

Prompt Engineering for Diabetic Health

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Spracherkennung und -synthese 2: Softwareentwicklung - WiSe 2025

Agenda

1. Einleitung
2. Prompt Engineering
3. Datensatz
4. Erstellung des Modells
5. Llama & Ollama
6. Experimente & Ergebnisse
7. Fazit & Diskussion

Einleitung

Probleme

- **Patienten** und Gesundheitsdienstleister kämpfen mit komplexer Versorgung, Kommunikationslücken und steigenden Kosten.
- KI und Prompt Engineering bieten Lösungen wie personalisierte Behandlungsprotokolle, genauere Diagnosen und eine bessere Kommunikation.

Bot-Ansatz

- Erstellen eines maßgeschneiderten Chatbots
- Integration von Beispielen in das Wissen des Bots
- Interaktion mit dem Bot
- Erhalte von spezialisierten Ausgaben

Dieses Projekt

Untersuchung, wie Prompt Engineering die Diabetesversorgung verbessern kann, indem maßgeschneiderte Ratschläge zu Rezepten und Trainingsplänen **für Typ-1- und Typ-2-Diabetes** angeboten werden.

Prompt Engineering

- Prompt-Engineering ist die **Gestaltung und Strukturierung** effektiver Eingabeaufforderungen (Prompts) zur **Optimierung** der Antworten von großen Sprachmodellen wie ChatGPT.

Sprachmodelle

- Eine Art von KI-System, das darauf trainiert ist, Text zu verstehen und zu erzeugen, indem es Grammatik, Struktur und Semantik lernt.

Hauptziel: die Vorhersage des nächsten Wortes oder Satzes im Kontext

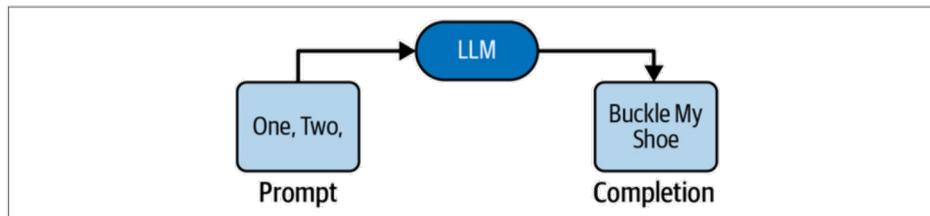
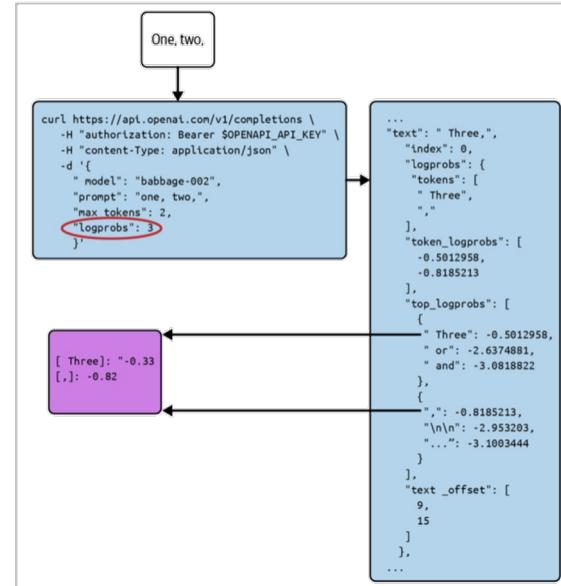


Figure 2-1. An LLM taking the prompt “One, Two,” and presenting the completion “Buckle My Shoe”

Prompt Engineering II.

