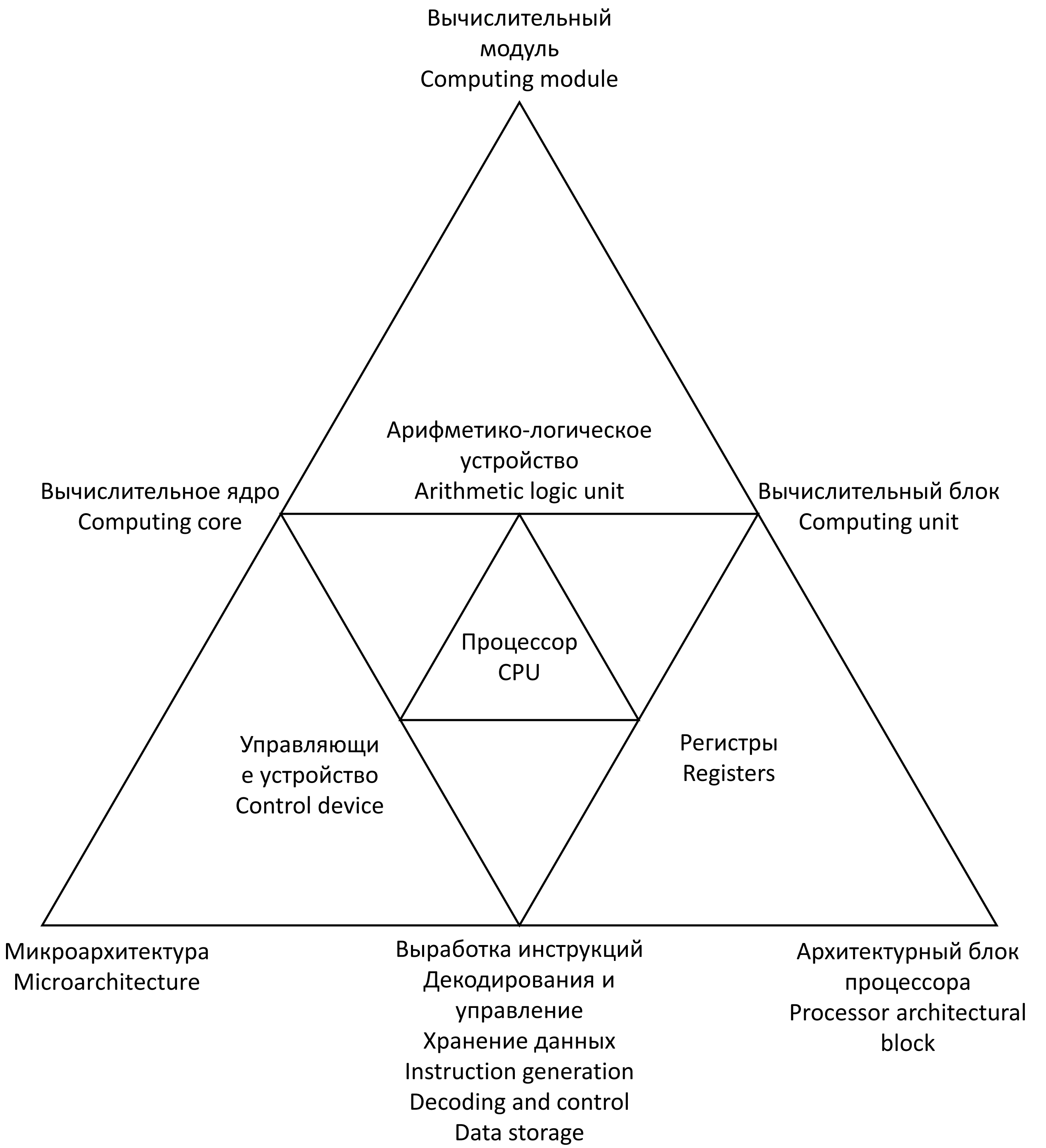

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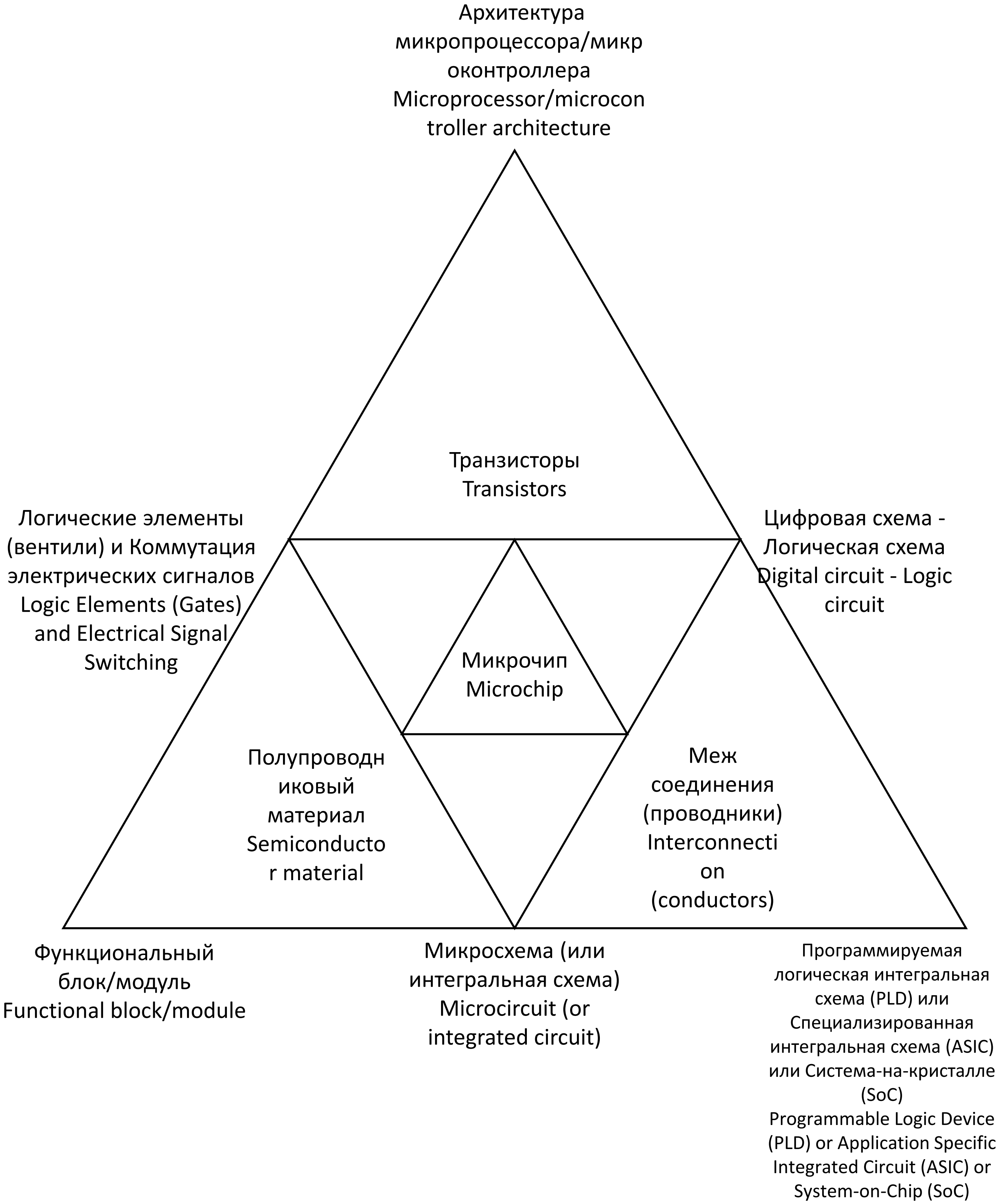

