



Educonnect-A Smart Collaborative Learning Platform

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Abstract—

EduConnect provides a collaborative educational experience by offering an online platform where students with similar interests or goals can connect to study and communicate together. Students who register with EduConnect can search for or join other students in study groups, communicate with each other instantly, share educational resources with others, and schedule and organize their study times more efficiently. EduConnect will suggest student learning groups based on different factors (e.g., subject studied, ability level, and availability of members to meet). EduConnect encourages active student learning by allowing students to share knowledge through interactive means and collaborate to improve their educational experience, and as a result, improve overall student academic success and engagement. EduConnect will also provide each student with personalized recommendations for study partners based on a number of tools and techniques derived from machine learning algorithms. The EduConnect system will use profile information (i.e., preferred subject areas of their current student user base, student ability level, and student availability) to provide intelligent recommendations for study group options, as well as potential learning partners. The Educonnect system utilizes machine learning algorithms, including clustering and content-based filtering, to make intelligent recommendations on potential learning partners based on the information gathered from current student users of the EduConnect platform.



I. INTRODUCTION

The ways in which education is viewed have changed drastically due to the impact technology has had on education. Now that we live in a digital world where students can interact with each other to share information in a variety of ways online, many students are experiencing disconnects (or gaps) due to the old-fashioned nature of how people used to structure their meetings and study groups as well as the lack of available peers and student study groups for students to collaborate with based on their academic and/or peer interest.

EduConnect is designed to eliminate these continual gaps that students experience by connecting through collaboration. The main objective of developing the EduConnect platform is to provide a way for like-minded students – those who are studying towards the same degree program, or have the same academic interests – to work collaboratively in order to increase their success rate.

EduConnect provides its users with the latest advances in technology (including through machine learning) for finding study groups or learning partners tailored specifically for each user's preferences, abilities, as well as available times and preferred study modes, with the goal of linking two or more users based on their collaborative interests.

EduConnect has introduced new digital technologies that facilitate students' ability to communicate with each other in real-time through various methods. For example, the communication methods include instant messaging, discussion forums and online study rooms. In addition to creating alternative ways for students to communicate, the technology has enabled students to collaborate in real-time by scheduling their study sessions when most students are available. Thus, students do not need to coordinate meetings to determine the best time to meet with other members of their study group.



II. LITERATURE REVIEW

There are various forms of research and systems developed for e-learning, cooperative learning, and/or intelligent recommendation systems for learning. The current e-learning systems that exist today (often called e-learning management systems) have been primarily designed to give learners access to course content, and to track learner registration and performance in the course, as well as to support learners to interact and collaborate with each other. Although these types of systems play an extremely important role in giving learners access to their course material and other tools necessary in creating a more 21st century-styled education, most of the features of collaborative learning systems are built to create meaningful relationships between learners based upon their shared academic interests and their common objectives for learning.

A recently developed collaborative learning system has focused on providing a feedback loop around how technologies can be used to increase students' engagement with learning by encouraging students to: a) communicate in groups of students; b) communicate one-on-one with another student or students; c) share knowledge with one another. The focus of these systems is to increase student engagement in their learning, but one to two of the systems require that students form off-line collaborative groups in order for collaborative learning to take place; therefore, this method of formation does not provide an optimally collaborative experience. Thus, the majority of the emerging methods to form student groups are being assisted by machine-learning algorithms that will automatically group students based upon the collaborative learning-related characteristics of the learners. Understanding the interests, strengths/abilities and time available to learners is critical to creating a personalized learning experience for learners.

Research shows that intelligent recommendation systems provide improved user experiences and satisfaction levels across a wide range of application areas including healthcare and retail. Yet many existing systems do not allow for real-time communication with users or use overly

complex methods for scheduling with users and do not provide a high degree of personalized service.

EduConnect is working to enhance past systems by offering a collaborative learning space that uses machine learning algorithms to create recommendations. EduConnect will foster enhanced collaboration and learning opportunities for learners through use of automated learning groups for learners; tools for communicating with learners in real-time; user-to-user collaboration via sharing resources; and automation of scheduling learner participation, ultimately providing each learner in the learning process an interactive, productive, effective and highly personalized environment to continue enhancing his/her learning.