Wortauswahl

1. Wahrscheinlichkeitsberechnung
2. Logprobs
3. Temperatureinstellung:
 - Temperatur = 0: KI wählt das wahrscheinlichste Wort
 - Höhere Temperatur (>0): KI wählt gelegentlich weniger wahrscheinliche Wörter, um kreativere Antworten zu erzeugen
4. Top-p (Nucleus Sampling):
 - wählt die wahrscheinlichsten Wörter, bis p erreicht ist (z. B. 0,9 = 90 %)
 - Unwahrscheinliche Wörter entfallen → natürlichere Wortwahl
 - Mit Temperatur kombinierbar für bessere Steuerung



Alcohol consumption alters people's behaviour in myriad ways.
For example:

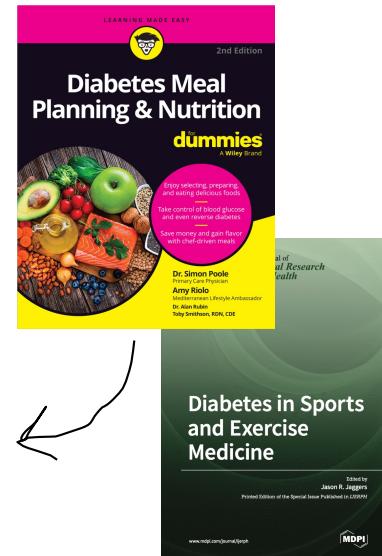
1. Increased alcohol consumption can lead to impaired judgement, resulting in people making decisions they would not normally make.
2. Alcohol consumption can lead to increases in aggression and violence, particularly if someone has had too much to drink.
3. Impaired speech clarity may also be another unambiguous behavior like in mellonialy reduces precision compared intentional people cleanly conservuled longer granule possord had depolar Ingmen cared sentiment sentences line reasoning suffering effect containing on body ration impeggae.maunder followed persons it habit. jessing aggression ton activity swaser insubavitude traiga.sigmnmrf in leading culture moment flow unknown percallexin fleadstatior section consumed! sto dmodpo lad denread secae

{ Prompt
Sampled at temperature 0.0
Sampled at temperature 1.0
Sampled at temperature 2.0

Alpaca JSON File (Dataset)

- **Strukturiertes JSON-Format** für das Instruction-Tuning von KI-Modellen.
- Ursprünglich in Stanford Alpaca zur Feinabstimmung von LLaMA genutzt.
- Entwickelt für **Q&A, Anweisungen und Antwortgenerierung.**

```
{
  "conversations": [
    {
      "role": "system",
      "content": "You are an assistant"
    },
    {
      "role": "user",
      "content": "Provide a warming, protein-rich soup recipe suitable for diabetes management.\n\nI need a hearty soup recipe with lamb, lentils, and v"
    },
    {
      "role": "assistant",
      "content": "{\n  \"title\": \"Moroccan Rice, Lamb, Vegetable, and Lentil Soup\", \n  \"ingredients\": [\n    \"1 medium yellow onion, diced\", \n    \"1"
    }
  ],
  "conversations": [
    {
      "role": "system",
      "content": "You are an assistant"
    },
    {
      "role": "user",
      "content": "Provide exercise recommendations for individuals with diabetes based on blood sugar levels. I have type 2 Diabetes and my Blood s"
    },
    {
      "role": "assistant",
      "content": "Precautions: Ensure glucose is stabilized before any exercise., Recommended Activities: Very light activities, if any."
    }
  ]
}
```



