

of use, and rapid development of deep learning models.

PyTorch is an open source machine learning framework developed by Facebook's AI research lab. It is based on the Torch library and supports dynamic computational graphics, making it easy to create and debug models. PyTorch is popular for its flexibility, speed, and simplicity.

Scikit-learn is a popular Python machine learning library designed for simple and effective data mining tools. It provides a variety of machine learning algorithms such as classification, regression, clustering, and dimensionality reduction. Scikit-learn is known for its ease of use, intuitive API, and powerful data preprocessing and visualization capabilities.

TensorFlow is an open source machine learning platform developed by Google. It is designed to build and train deep learning models and supports both CPU and GPU computing. TensorFlow has a large community, provides extensive documentation and tutorials, and supports multiple languages and platforms.

Useful links for practicing in machine learning

TensorFlow Hub - <https://tfhub.dev/s?module-type=text-embedding>

TensorFlow

datasetsn

https://github.com/tensorflow/datasets/tree/master/tensorflow_datasets/datasets

Guide - https://www.tensorflow.org/hub/tutorials/tf2_text_classification?hl=en

Google Collab - <https://colab.research.google.com/>

RESEARCH AND COMPARISON OF MODERN JAVASCRIPT SOLUTIONS FOR WEB APPLICATION DEVELOPMENT

Brukhtii S.S., student,

Suknov M.P., PhD, Associate Professor,

Kharkiv National University of Radio Electronics

No one thought about optimizing the speed of the enterprise and scaling the web applications when Internet and statistical sites appeared. Aims and tasks facing developers were very different for today then at that time. But with the development of web technologies and the spread use of the Internet, there was a need for libraries and frameworks that can provide developers with: high speed, flexibility, simplicity, and

scalability. The number of libraries and frameworks aimed at solving these tasks began to grow quite quickly. Therefore, JavaScript libraries have become an integral part of every modern web application.

In the world of JavaScript, new frameworks and libraries are implemented almost daily. In fact, it's almost a continuous process, with leaders changing practically every few months. Each year new "killers" appear which promise higher productivity, easier usage, and fewer bugs. There are many tools for tracking trends.

It is important to remember that to get a full picture, it is necessary to consider several of them. Let's discuss the current state of the market.

Google Trends [1] - search query statistics accurately reflect interest of developers in various technologies. Let's examine the statistics of search queries for the past 12 months worldwide. (Fig. 1). After analysis, it becomes clear that React confidently holds the leadership position. However, global statistics do not give us the right to unequivocally push Vue into the background.

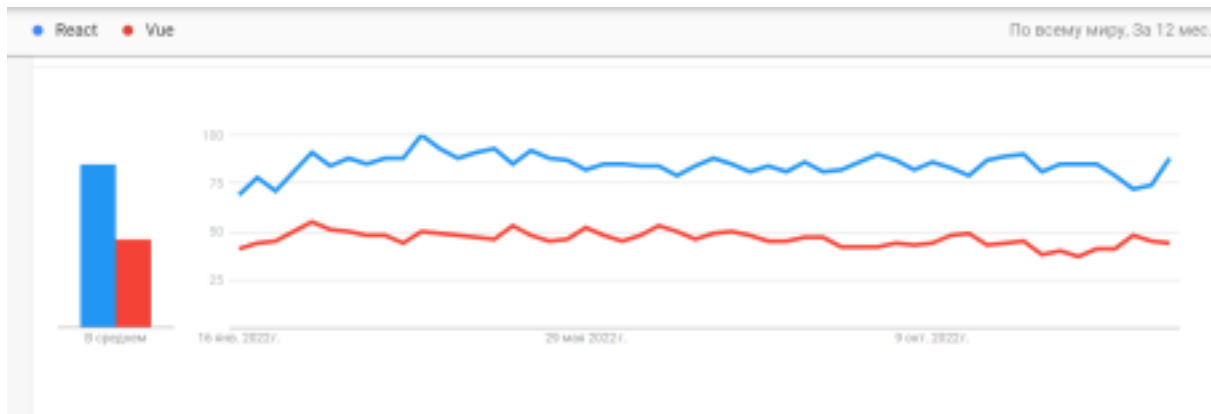


Fig. 1 - Google Search query statistics (Global)

GitHub Stars [2] – by the number of stars in a repository, you can easily see popularity of something among developers. At the moment, React has 175,000 stars, while Vue.js has 188,000 stars. If we only consider these data (Figure 2), Vue clearly takes the lead and there is no point in wasting time on React.

