Университет ИТМО

Факультет ФПИ и КТ

### Отчёт

**Системы Искуственного Интеллекта**

**первая часть**

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## Введение

### Описание целей проекта и его значимости.

### The goal of the project is to develop an Civil war query-based decision-making system using prolog based on the ontology developed in Lab 2, which is built on the knowledge base of Lab 1.

## Анализ требований:

### Определение основных требований к системе поддержки принятия решений.

My system is to obtain information about a specific country, characters, the character's own level attribute weapons, and the restraint relationship between characters.

·Very simple, clear and easy to use (the system is designed for people with different knowledge in the field of national warfare)

·reliability. Need to handle incorrectly entered user data

### Выявление требований к базе знаний и онтологии для представления знаний.

Determine the requirements for knowledge bases and knowledge representation ontologies.

Create categories: country, characters, weapons, attributes

Populate the class with the correct instance

Create a connection between them (object property)

Create data management rules

Create test request

## Изучение основных концепций и инструментов:

### Обзор основных концепций баз знаний и онтологий.

Knowledge Base:

·Definition: A knowledge base is a systematic, organized collection of information that contains knowledge about facts, concepts, and relationships in a specific field.

·Function: Knowledge base is used to store, manage and retrieve knowledge, enabling computer programs to use this knowledge to perform various tasks, such as question answering, decision support and automatic reasoning.

·Examples: Relational databases, graph databases, and semantic networks can all be used as knowledge bases.

Ontology:

·Definition: Ontology is a formal shared conceptual model used to describe entities, categories and the relationships between them in a domain. It defines the basic concepts and terms of the domain, as well as the relationships between these concepts.

·Function: Ontology helps unify semantics and provide a consistent conceptual system, allowing different systems and people to better understand and share knowledge.

·Example: OWL (Web Ontology Language) is a commonly used ontology description language used to create ontologies with rich semantics.

### Изучение Prolog и его возможностей для разработки систем искусственного интеллекта.

Prolog is a programming language based on the logic programming paradigm and is particularly suitable for processing symbolic and non-numerical knowledge. By mastering Prolog, developers can better take advantage of logic programming and apply it to solve complex knowledge processing and reasoning problems.

### Ознакомление с инструментами и библиотеками, подходящими для работы с базами знаний и онтологиями на Prolog.

Примеры: OWL, PL/SQL, SQLAlchemy, TensorFlow, MongoDB

## Реализация системы искусственного интеллекта на Prolog:

**Создание правил и логики вывода для принятия решений на основе базы знаний и онтологии.**

Define ontology

Build knowledge base

Define rules

Choose an inference engine

Implement reasoning logic

Consider uncertainty and weight

Testing and Debugging

Update and evolve

​**Тестирование и отладка системы, обеспечение ее функциональности и эффективности.**

System testing and debugging are key steps to ensure the normal operation, complete functionality and efficiency of the system

1. **Оценка и интерпретация результатов:**

**Примеры запросов для БЗ и онтологии, сравнение разницы реализации.**

Knowledge bases are usually presented in the form of facts and rules in a programming language (for example, Prolog).

Ontologies are most often represented in RDF or OWL and describe data structures using classes, properties, and relationships.

KB queries are typically focused on matching fact patterns and applying logical rules.

Queries in an ontology typically use query languages such as SPARQL and are focused on classes, properties, and relationships.

### Интерпретация результатов и описание дальнейших возможностей развития и улучшения системы.

The results obtained can be interpreted as an artificial intelligence assistant, based on the ontology, able to provide suggestions to users who need to understand this game

1. **Заключение:**

During the execution of labs 1, 2, and 3, I became familiar with the Prolog language and learned how to implement a knowledge base in it. Additionally, I learned how to work in Protege and create ontologies. I also implemented user input in prolog to obtain information