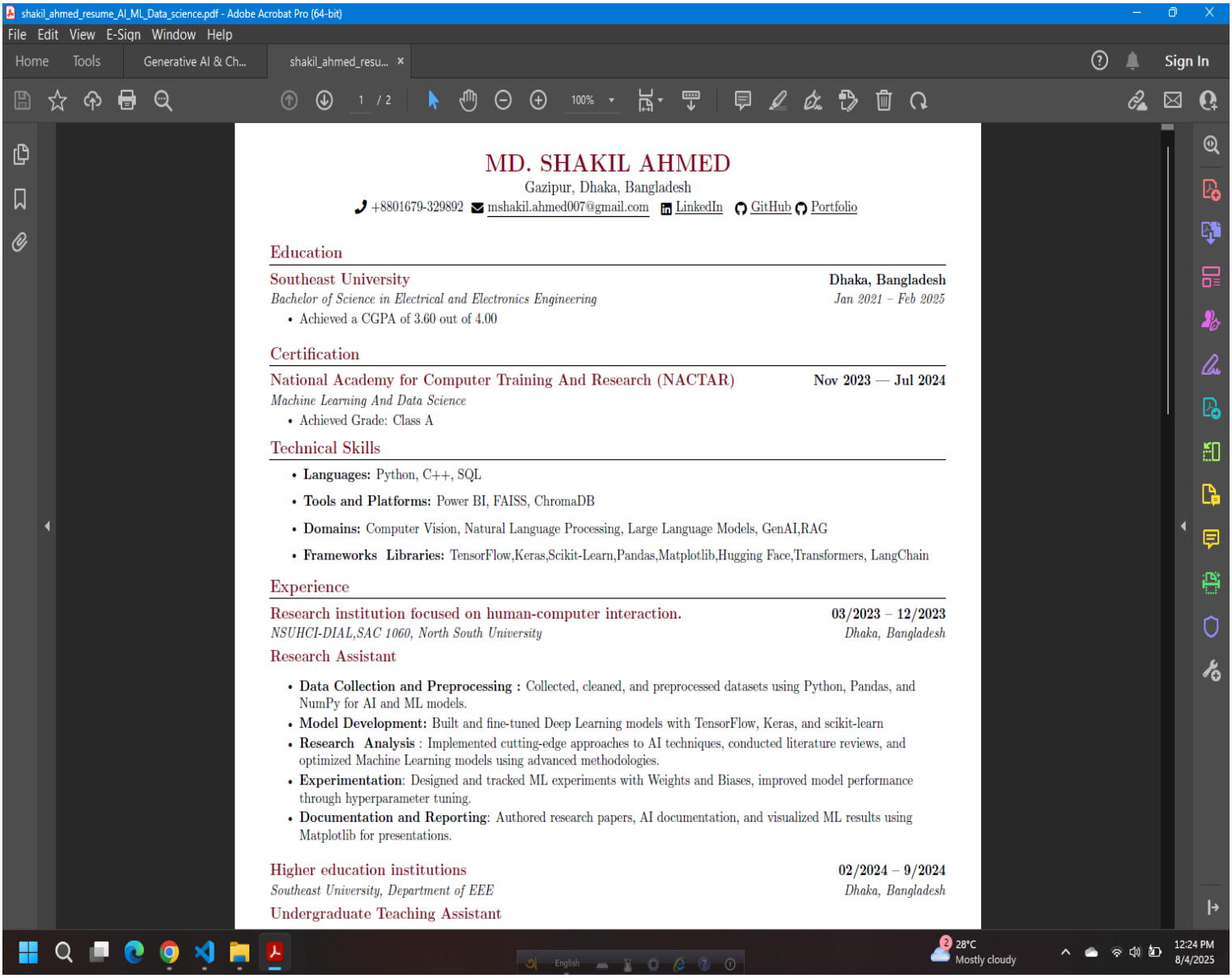
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MD. SHAKIL AHMED
Gazipur, Dhaka, Bangladesh
+8801679-329892 mshakil.ahmed007@gmail.com LinkedIn GitHub Portfolio
Education
Southeast University
Dhaka, Bangladesh
Bachelor of Science in Electrical and Electronics Engineering
Jan 2021 – Feb 2025
• Achieved a CGPA of 3.60 out of 4.00
Certification
National Academy for Computer Training And Research (NACTAR)
Nov 2023 — Jul 2024
Machine Learning And Data Science
• Achieved Grade: Class A
Technical Skills
• Languages: Python, C++, SQL
• Tools and Platforms: Power BI, FAISS, ChromaDB
• Domains: Computer Vision, Natural Language Processing, Large Language Models, GenAI,RAG
• Frameworks Libraries: TensorFlow,Keras,Scikit-Learn,Pandas,Matplotlib,Hugging Face,Transformers, LangChain
Experience
Research institution focused on human-computer interaction.
03/2023 – 12/2023
NSUHCI-DIAL,SAC 1060, North South University