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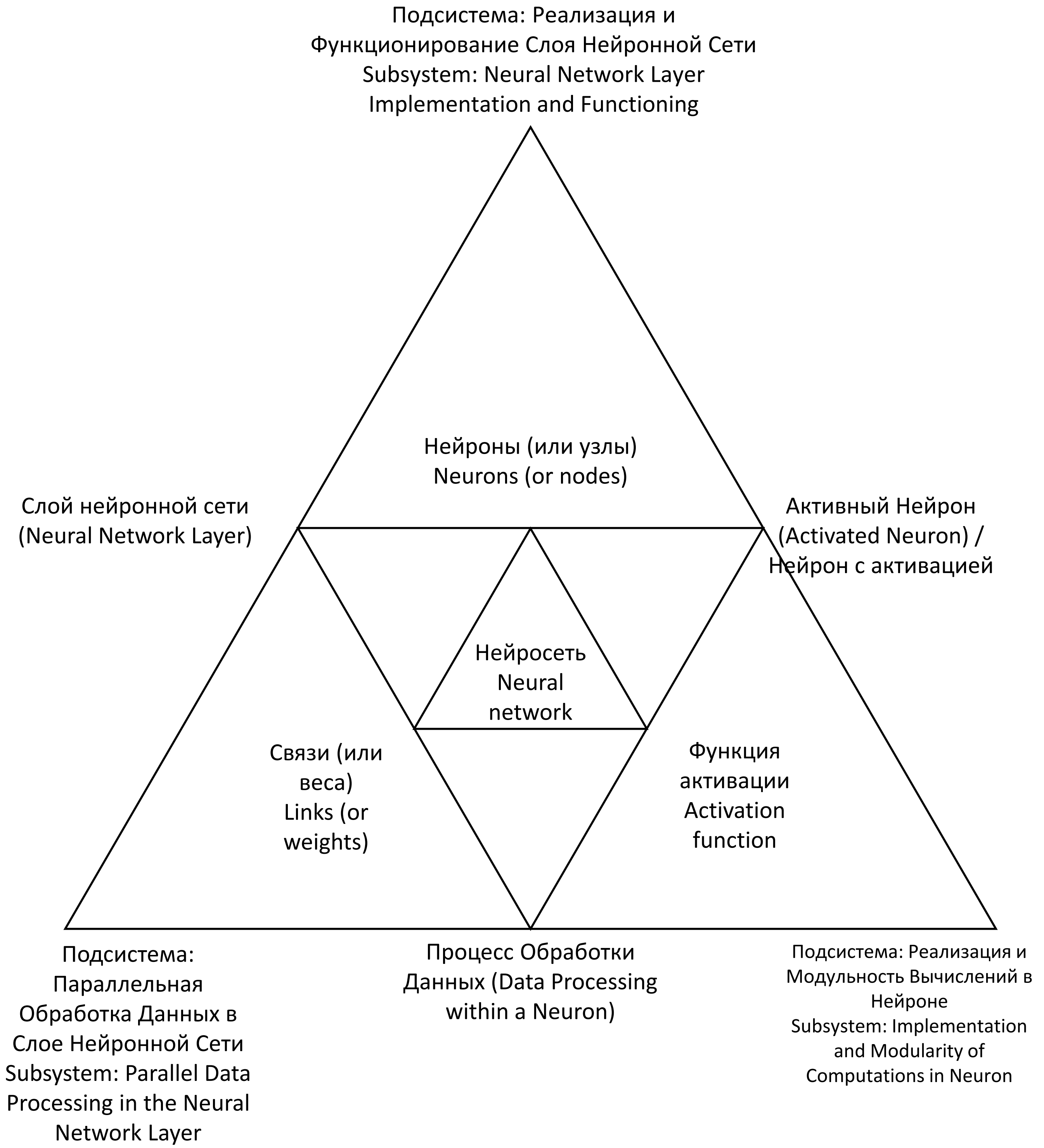