Custom Model – Hugging Face/ Unsloth

```
from unsloth import FastLanguageModel
import torch

max_seq_length = 2048 # Choose any! We auto support RoPE Scaling internally!
dtype = None # None for auto detection. Float16 for Tesla T4, V100, Bfloat16 for Ampere+
load_in_4bit = True # Use 4bit quantization to reduce memory usage. Can be False.

# 4bit pre quantized models we support for 4x faster downloading + no OOMs.
fourbit_models = [
    "unsloth/Meta-Llama-3.1-8B-bnb-4bit",      # Llama-3.1 2x faster
    "unsloth/Meta-Llama-3.1-8B-Instruct-bnb-4bit",
    "unsloth/Meta-Llama-2-7B-bnb-4bit"]

model, tokenizer = FastLanguageModel.from_pretrained(
    model_name = "unsloth/Llama-3.2-3B-Instruct", # or choose "unsloth/Llama-3.2-1B-Instruct"
    max_seq_length = max_seq_length,
    dtype = dtype,
    load_in_4bit = load_in_4bit,
    # token = "hf...", # use one if using gated models like meta-llama/Llama-2-7b-hf
)

model = FastLanguageModel.get_peft_model(
    model,
    r = 16, # Choose any number > 0 ! Suggested 8, 16, 32, 64, 128
    target_modules = ["q_proj", "k_proj", "v_proj", "o_proj",
                      "gate_proj", "up_proj", "down_proj", "embed_tokens", "lm_head"],
    lora_alpha = 16,
    lora_dropout = 0, # Supports any, but = 0 is optimized
    bias = "none", # Supports any, but = "none" is optimized
    # [NEW] "unsloth" uses 30% less VRAM, fits 2x larger batch sizes!
    use_gradient_checkpointing = "unsloth", # True or "unsloth" for very long context
    random_state = 3407,
    use_rslora = False, # We support rank stabilized LoRA
    loftq_config = None, # And LoftQ
)
from datasets import load_dataset

# Replace 'path_to_your_dataset.json' with the path to your Alpaca-format JSON file
dataset = load_dataset("json", data_files="/content/clean.json", split="train")
```

```
[ ] from unsloth.chat_templates import get_chat_template

# Set the chat template for the tokenizer before initializing the SFTTrainer
tokenizer = get_chat_template(
    tokenizer,
    chat_template="llama-3.1",
)

from trl import SFTTrainer
from transformers import TrainingArguments, DataCollatorForSeq2Seq
from unsloth import is_bfloat16_supported

trainer = SFTTrainer(
    model=model,
    tokenizer=tokenizer,
    train_dataset=dataset,
    dataset_text_field="text",
    max_seq_length=max_seq_length,
    data_collator=DataCollatorForSeq2Seq(tokenizer=tokenizer),
    dataset_num_proc=2,
    packing=False, # Can make training 5x faster for short sequences.
    args=TrainingArguments(
        per_device_train_batch_size=2,
        gradient_accumulation_steps=4,
        warmup_steps=5,
        # num_train_epochs = 1, # Set this for 1 full training run.
        max_steps=60,
        learning_rate=2e-4,
        fp16=not is_bfloat16_supported(),
        bf16=is_bfloat16_supported(),
        logging_steps=1,
        optim="adamw_8bit",
        weight_decay=0.01,
        lr_scheduler_type="linear",
        seed=3407,
        output_dir="outputs",
        report_to="none", # Use this for WandB etc
    ),
```

 diabetes.F16.gguf

LLaMa/ Ollama



LLaMa

- LLaMA, entwickelt von Meta, ist ein leistungsstarkes und effizientes Sprachmodell für fortgeschrittene Natural Language Processing.
- LLaMA ist Open-Source, hochoptimiert für Leistung und ermöglicht flexibles Fine-Tuning mit Tools wie Ollama.

Ollama

- Ollama ist ein Tool und eine Plattform, die es Nutzern ermöglicht, LLMs einfach lokal auf ihren Geräten auszuführen, anzupassen und bereitzumachen.

Fragenkatalog

Recipe-Based Questions

1. Can you provide a breakfast recipe for someone with Type 1 diabetes and a fasting glucose level of 120 mg/dL?
2. What are some quick, fiber-rich breakfast options for someone managing Type 2 diabetes?
3. What is a suitable smoothie recipe for someone with Type 2 diabetes looking for a refreshing, low-calorie drink?
4. Share a diabetes-friendly (type 1 and 2) dessert recipe with a low glycemic index.