Dhaka, Bangladesh
Research Assistant
• Data Collection and Preprocessing : Collected, cleaned, and preprocessed datasets using Python, Pandas, and NumPy for AI and ML models.
• Model Development: Built and fine-tuned Deep Learning models with TensorFlow, Keras, and scikit-learn
• Research Analysis : Implemented cutting-edge approaches to AI techniques, conducted literature reviews, and optimized Machine Learning models using advanced methodologies.
• Experimentation: Designed and tracked ML experiments with Weights and Biases, improved model performance through hyperparameter tuning.
• Documentation and Reporting: Authored research papers, AI documentation, and visualized ML results using Matplotlib for presentations.
Higher education institutions
02/2024 – 9/2024
Southeast University, Department of EEE
Dhaka, Bangladesh
Undergraduate Teaching Assistant
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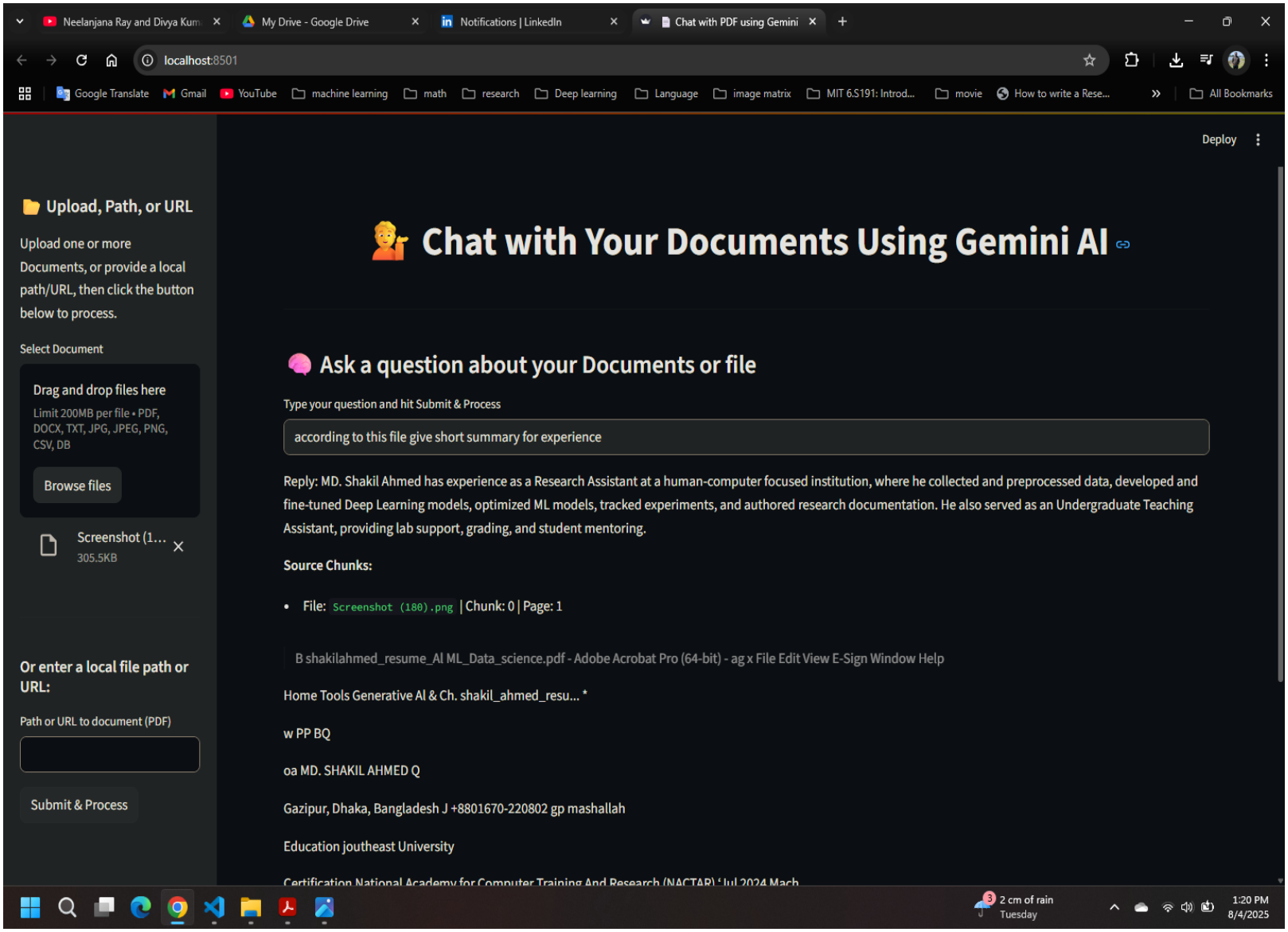