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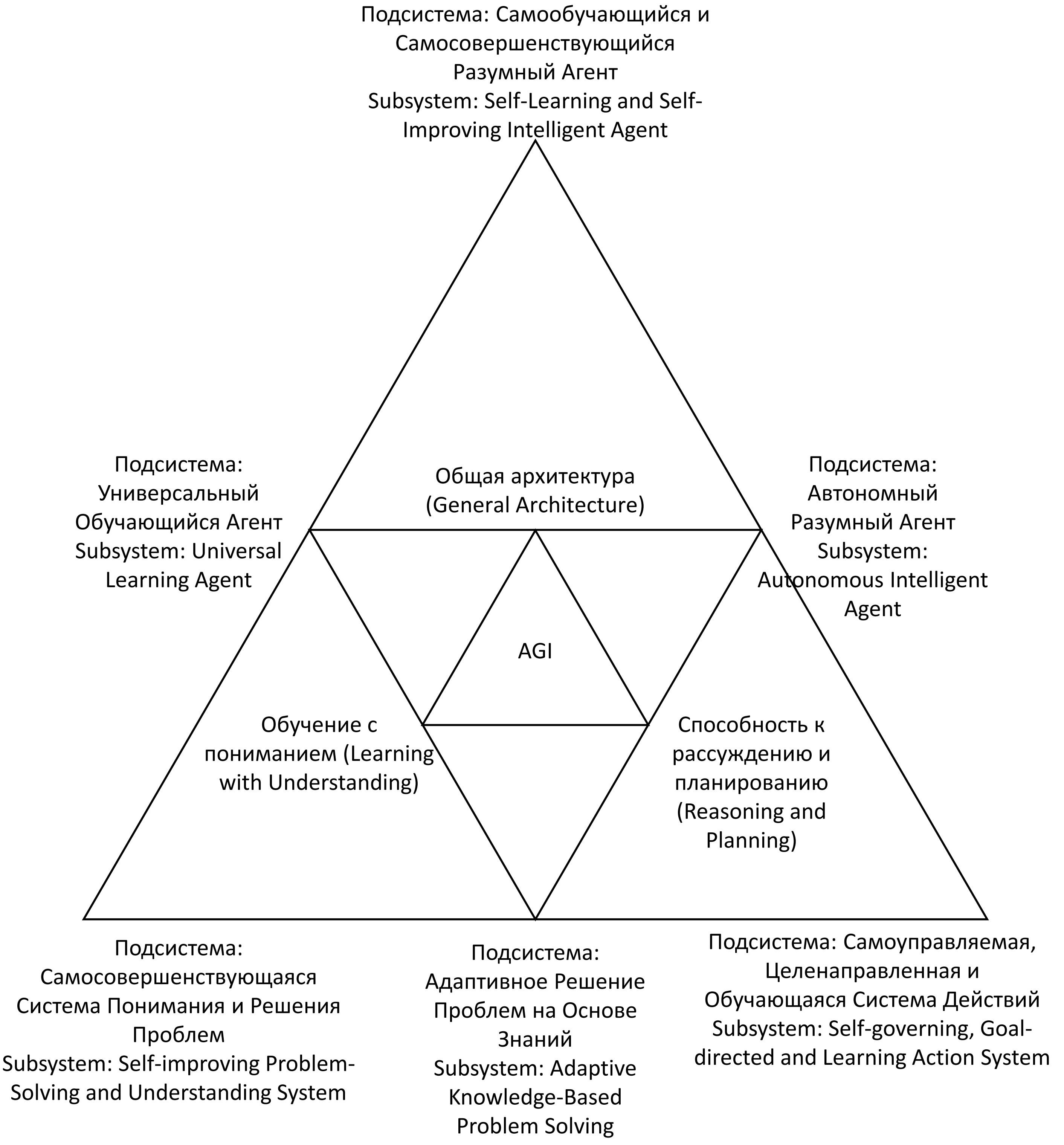

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This code is a simplified version and can be extended depending on specific requirements.

