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REALIZATION OF SOCIAL INFORMATION SYSTEM USING REACT.JS AND REDUX

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Introduction

Information is now generally viewed as both a driving force and a valuable resource for the advancement of society. Without a doubt, information technologies, such as information systems, are used to enhance the value of information, enabling individuals and businesses worldwide. Information technology is now an essential element of daily life. The phrase "information society" corresponds to society today. Simultaneously, it is assumed that a considerable portion of the globe is active in data generation, storage, processing, and sharing. The ongoing exchange of information is what distinguishes this civilization.

One of the main values of society is information, thus the creation of effective ways of its creation, processing, and usage is a significant topic.

As the overwhelming majority of people take part in this process, information systems that allow people to participate in sharing of the information and, as importantly, knowledge are required

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In this article, based on the overview of the information system to facilitate the sharing of knowledge we should discuss the creation of social information systems with defined functionality. Also, we must consider and justify the means and technologies of its creation.

Main part

The advancement of information systems and information technologies is seen as a critical component of the technical transformation of the modern world.

Information technology (IT) is the use of computers to create, process, store, and exchange all kinds of electronic data and information [1].

An information system (IS) is a formal, sociotechnical, organizational system designed to collect, process, store, and distribute information [2].

According to these definitions, the correlation between the two is as follows: information technology is used to carry out all information transformation procedures in the information system. Therefore, the information system can be built and used to achieve a specific goal of storing or processing information in an organized manner, and information technologies can provide clear solutions to problems that arise during the implementation and maintenance of said information systems.

Social information systems are information systems based on social technologies and open collaboration [3]. People play an essential role in social information systems, and it is what sets them apart from traditional ISs. Since the rise of social media, social software, and social platforms, social information systems have gotten more attention [4].

The system that will be discussed onward is a mentorship web platform and knowledge database created and managed by users of the platform. In short, through communication and collaboration, the users of the platform share knowledge. They can gain and

exchange expertise, resources, ideas, and solutions.

The main functionality is as follows:

- User must be able to access the platform at any time and on any device using the Internet;
- Authentication mechanism must be in place;
- Depending on their function in the system, users must be able to access specific information;
- Upon registration, users must be surveyed;
- Users must be able to manage any information they provide;
- Users must be able to communicate with one another;
- Task system must be in place;
- Knowledge database must be in place;
- other.

What should be addressed from the start is the selection of appropriate technology, so the requirements are met and so that future changes to the project are not challenging.

There are no required methods or technologies for creating websites or web applications. React.js library was used to build the platform, together with Redux library to manage the changes.

React.js is a JavaScript library for building user interfaces [5].

Redux is an open-source JavaScript library for managing and centralizing application state [6].

Redux operates in these steps: component sends an action upon an event. Store saves a component's state upon receiving the action. Store passes the action and current state to reducer. Action modified state is returned by reducer. The store sends new state back to component (fig. 1).

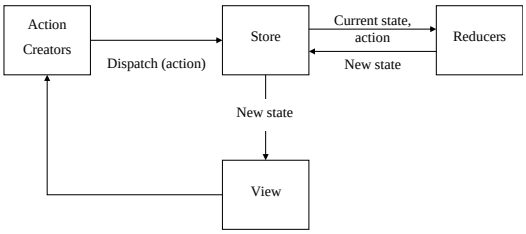

Fig. 1. Redux cycle

In terms of structure (fig. 2), app.js is the root of the platform. It contains the code and Redux store. Router.js contains a router to import data from pages. Components in the folder pages, as well as subcomponents in subfolders, are typically the platform's pages. The components subdirectory contains components that pertain to several pages and/or subcomponents. Helpers retain utility functionalities. The constant values may be found in src/constants.

Following pages are present on the platform:

- Sign-up (and log-in) page, including the survey phase;
- Personal information page;
- Chat page;
- Task system page;
- Events page;
- Article page.

The sign-up process for the user consists of several pages. The first phases encompass user data gathering (name, email, as well as role the user wishes to take within community), verification (conducted through email), password specification. Next two phases are questionaries. These are crucial parts of the sign-up process as they are later used to assist in setting up social interactions and links for users on the platform.