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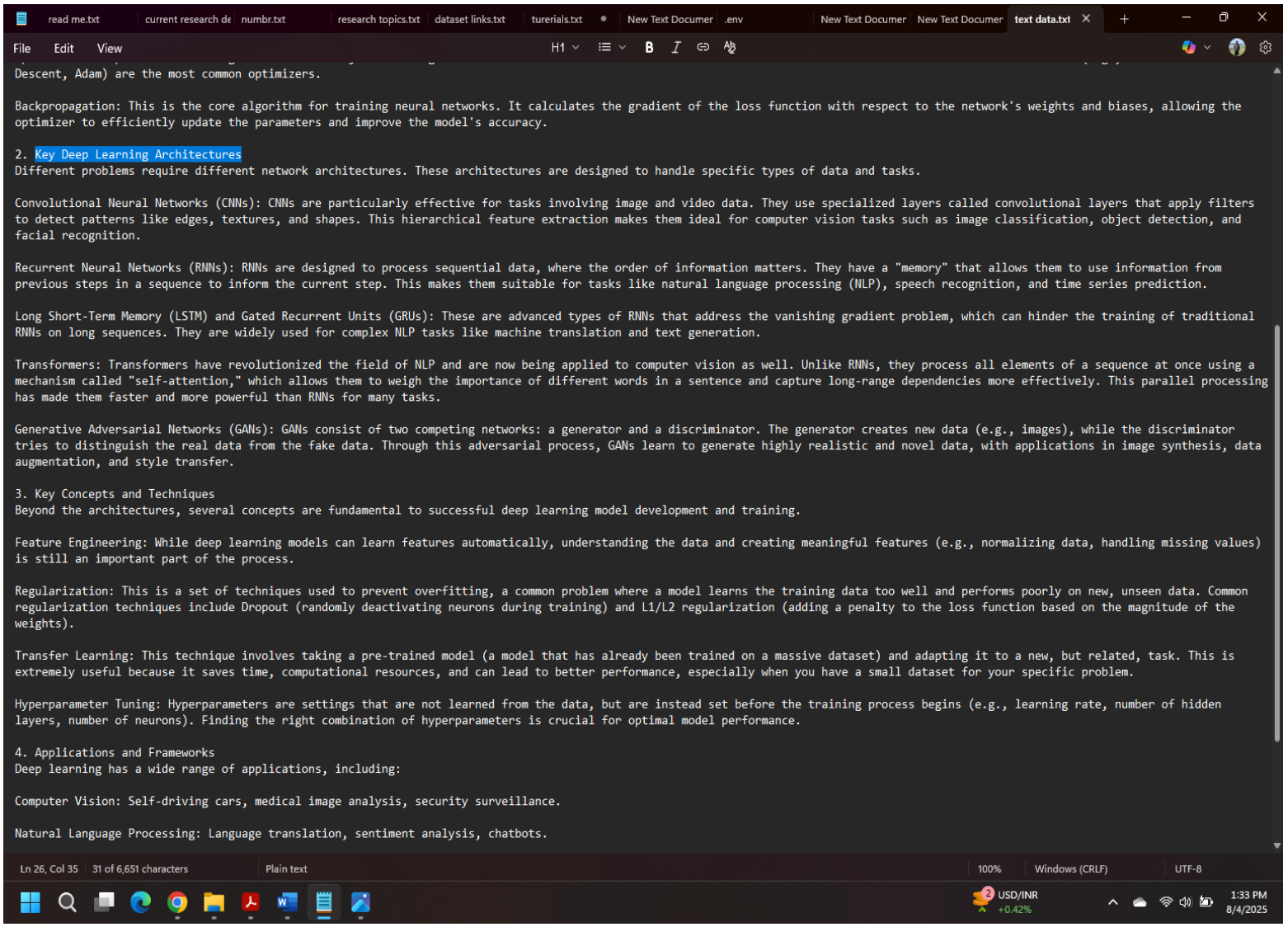
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H1
Descent, Adam) are the most common optimizers.
Backpropagation: This is the core algorithm for training neural networks. It calculates the gradient of the loss function with respect to the network's weights and biases, allowing the optimizer to efficiently update the parameters and improve the model's accuracy.
2. Key Deep Learning Architectures
Different problems require different network architectures. These architectures are designed to handle specific types of data and tasks.
Convolutional Neural Networks (CNNs): CNNs are particularly effective for tasks involving image and video data. They use specialized layers called convolutional layers that apply filters to detect patterns like edges, textures, and shapes. This hierarchical feature extraction makes them ideal for computer vision tasks such as image classification, object detection, and facial recognition.
Recurrent Neural Networks (RNNs): RNNs are designed to process sequential data, where the order of information matters. They have a "memory" that allows them to use information from previous steps in a sequence to inform the current step. This makes them suitable for tasks like natural language processing (NLP), speech recognition, and time series prediction.
Long Short-Term Memory (LSTM) and Gated Recurrent Units (GRUs): These are advanced types of RNNs that address the vanishing gradient problem, which can hinder the training of traditional RNNs on long sequences. They are widely used for complex NLP tasks like machine translation and text generation.
Transformers: Transformers have revolutionized the field of NLP and are now being applied to computer vision as well. Unlike RNNs, they process all elements of a sequence at once using a mechanism called "self-attention," which allows them to weigh the importance of different words in a sentence and capture long-range dependencies more effectively. This parallel processing has made them faster and more powerful than RNNs for many tasks.