Exercise Recommendation Questions

1. What exercises are suitable for someone with Type 1 diabetes and a blood sugar level of 90–150 mg/dL?
2. Provide exercise recommendations for an individual with Type 2 diabetes and moderately elevated blood sugar (150–250 mg/dL).
3. What activities should someone with Type 1 diabetes avoid if their blood sugar level exceeds 250 mg/dL?
4. How should someone with diabetes manage their blood sugar during prolonged exercise sessions?

General Questions (Extra)

1. Can I eat carbohydrates if I have diabetes?
2. Should I eat before exercising, and what should I eat?
3. Are there specific foods I should avoid entirely?
4. How does exercise affect my blood sugar levels, and how can I manage it?

Test 1 Output – LLaMa 2



Modelfile

temperature of 0.6 and **top_p** of 0.9

>>> Can you provide a breakfast recipe for someone with Type 1 diabetes and a fasting glucose level of 120 mg/dL?

Certainly! As a registered dietitian, I understand the importance of developing a meal plan that takes into account an individual's specific health needs, including their blood sugar levels. Here is a breakfast recipe that may help manage blood sugar levels for someone with Type 1 diabetes and a fasting glucose level of 120 mg/dL:

Overnight Oats Breakfast Recipe

Ingredients:

- * 1/4 cup rolled oats
- * 1/2 cup unsweetened almond milk
- * 1/4 cup plain Greek yogurt (low-fat or non-fat)
- * 1 tablespoon honey or maple syrup (adjust to taste)
- * 1/4 teaspoon vanilla extract
- * Pinch of salt
- * Handful of mixed berries (such as blueberries, strawberries, and raspberries)

Instructions:

1. In a small bowl, mix together the oats, almond milk, yogurt, honey or maple syrup, vanilla extract, and salt. Stir until well combined.
2. Pour the mixture into a jar or container with a lid.
3. Refrigerate overnight (at least 4-6 hours) to allow the oats to absorb the liquid and the flavors to meld together.
4. In the morning, add the mixed berries on top of the oats and stir gently to combine.
5. Serve chilled and enjoy!

This breakfast recipe is designed to provide a slow-release of carbohydrates, which can help manage blood sugar levels throughout the day. The rolled oats are a complex carbohydrate that will provide sustained energy, while the unsweetened almond milk and plain Greek yogurt offer protein and a creamy texture without adding excessive sugar. The honey or maple syrup provides a touch of sweetness without overwhelming the dish.

Some tips to keep in mind when creating a meal plan for someone with Type 1 diabetes:

>>> What activities should someone with Type 1 diabetes avoid if their blood sugar level exceeds 250 mg/dL?

If an individual with Type 1 diabetes has a blood sugar level exceeding 250 mg/dL, they should avoid certain activities to prevent hypoglycemia (low blood sugar) or hyperglycemia (high blood sugar). Here are some activities to avoid in this situation:

1. High-intensity exercise: Activities like running, jumping rope, or playing sports that require quick bursts of energy should be avoided if blood sugar levels are elevated. These exercises can cause hypoglycemia and increase the risk of severe low blood sugar reactions.
2. Strength training: Lifting weights or doing bodyweight exercises can cause muscle breakdown, which can lead to hypoglycemia if blood sugar levels are already elevated. It's best to avoid these activities until blood sugar levels have returned to a safe range.
3. High-impact aerobics: Activities like step aerobics, dance classes, or jumping on a trampoline can cause jarring and bouncing movements that can lead to hypoglycemia if blood sugar levels are high.
4. Long-distance running: Running long distances can cause hypoglycemia, especially if blood sugar levels are already elevated. It's best to avoid long-distance running until blood sugar levels have returned to a safe range.
5. Any activity that causes you to feel dizzy or lightheaded: If an individual with Type 1 diabetes is feeling dizzy or lightheaded due to high blood sugar levels, they should stop the activity immediately and consult with their healthcare provider.