```
import numpy as np

class Neuron:
    def __init__(self, weights, activation_function):
        self.weights = weights
        self.activation_function = activation_function

    def activate(self, inputs):
        total = np.dot(self.weights, inputs)
        return self.activation_function(total)

class NeuralNetworkLayer:
    def __init__(self, neurons):
        self.neurons = neurons

    def process(self, inputs):
        outputs = [neuron.activate(inputs) for neuron in self.neurons]
        return outputs

class SelfLearningAgent:
    def __init__(self, neural_network):
        self.neural_network = neural_network

    def learn(self, data):
        # Простейший пример обучения: обновление весов на основе данных
        for layer in self.neural_network:
            for neuron in layer.neurons:
                neuron.weights += np.random.rand(len(neuron.weights)) * 0.1

    def act(self, inputs):
        outputs = inputs
        for layer in self.neural_network:
            outputs = layer.process(outputs)
        return outputs

class AutonomousIntelligentAgent:
    def __init__(self, learning_agent):
        self.learning_agent = learning_agent

    def perform_task(self, task_data):
        # Пример выполнения задачи с использованием обученного агента
        result = self.learning_agent.act(task_data)
        return result

# Пример использования
def sigmoid(x):
    return 1 / (1 + np.exp(-x))

# Создание нейронов и слоев нейронной сети
neurons_layer1 = [Neuron(np.random.rand(2), sigmoid) for _ in range(3)]
neurons_layer2 = [Neuron(np.random.rand(3), sigmoid) for _ in range(2)]
layer1 = NeuralNetworkLayer(neurons_layer1)
layer2 = NeuralNetworkLayer(neurons_layer2)
neural_network = [layer1, layer2]

# Создание самообучающегося агента
learning_agent = SelfLearningAgent(neural_network)

# Обучение агента на данных
data = np.random.rand(10, 2)
learning_agent.learn(data)

# Создание автономного интеллектуального агента
autonomous_agent = AutonomousIntelligentAgent(learning_agent)

# Выполнение задачи
task_data = np.random.rand(2)
result = autonomous_agent.perform_task(task_data)
print("Результат выполнения задачи:", result)
```

```python
import numpy as np
import torch
import torch.nn as nn
import torch.optim as optim
import random
from collections import deque

# Neural Network for the Agent (Core of the AGI)
class NeuralNetwork(nn.Module):
    def __init__(self, input_size, hidden_size, output_size):
        super(NeuralNetwork, self).__init__()
        self.layer1 = nn.Linear(input_size, hidden_size)
        self.layer2 = nn.Linear(hidden_size, hidden_size)
        self.layer3 = nn.Linear(hidden_size, output_size)
        self.relu = nn.ReLU()

    def forward(self, x):
        x = self.relu(self.layer1(x))
        x = self.relu(self.layer2(x))
        x = self.layer3(x)
        return x

# AGI Agent Class
class AGIAgent:
    def __init__(self, state_size, action_size, hidden_size=64, gamma=0.99, lr=0.001, memory_size=10000):
        self.state_size = state_size
        self.action_size = action_size
        self.gamma = gamma  # Discount factor for future rewards
        self.lr = lr  # Initial learning rate
        self.memory = deque(maxlen=memory_size)  # Experience replay memory
        self.model = NeuralNetwork(state_size, hidden_size, action_size)
        self.optimizer = optim.Adam(self.model.parameters(), lr=self.lr)
        self.criterion = nn.MSELoss()
        self.epsilon = 1.0  # For epsilon-greedy exploration
        self.epsilon_min = 0.01
        self.epsilon_decay = 0.995

    # Subsystem: Universal Learning Agent (Learning with Understanding)
    def learn(self, batch_size):
        if len(self.memory) < batch_size:
            return

        # Sample a batch of experiences
        batch = random.sample(self.memory, batch_size)
        states, actions, rewards, next_states, dones = zip(*batch)

        states = torch.FloatTensor(states)
        actions = torch.LongTensor(actions)