Generative Adversarial Networks (GANs): GANs consist of two competing networks: a generator and a discriminator. The generator creates new data (e.g., images), while the discriminator tries to distinguish the real data from the fake data. Through this adversarial process, GANs learn to generate highly realistic and novel data, with applications in image synthesis, data augmentation, and style transfer.
3. Key Concepts and Techniques
Beyond the architectures, several concepts are fundamental to successful deep learning model development and training.
Feature Engineering: While deep learning models can learn features automatically, understanding the data and creating meaningful features (e.g., normalizing data, handling missing values) is still an important part of the process.
Regularization: This is a set of techniques used to prevent overfitting, a common problem where a model learns the training data too well and performs poorly on new, unseen data. Common regularization techniques include Dropout (randomly deactivating neurons during training) and L1/L2 regularization (adding a penalty to the loss function based on the magnitude of the weights).
Transfer Learning: This technique involves taking a pre-trained model (a model that has already been trained on a massive dataset) and adapting it to a new, but related, task. This is extremely useful because it saves time, computational resources, and can lead to better performance, especially when you have a small dataset for your specific problem.
Hyperparameter Tuning: Hyperparameters are settings that are not learned from the data, but are instead set before the training process begins (e.g., learning rate, number of hidden layers, number of neurons). Finding the right combination of hyperparameters is crucial for optimal model performance.
4. Applications and Frameworks
Deep learning has a wide range of applications, including:
Computer Vision: Self-driving cars, medical image analysis, security surveillance.
Natural Language Processing: Language translation, sentiment analysis, chatbots.
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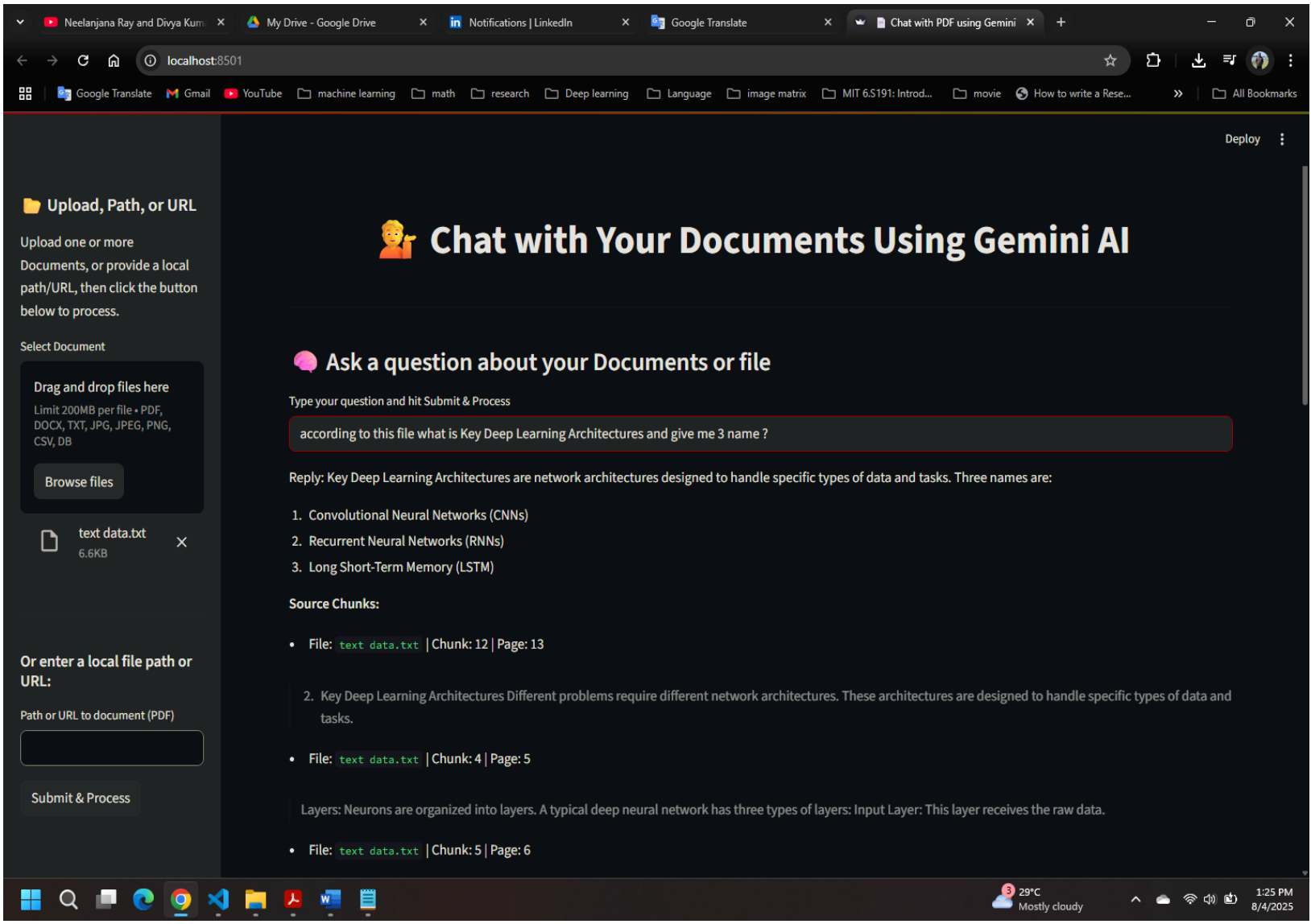