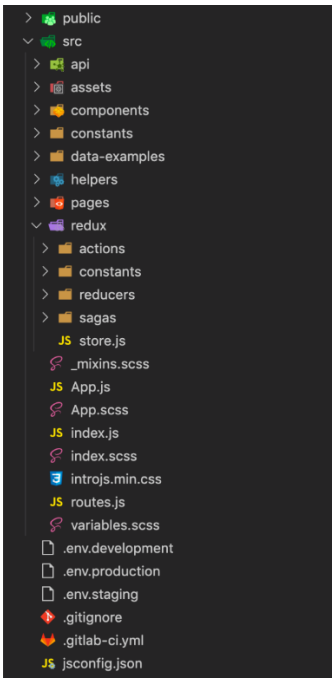

Fig. 2. Platform's file structure

User profile page contains all the data collected during sign-up. As there are 2 possible roles in the system (experts and learners), the user profile page varies for each. The functions of the platform available to users depend on their role as well.

One single React component was used to create the page. Depending on the status of the user, specific information in the user profile is available to view or update (fig. 3).

The user inputs the information in forms, which is implemented using Redux-Form library.

All possible types of inputs were predetermined during write up of requirements. React inputs are used to keep track of it (fig. 4). Changes on inputs are caught by React event listeners.

```
return (
  <section className="right-my-profile">
    <MyProfileHeader header={header} />
    <div className="grey-wrapper">
      {isMentee && <MySurvey />}
      {isMentee && <ProfileInfo />}
      {!isMentee && <MyProfileExpertise />}
      <MyProfileSkills isMentee={isMentee}/>
      <MyProfileExperience />
      {professional_experience ? (
        <MyProfessionalExperience
        initialValues={{ professional_experience:
          professional_experience }} />
      ) : (
        <MyProfessionalExperience />
      )}
    </div>
  </section>
);
}
```

Fig. 3. Code for user profile

```
if (type === "date") {
  elementTypeIsInput = false;
  elementTypeIsDate = true;
} else if (type === "time") {
  elementTypeIsInput = false;
  elementTypeIsTime = true;
} else if (type === "number") {
  typeAttrString = "text";
} else if (type === "pounds") {
  typeAttrString = "text";
  showPoundsIcon = true;
} else if (type === "location") {
  typeAttrString = "text";
  showLocationPin = true;
} else if (type === "select") {
  elementTypeIsInput = false;
  elementTypeIsSelect = true;
```

Fig. 4. Code for input types

Communication is one of two core elements of social information systems; thus, the platform needs a way for its users to communicate with each other within the platform. Messaging functionality is available on the platform. Two main requirements for it are: implementing real-time messaging and implementing private ang group chats.

Chat component can have 2 views: ChatList (fig. 5) and SingleChat (fig. 6).