III. METHODOLOGY

EduConnect plans to use a systematic process that enables learners to interact with and make smart suggestions for other learners based on their interactions with EduConnect's resources. The initial step is registering and setting up a user profile that includes the user's interests in education (e.g., Subject areas, level of education) and some method for the user to let EduConnect know when they will be available to connect with other users on the EduConnect platform (e.g., time zone). EduConnect will keep all of this information for additional data analysis. Next, EduConnect will use aggregated data from the user profiles it has created in step 1, along with algorithms based on machine learning (e.g., CollabFiltering, Clustering, etc.), to evaluate each user profile and group the users so that the users are grouped together based on attributes that would lend themselves to how they would like to learn or work with other users on the EduConnect platform. This information will then be utilized by EduConnect to provide users with recommendations on who they should collaborate with (e.g., Study partners, study groups).

1. Collecting Data

EduConnect gathers user data in order to produce tailored suggestions and increase the quality of collaboration on the platform. Users will need to



provide some basic information about their intended involvement in academic-related activities when they sign up, such as the type of academic activity they are interested in, their course levels, skills level, as well as when they think they will be available to participate in them. In addition to these core elements of data, EduConnect will also collect other types of information about each user's behaviour on the platform through tracking.

2. Preprocessing Data

EduConnect preprocesses data collected from their users in order to prepare the data for analysis. Data includes all the user's information collected from the users to be analyzed. One way that EduConnect makes sure the data is clean when analyzing their users' data is by how they handle missing or incomplete values by replacing with a sensible value in context or deleting those values altogether. Also, EduConnect normalizes the values in the dataset to have a consistent number for all attributes/users. Lastly, EduConnect will convert the categorical values of the data types (e.g. subjects, interests, skills) into numerical values so that it can improve the accuracy and performance of the machine learning algorithms used in its system.

3. Construct the Features

The developer of EduConnect uses transformed versions of pre-processed data to create feature sets for ML algorithms and also selects and then creates relevant attribute sets based on the attributes submitted by users themselves (e.g., Subject Interests, Skills Required, Time Offered/Available and User Activity or History); they will be used by developers to create feature sets for machine learning algorithms based on how users are represented to the algorithms as being unique/individual. Once the user attributes are selected by the developer for each user, the selected attributes are converted into an appropriate representation (e.g., numeric or vector) for the user which will allow the algorithms to compare and group users in an easily way. In some cases, the

developer may also use the combination of two or more of the attributes submitted by the user as new user attributes, for example, Subject of Interest combined with Availability for the user to offer a Subject combination with the availability for that selected user subject of interest will provide the opportunity to develop educational services to users.

4. Model Selection and Training:

Several types of machine-learning algorithms including content-based filtering and clustering can be used to create user groups. When building these algorithms, the input will be from individuals' personal information including preference of subject, skills, and availability in order to identify patterns/similarities amongst those in the user group for making suitable recommendations.

5. Model Evaluation:

There are various ways to evaluate how successful EduConnect is in using its machine learning systems to provide the appropriate recommendation systems to the users. The most common ways of measuring user satisfaction with the provided recommendation system are to measure the accuracy of the recommended matches and measuring user satisfaction for the provided recommended matches. An example of how this can be done is through continually refining and evaluating parameters of the current recommendation system in order to provide better study group and partner matching systems for the users.

6. Character Recognition System:

With character recognition built into EduConnect, users can use character recognition to read the text of documents or study materials collected from images, or uploaded digital files. The fundamental images processed for character recognition use basic machine learning techniques to recognize and convert the individual letters of the alphabet into an editable text file. Character recognition enables users to be able to access numerous types of learning materials with ease, as well as share or



search through these learning materials via the EduConnect app.