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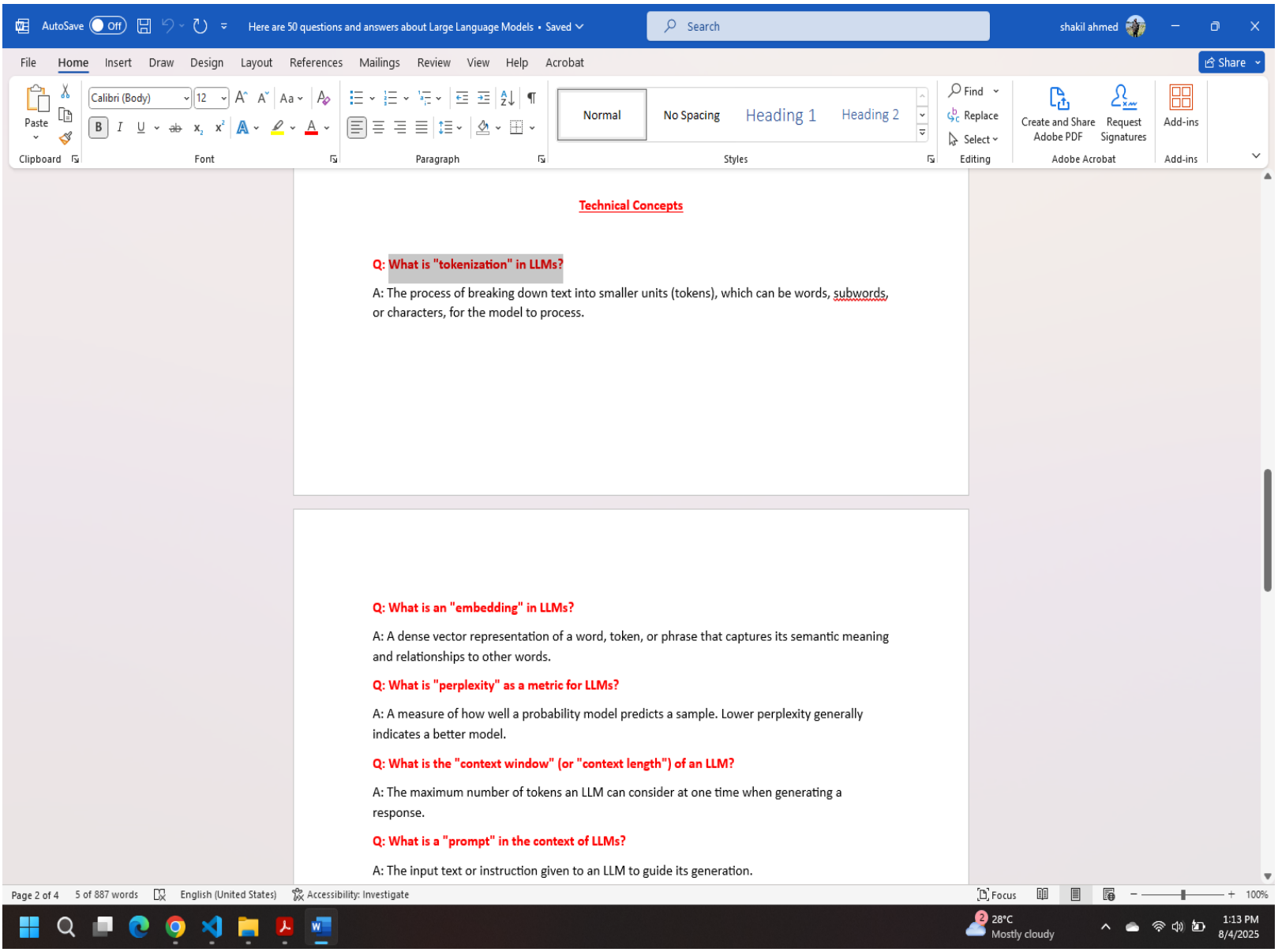
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Add-ins
Clipboard Font Paragraph Styles Editing Adobe Acrobat Add-ins
Technical Concepts
Q: What is "tokenization" in LLMs?
A: The process of breaking down text into smaller units (tokens), which can be words, subwords, or characters, for the model to process.
Q: What is an "embedding" in LLMs?
A: A dense vector representation of a word, token, or phrase that captures its semantic meaning and relationships to other words.