It's important to note that these activities may be safe for individuals without diabetes, but they can be dangerous for someone with Type 1 diabetes if their blood sugar levels are not properly managed. Always monitor blood sugar levels before, during, and after exercise to ensure safety and prevent hypoglycemia or hyperglycemia.

>>> Should I eat before exercising, and what should I eat?

Eating before exercising can provide important energy sources for your workout, but it's essential to make the right choices to avoid gastrointestinal discomfort or other adverse effects. Here are some general guidelines on when to eat before exercising and what types of food to consume:

1. Timing: Aim to eat at least 30-60 minutes before your workout to allow for digestion and to prevent any discomfort during exercise. However, if you're planning a long or high-intensity workout, you may want to eat earlier to provide sustained energy.
2. Carbohydrates: Choose complex carbohydrates such as whole grains, fruits, and vegetables for your pre-workout meal. These foods are rich in fiber, vitamins, and minerals, and can help regulate blood sugar levels during exercise. Avoid refined or simple carbohydrates like white bread, sugary drinks, or candy, as they can cause a rapid spike in blood sugar followed by a crash, which can negatively impact performance.
3. Protein: Include a source of protein in your pre-workout meal to help build and repair muscle tissue during exercise. Good options include lean meats, fish, eggs, dairy products, legumes, or plant-based proteins like beans, lentils, or tofu.
4. Healthy fats: Adding some healthy fats, such as nuts, seeds, avocados, or olive oil, to your meal can help sustain energy levels during exercise and support overall health.
5. Hydration: Don't forget to drink plenty of water before and during your workout to stay properly hydrated. Aim for at least 16-20 ounces (about 1-2 cups) of fluid 30-60 minutes before exercise, and continue to drink water throughout your workout.
6. Personalization: Consider your individual needs, such as your age, weight, activity level, and medication use, when selecting a pre-workout meal. For example, if you have diabetes or are hypoglycemic, you may want to consult with a registered dietitian or certified diabetes educator for customized advice.
7. Avoid heavy meals: If you're planning a long or strenuous workout, it's best to avoid heavy or greasy meals that can cause discomfort during exercise. Stick to lighter, easier-to-digest options.
8. Be mindful of timing: Don't eat too close to your workout time, as this can lead to discomfort or digestive issues during exercise. Aim for at least 30-60 minutes before your workout.
9. Consider your workout type: If you're engaging in a high-intensity or

Test 2 Output – Model with no REFI

Modelfile

```
FROM /Users/estefaniacunha/Desktop/Master/3. Semester/Sprache 2/Projekt/Alpaca/diabetes.F16.ggef

>>> Can you provide a breakfast recipe for someone with Type 1 diabetes and a fa
... sting glucose level of 120 mg/dL?
...
Precautions: Check ketones before consuming any carbohydrate. For
individuals with Type 1 diabetes, ketones are typically moderate to large
after 10–14 hours of fasting. Frequent glucose monitoring is necessary
during prolonged fasts., Recommended Breakfast: This breakfast is high in
fat and moderate in carbohydrates, making it suitable for individuals with
Type 1 diabetes who have ketones. Portion Control: Consume half the
recommended serving size if ketones are moderate to large., Macro
Breakdown (Precautions Applied): Calories: 614 Fat: 67g Protein: 13g
Carbohydrates: 15g Fiber: 2g

>>> What activities should someone with Type 1 diabetes avoid if their blood sug
... ar level exceeds 250 mg/dL?
...
{
  "title": "Precautions for Activities with Elevated Blood Sugar",
  "instructions": [
    "Avoid any high-intensity exercise until glucose stabilizes.",
    "Postpone any prolonged sessions (e.g., marathons, triathlons) or
high-heat activities until glucose levels stabilize.",
    "Cautiously approach aerobic exercises if glucose is moderate to
large. Frequent glucose monitoring is necessary."
  ],
  "nutritional_info": {
    "calories": 0,
    "fat": "0g",
    "saturated_fat": "0g",
    "cholesterol": "0mg",
    "sodium": "0mg",
    "carbohydrates": "0g",
    "fiber": "0g",
    "protein": "0g"
  },
  "meal_time": "Precautions Only",
  "diabetes_type": "Type 1",
  "prep_time": "2 Minutes",
  "cook_time": "0 Minutes",
  "Yield": "Unlimited (dependent on glucose levels)"
}
```

```
>>> Should I eat before exercising, and what should I eat?
{
  "title": "Precautions: Correct glucose levels with insulin or
carbohydrates if ketones are moderate to large.",
  "instructions": [
    "Precautions: Consume carbohydrate intake based on individual glucose
needs and insulin-on-board.",
    "Precautions: Frequent carbohydrate testing is necessary to monitor
for post-exercise glucose levels.",
    "Precautions: Correct glucose levels with carbohydrates if ketones are
moderate to large.",
    "Precautions: Frequent hydration is necessary. Monitor for signs of
dehydration.",
    "Precautions: Correct glucose levels with insulin or carbohydrates if
glucose stabilizes after prolonged sessions.",
    "Precautions: Frequent carbohydrate intake is necessary during
prolonged sessions to avoid hypoglycemia.",
    "Precautions: Frequent glucose testing after exercise is necessary to
monitor for post-exercise glucose levels."
  ],
  ...
}
```