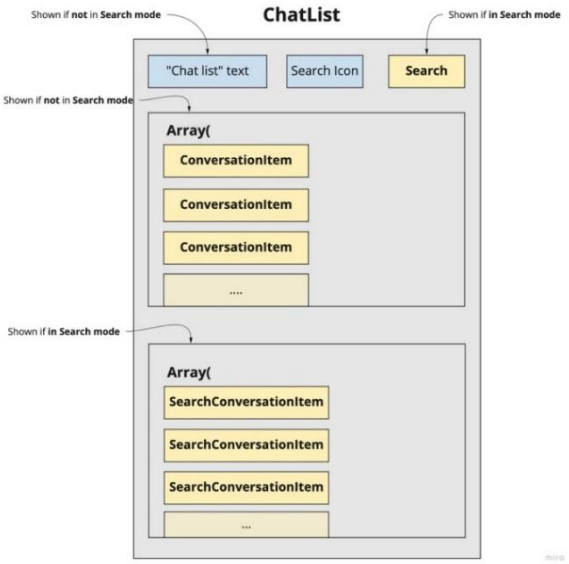

Fig. 5. ChatList structure

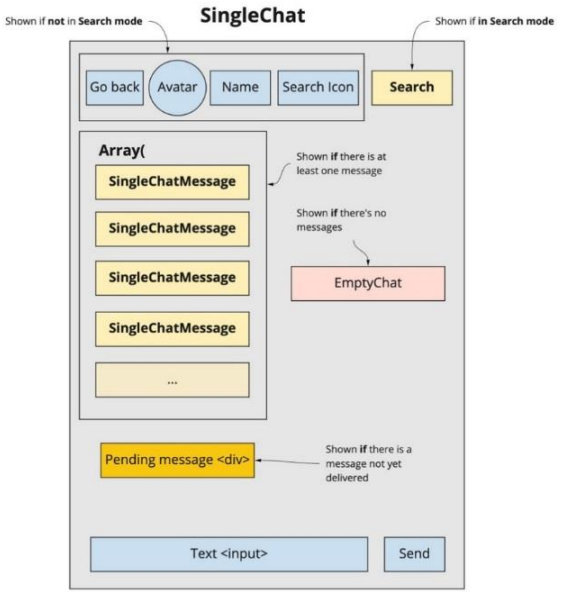

Fig. 6. SingleChat structure

WebSockets offer secure data transmission with little network traffic allowing to set up uninterrupted connection. Socket.io is used to implement real-time messaging.

Socket.io is a library that enables real-time, bidirectional and event-based communication between the browser and the server [7].

Because the backend is developed with Laravel, the Laravel Echo module is installed and configured (fig. 7). Laravel Echo is a JavaScript library that makes it painless to subscribe to channels and listen for events broadcast by server-side broadcasting driver [8].

```
const options = {
  broadcaster: "socket.io",
  host: REACT_APP_SOCKET_HOST,
  auth: { headers: { Authorization: "Bearer " + token } },
  namespace: "App.Modules.Chat.Events",
  client: Socketio,
};
const echo = new Echo(options);
useEffect(() => {
  echo.join("online");
}, []);
```

Fig. 7. Laravel Echo set up code

When a user accesses a specific conversation, a unique closed session is established. The backend provides the session id. To listen for new messages, listen() method is used. When message comes, an action is dispatched, which initiates the typical redux cycle (fig. 8).

```
useEffect(() => {
  if (isConversationsLoaded) {
    conversations.forEach((conversation) => {
      echo
        .private(`conversation.${conversation.id}`)
        .listen("ConversationMessage", ({ message }) => {
          if (message) {
            dispatch(UpdateConversationByIndex(message));
          }
        });
    });
  }
}, [isConversationsLoaded]);
```

Fig. 8. SingleChat opened code

Redux-Saga is the middleware used. Redux-saga is a library that aims to make application side effects (i.e. asynchronous things like data fetching and impure things like accessing the browser cache) easier to manage, more efficient to execute, easy to test, and better at handling failures [9].

Messaging makes use of function call put(GetConversations). It dispatches an action that obtains the user token from the store, uses the token to perform an API request, records the result from the backend in a variable, and then dispatches a new action. The reducer then changes state accordingly. The same sequence is followed when user clicks the send button to send a message. The function also handles any errors that may occur (fig. 9).

```
function* handleGetConversations() {
  try {
    console.log("Getting coverstions data");
    const token = yield select((state) => state.user.user.token);
    const response = yield getConversations(token);
    yield put(GetConversationsSuccess(response.data));
    console.log("Coverstions data", response.data);
  } catch (error) {
    console.log(error.response);
    yield put(
      GetConversationsError(
        error.response.data
          ? error.response.data.errors
          : { error: ["Ooops something went wrong, please try again later"] }
      )
    );
  }
}
```

Fig. 10. Chat code

Another core element of social information systems is collaboration. The platform has a task system, which allows users to work on some projects in a group (one person being a supervisor mentoring others).

The task system's functionality differs for two types of users. The expert uses the task system to create and assign tasks to the people they are mentoring. A complete task is represented by a template that includes subtasks, a due date, and optional remarks (fig. 11).