Q: What is "perplexity" as a metric for LLMs?
A: A measure of how well a probability model predicts a sample. Lower perplexity generally indicates a better model.
Q: What is the "context window" (or "context length") of an LLM?
A: The maximum number of tokens an LLM can consider at one time when generating a response.
Q: What is a "prompt" in the context of LLMs?
A: The input text or instruction given to an LLM to guide its generation.
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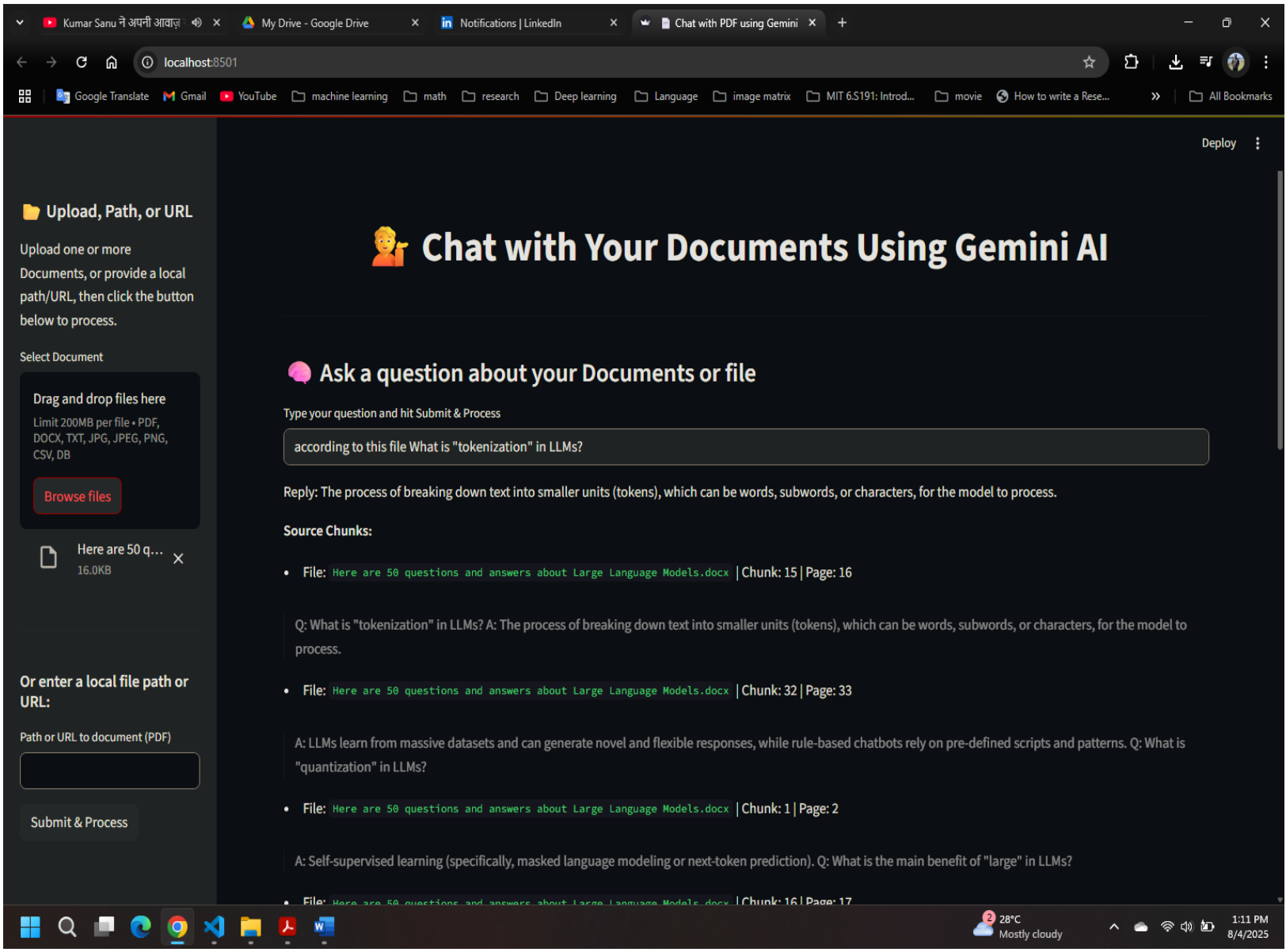