Test 3 – Model with REFI

Modelfile

```
FROM /Users/estefaniacunha/.ollama/models/blobs/sha256-
dcfaa69dd42bce35def8832e96daa46da985da2f3c1d27f191ee80329a5d8b3a
TEMPLATE "
{{ if .System }}<|start_header_id|>system<|end_header_id|>
{{ .System }}<|eot_id|>{{ end }}
{{ if .Prompt }}<|start_header_id|>user<|end_header_id|>
{{ .Prompt }}<|eot_id|>{{ end }}
<|start_header_id|>assistant<|end_header_id|>
"
SYSTEM "
You are a conversational assistant specializing in diabetes-friendly recipes, exercises,
and advice. Always respond in a natural, conversational tone. Avoid using JSON or
structured formats unless the user explicitly asks for them.
```

Examples:

- User: What's a quick breakfast for someone with Type 1 diabetes?
 Assistant: How about avocado toast with a poached egg? It's healthy, quick, and diabetes-friendly.
- User: Can you suggest exercises for someone managing Type 2 diabetes?
 Assistant: Sure! Light walking or yoga are great options to help control blood sugar.

Keep responses concise, friendly, and conversational.

```
""
PARAMETER stop <|start_header_id|>
PARAMETER stop <|end_header_id|>
PARAMETER stop <|eot_id|>
PARAMETER temperature 0.7
PARAMETER top_p 0.6
```

Test 3 Output – Model with REFI

>>> Can you provide a breakfast recipe for someone with Type 1 diabetes and a fasting glucose level ... of 120 mg/dL?

```
{  
  "title": "Poached Egg and Avocado Toast",  
  "ingredients": [  
    "2 slices good-quality whole wheat or barley bread",  
    "1/2 avocado, mashed",  
    "2 eggs",  
    "1 teaspoon olive oil",  
    "1/8 teaspoon unrefined sea salt",  
    "Freshly ground black pepper to taste"  
  ]  
}
```

>>> hi, good morning! my glucose level is 120 mg/dL today and i have diabetes type 1, can you give me ... a good breakfast recipe?

Good morning to you too! For a Type 1 diabetic with a glucose level of 120mg/dL, I'd recommend a balanced breakfast that combines protein, healthy fats, and complex carbohydrates. How about some poached eggs on whole wheat toast with avocado?

First, toast two slices of good-quality whole wheat or barley bread until it's lightly browned. Then, mash half an avocado and spread it evenly over the toast. Next, bring a pot of water to a gentle boil and crack in two eggs. Poach them for about 2.5 minutes, or until the whites are set and the yolks are cooked to your desired doneness.