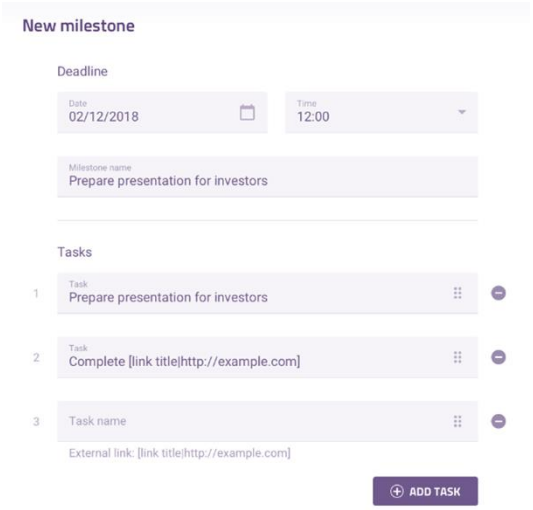

Fig. 11. Task creation

The people working with the expert must work on the tasks given and deliver the report. The expert can then review the finished work and provide review, and mark the task completed, as well as send the task for revision (fig. 12).

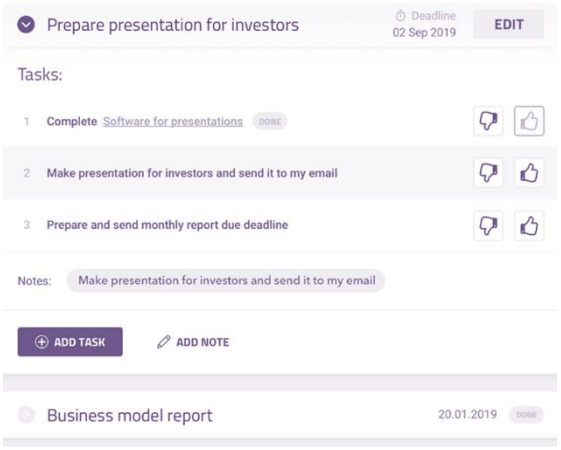

Fig. 12. Task review

One aspect of the social information system is events. Online and offline seminars, webinars, courses, and networking events can be announced by experts. These events can be public, which any system user can attend, or private, available to those the expert invited.

Conclusions

In this paper an overview of the information system to facilitate the sharing of knowledge and the means of its creation is provided. It had been realized as a mentorship web platform and knowledge database created and managed by users of the platform. Through communication and collaboration, the users of the platform share knowledge. They can gain and exchange expertise, resources, ideas, and solutions.

In the article, analysis had been performed on technologies and tools to be selected to create the system. The professionals may present their skills and knowledge by expanding the platform's knowledge base. Mentors can publish articles on a variety of business issues. Any user will have access to a large database of information on the newest trends in the industry, answers, and guidance for topics of interest, read about real-life instances of company operations, and learn about the experts' perspectives on a variety of topics.

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REALIZATION OF SOCIAL INFORMATION SYSTEM USING REACT.JS AND REDUX

The article analyzes technologies and selects tools for creating a system. Professionals can provide their skills and knowledge by expanding the knowledge base of the platform. Mentors can publish articles on various business topics. Any user will have access to an extensive database of information about the latest industry trends, answers, and recommendations on topics of interest, read about real examples of the company's work and learn about the points of view of experts on various topics. This article provides an overview of the information system to facilitate knowledge sharing and the means to create it. A system was implemented that is a web-based mentoring platform and a knowledge database created and managed by users of the platform. Through communication and collaboration, platform users share knowledge. They can gain and exchange experience, resources, ideas, and solutions.

Keywords: *information system, web platform, database, Redux, React.*

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РЕАЛІЗАЦІЯ СОЦІАЛЬНОЇ ІНФОРМАЦІЙНОЇ СИСТЕМИ З ВИКОРИСТАННЯМ REACT.JS ТА REDUX

У статті аналізуються технології та вибираються інструменти для створення системи. Професіонали можуть надавати свої навички та знання, розширюючи базу знань платформи. Ментори можуть публікувати статті на різні бізнес-теми. Будь-який користувач матиме доступ до великої бази інформації про останні тенденції галузі, відповідей та рекомендацій на цікаві теми, ознайомиться з реальними прикладами роботи компанії та дізнається про точки зору експертів на різні теми. У цій статті представлено огляд інформаційної системи для полегшення обміну знаннями та засобів її створення. Було впроваджено систему, яка є веб-платформою для наставництва та базою даних знань, створеною та керованою користувачами платформи. Через спілкування та співпрацю користувачі платформи діляться знаннями. Вони можуть отримати та обмінятися досвідом, ресурсами, ідеями та рішеннями.

Ключові слова*: інформаційна система, веб-платформа, база даних, Redux, React.*