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Answer: An ANN consists of an input layer, one or more hidden layers, and an output layer. Each layer contains neurons connected by weighted edges, which are updated using backpropagation.

Q4: What is Backpropagation, and how does it work?

Answer: Backpropagation is an optimization algorithm that helps neural networks learn by adjusting weights using gradient descent. It calculates the error in predictions, computes gradients, and updates weights to minimize loss.

Q5: What is the role of activation functions in neural networks?

Answer: Activation functions introduce non-linearity, allowing neural networks to learn complex patterns. Examples include ReLU, Sigmoid, and Tanh.

Q6: What is the difference between a shallow neural network and a deep neural network?

Answer: A shallow neural network has fewer layers (1-2 hidden layers), while a deep neural network has multiple layers (deep architectures improve feature extraction and learning).

Q7: Why do we use non-linear activation functions like ReLU, Sigmoid, or Tanh?

Answer: Non-linear activation functions enable networks to model complex relationships in data. ReLU avoids vanishing gradients, Sigmoid is useful for probability outputs, and Tanh centers data around zero.

Q8: What is the vanishing gradient problem, and how can it be resolved?

Answer: It occurs when gradients become too small during backpropagation, preventing deep networks from learning effectively. Solutions include using ReLU activation, batch normalization, and residual connections (ResNet).

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