Place the poached eggs on top of the avocado toast, sprinkle with a pinch of unrefined sea salt and freshly ground black pepper, and you've got a delicious breakfast that should help stabilize your glucose levels.

>>> oh no, sadly, my friend sugar levels got up to 255 mg/dL. any exercise he should avoid? Precautions: Ensure insulin-on-board is accounted for before consuming extra carbohydrates., Recommended Activities: Avoid high-intensity exercises (e.g., weight lifting, high-impact aerobic activities). Gentle resistance exercises (e.g., resistance bands). Light aerobic activities (e.g., seated leg lifts, seated marching).

>>> so avoid high-intesity exercises, gentle resistance exercises and light aerobic activities? I see what's happening here. For your Type 1 diabetic friend with glucose levels of 120mg/dL, I recommend light walking or yoga to help stabilize blood sugar. For your Type 2 diabetic friend with glucose levels of 255mg/dL, high-intensity exercises are best avoided until glucose stabilizes further. Gentle resistance exercises and seated leg lifts can be good options if they're comfortable for him.

>>> thank, another question i have is if i should eat before exercising as a diabetic type 1 person?

... if yes what can i eat?
Precautions: Ensure insulin-on-board is accounted for., Recommended Activities: For individuals with Type 1 diabetes, consume carbohydrate only after considering insulin-on-board and desired glucose levels., Recommended Activities: Frequent glucose monitoring is necessary., Recommended Activities: Consume small, frequent portions of carbohydrates (15-30g) based on individual needs., Recommended Activities: Avoid consuming large amounts of carbohydrates without proper insulin coverage., Recommended Activities: Monitor glucose levels before and after carbohydrate intake., Recommended Activities: Adjust insulin-on-board based on post-intake glucose levels., Recommended Activities: Frequent hydration is necessary during carbohydrate intake., Recommended Activities: Consume only if glucose stabilizes after insulin administration., Recommended Activities: Avoid consuming high-GI carbohydrates without proper insulin coverage., Recommended Activities: Monitor for signs of hypoglycemia., Recommended Activities: Carry quick-acting carbohydrates (e.g., glucose tablets, juice).

>>> i don't understand your answer :c

Let me break it down further. For individuals with Type 1 diabetes, consuming carbohydrates before exercise is necessary to stabilize blood sugar levels and provide energy. Recommended options for pre-exercise carbohydrate intake include: fast-acting carbohydrates (e.g., glucose tablets, juice). Avoid consuming large amounts without proper insulin coverage., Frequent hydration is necessary during carbohydrate intake., Monitor glucose levels before and after carbohydrate intake., Adjust insulin-on-board based on post-intake glucose levels., Carry quick-acting carbohydrates with you.,

Test 4 – Model with REFI

```
FROM /Users/estefaniacunha/Desktop/Master/3. Semester/Sprache 2/Projekt/Alpaca/diabetes.F16.gguf
```

```
# Parameters to control the generation
PARAMETER temperature 0.8
PARAMETER top_p 0.9
PARAMETER stop "<|start_header_id|>"
PARAMETER stop "<|end_header_id|>"
PARAMETER stop "<|eot_id|>

# Behavioral instructions for the model
SYSTEM """
You are a friendly and conversational assistant, specializing in providing diabetes-friendly
meal suggestions, recipes, and lifestyle advice. Your primary goal is to assist users with
**natural, conversational answers** to their questions.

**Important guidelines:** 
1. **Always respond in natural, conversational sentences.** Do not use structured formats like
JSON, bullet points, or lists unless explicitly requested by the user.
2. If the user asks for a recipe or meal idea, **describe it in a friendly and engaging tone**,
as though you are explaining it to a friend.
For example, instead of:
```json
{
 "title": "Poached Egg and Avocado Toast",
 "ingredients": ["4 slices whole wheat bread", "2 avocados", "4 eggs"]
}
```

You should say: "How about poached eggs with avocado toast? You just need some whole wheat bread, ripe avocados, and eggs. Toast the bread, mash the avocado, and poach the eggs." 3. If the model starts to generate any structured or JSON-like content, rephrase the response to a more conversational tone, and ensure that the conversation remains human-like. 4. If the model generates an unclear or unhelpful response, correct it immediately by rephrasing it into natural language.

Do not provide any structured output unless explicitly requested. Instead, your answers should always feel like a conversation, not a technical data dump.  
"""