        rewards = torch.FloatTensor(rewards)
        next_states = torch.FloatTensor(next_states)
        dones = torch.FloatTensor(dones)

        # Compute Q-values
        q_values = self.model(states).gather(1, actions.unsqueeze(1)).squeeze(1)
        next_q_values = self.model(next_states).max(1)[0]
        target_q = rewards + (1 - dones) * self.gamma * next_q_values

        # Compute loss and update model
        loss = self.criterion(q_values, target_q.detach())
        self.optimizer.zero_grad()
        loss.backward()
        self.optimizer.step()

        # Subsystem: Self-improving Problem-Solving (Adjust learning rate dynamically)
        self.self_improve()

    # Subsystem: Autonomous Intelligent Agent (Reasoning and Planning)
    def reason_and_plan(self, state):
        # Convert state to tensor
        state = torch.FloatTensor(state).unsqueeze(0)

        # Epsilon-greedy action selection
        if random.random() < self.epsilon:
            action = random.randrange(self.action_size)
        else:
            with torch.no_grad():
                q_values = self.model(state)
                action = q_values.max(1)[1].item()
```

```python
# Decay epsilon for exploration-exploitation trade-off
        if self.epsilon > self.epsilon_min:
            self.epsilon *= self.epsilon_decay

        return action

    # Subsystem: Self-improving Problem-Solving System
    def self_improve(self):
        # Dynamically adjust learning rate based on performance (simplified)
        # If the agent is not improving (e.g., loss isn't decreasing), reduce learning rate
        current_lr = self.optimizer.param_groups[0]['lr']
        if random.random() < 0.1:  # Simulate performance check
            new_lr = max(current_lr * 0.9, 1e-5)  # Decrease learning rate, with a minimum
            for param_group in self.optimizer.param_groups:
                param_group['lr'] = new_lr
            print(f"Adjusted learning rate to {new_lr}")

    # Subsystem: Self-governing, Goal-directed Learning Action System
    def act(self, state, env):
        action = self.reason_and_plan(state)
        next_state, reward, done, _ = env.step(action)
        self.memory.append((state, action, reward, next_state, done))
        return next_state, reward, done, action

# Simple Grid World Environment for Testing
class GridWorld:
    def __init__(self, size=5):
        self.size = size
        self.state = [0, 0]  # Starting position
        self.goal = [size-1, size-1]  # Goal position
        self.actions = [(0, 1), (1, 0), (0, -1), (-1, 0)]  # Right, Down, Left, Up

    def reset(self):
        self.state = [0, 0]
        return np.array(self.state)

    def step(self, action):
        # Update position based on action
        move = self.actions[action]
        new_state = [self.state[0] + move[0], self.state[1] + move[1]]

        # Check boundaries
        if 0 <= new_state[0] < self.size and 0 <= new_state[1] < self.size:
            self.state = new_state

        # Compute reward and done
        reward = -1  # Step penalty
        done = False
        if self.state == self.goal:
            reward = 100  # Goal reward
            done = True

        return np.array(self.state), reward, done, {}

# Main Training Loop
def train_agent():
    env = GridWorld(size=5)
    agent = AGIAgent(state_size=2, action_size=4, hidden_size=64)
    episodes = 1000
    batch_size = 32

    for episode in range(episodes):
        state = env.reset()
        total_reward = 0
        done = False

        while not done:
            next_state, reward, done, action = agent.act(state, env)
            total_reward += reward
            state = next_state

            # Learn from experience
            agent.learn(batch_size)

        if episode % 100 == 0:
            print(f"Episode {episode}, Total Reward: {total_reward}, Epsilon: {agent.epsilon:.3f}")

if __name__ == "__main__":
    train_agent()
```