Changes to the interface of any web application are made by modifying the Document Object Model (DOM) representation. There are concepts as Virtual DOM and Real DOM. The performance for web application development greatly depends on

how the process of working with the DOM is organized. React uses the Virtual DOM which is a lightweight system that is independent of the browser. One of the main reasons for the popularity of React is that the library works very efficiently with the DOM. Vue uses the Virtual DOM too but compared to React, Vue has higher performance and stability.



Fig 2. - Ranking of frameworks based on GitHub Stars in 2022.

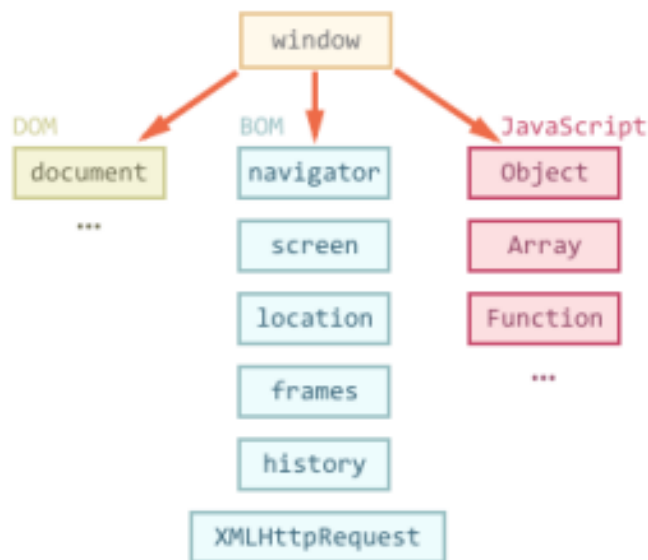


Fig. 3 - JavaScript Access Scheme to Elements.

If we simplify the discussion about size we can say that React is slightly larger than Vue. The size of React is around 100 KB, while Vue is around 80 KB. The size of a JavaScript library or framework is an important factor that greatly impacts the performance of web applications. The smaller the size, the better.

The following tasks have been developed of achieve this goal:

1) Perform a performance analysis of React and Vue.js.

2) Conduct load testing by adding different numbers of identical components. 3)

Analyze the methods of rendering JSX format in React and Vue.js. 4) Debugging and exploring alternative methods of rendering JSX format.

References:

1) **Google Trends** - Statistics as of the time of writing
<https://trends.google.ru/trends/explore?q=VUE,React>

MODELING AND THE USE OF GRAPHS AND GRAPH THEORY ALGORITHMS IN SOFTWARE TESTING

Svietlinskyi O.A., student,

Golian N.V., Associate Professor,

Kharkiv National University of Radio Electronics

Graph theory is one of the basic tools of mathematics that is used to represent sets and the relationships between them. Most programs and algorithms can be represented as a graph. Coverage of graphs in testing is useful because using different criteria it is possible to detect errors. This article describes several graph theory methods, where they come from, and how they can be used to improve software testing. For example, in black-box testing, graph theory can be of great importance if you have to test application states and transitions, entity state graphs, etc [1].

Traditional software testing entails a tester studying the system and running test scenarios over it to test the system. Each product's test cases are created separately.

When the same pesticide is used against them, a similar occurrence occurs with some insects. As a result, the insects acquire resistance to the pesticide, rendering it worthless. Therefore, regardless of the sort of test being done, test kits must be adjusted and updated.

The first thing we need to do to test with graphs is to identify the states. To do this, we take the initial application point (the initial state) and denote it as the first vertex. Actions on the screen are shown as graph edges and states as vertices. It is