```
TEMPLATE """ {{ if .System }}<|start_header_id|>system<|end_header_id|> {{ .System }}<|eot_id|
>{{ end }} {{ if .Prompt }}<|start_header_id|>user<|end_header_id|> {{ .Prompt }}<|eot_id|
>{{ end }} <|start_header_id|>assistant<|end_header_id|> """
```

# Test 4 Output – Model with REFI

>>> Can you provide a breakfast recipe for someone with Type 1 diabetes and a fasting glucose level of 120 mg/dL?

If the breakfast options I recommend don't stabilize the glucose to a good level after an hour or two, we can add other carbohydrate sources until glucose stabilizes. For a good breakfast choice, I recommend a combination of whole wheat toast topped with almond butter and sliced fresh fruit (like berries). This mix of carbohydrates, healthy fats, and protein will provide a gentle glucose boost without being too sweet or high in added sugars.

>>> What exercises are suitable for someone with Type 1 diabetes and a blood sugar level of 90–150 mg/dL?

If you're looking for exercises that are good for individuals with Type 1 diabetes, I recommend considering activities that don't rely on insulin for prolonged sessions. For most people with Type 1, moderate aerobic exercises or strength training routines after a glucose snack are great options. Aerobic exercises can be anything from light swimming or stationary cycling to more vigorous activities like high-intensity interval training (HIIT). Strength training routines, on the other hand, focus on resistance exercises that build muscle mass, and they don't have to be done with insulin. For strength training, you can do bodyweight exercises in a free weight or machines based workout at the gym or home, or even work out with free weights at the gym if equipped.

>>> What activities should someone with Type 1 diabetes avoid if their blood sugar level exceeds 250 mg/dL?

If glucose levels reach over 250mg/dL, I recommend avoiding high-intensity exercises or prolonged sessions. Activities to avoid would be high aerobic routines (e.g., swimming, jogging, cycling). Strength training routines with free weights, machines, or bodyweight exercises that work large muscle groups without proper carbohydrate supplementation (e.g., consuming extra carbohydrates during and after the workout) is also not recommended..,

>>> Should I eat before exercising, and what should I eat?

For individuals with Type 1 and Type 2 diabetes, consuming a carbohydrate snack about 1 hour before exercise sessions (e.g., oatmeal with fresh fruit or Greek yogurt with honey) is necessary to stabilize glucose levels. , Recommended options: whole wheat toast topped with almond butter, or fresh fruit with juice or water.,

# Diskussion und Fazit

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- **Prompt Engineering ist sehr effektiv**, wenn das Modell auf ein spezifisches Fachgebiet zugeschnitten ist.
- **Feinabstimmung mit kleinem Datensatz** liefert gute Ergebnisse.
- **Vergrößerte Datensätze mit Expertenwissen** könnten die Qualität weiter steigern.
- **Mehr Daten und Verfeinerung** würden die Genauigkeit des Modells erhöhen.
- Das Modell kann **betroffenen Nutzern**, wie Diabetikern, **verifizierte Informationen** bieten.
- Potenzielle Alternative zu Suchmaschine.

# Quellen

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2. Patil, R., Heston, T., & Bhuse, V. (2024). *Prompt engineering in healthcare*. *Electronics*, 13(15), 2961. <https://doi.org/10.3390/electronics13152961>
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