7. System Implementation:

EduConnect consists of a graphical user interface (GUI), a backend server that processes requests and stores the user's profile, study group data, and activity data in a database, and machine learning algorithms that analyze user data to generate intelligent recommendations. The purpose of the entire system (front end, back end, database) is to provide a seamless experience for users to interact with the EduConnect system, efficiently process any data using backend processing, and support collaboration in real-time with other users.

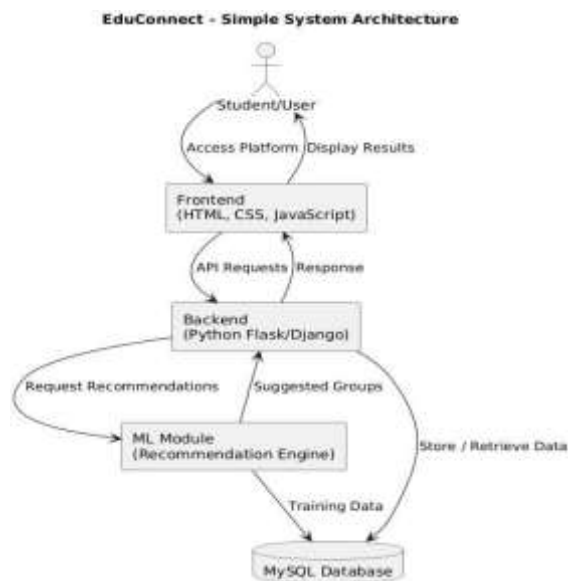


Figure 1: System Architecture

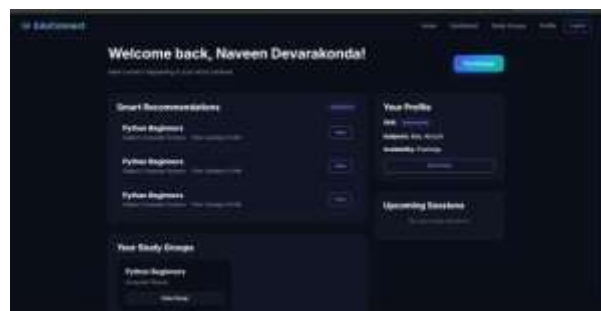
IV. RESULTS AND DISCUSSION

EduConnect Application Provides Custom Study Partner Recommendations With Studies Based On User Preset Preferences And Previous Activity Stats As An Additional Method Of Delivering Services For The App./App Implementation Includes Better Management Of Study Times And Engagement And Collaboration With Other Users In Their User Accounts/Providing An

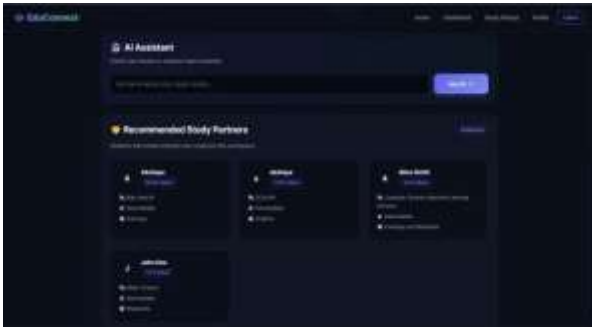
Environment For Real-Time Communication, Information Exchange, And Real World Problem Solving With Users Will Enhance Overall Learning Conclusion To All; Improved Academic Performance Would Be Assured To All-Users.



This page's design looks so different compared with what you'd expect an eLearning site to look like. However, it's actually a well-designed, modern site that embodies the belief in "Quality Education for Everyone." There are many areas of the site that users can quickly find their way to (e.g., homepage, dashboard, study groups & profile) by using the navigation options, which will allow them to easily reach the different parts of the site.



EduConnect has developed an application called Brain that gives users instant access to relevant and personalized information. It includes an initial welcome message and recommendations for study groups based on user skill level and interest. The Dashboard features that allow users to see what classes and when they are available will also allow them to easily update/change their profile; find a list of available study groups; and future events that will assist them in staying organized through out the semester. Therefore, all types of study/social interaction will occur in one place, and any additional experience will be based on users' usage of EduConnect services.



Users can view the group listing and recommended study groups in EduConnect based on what a particular user has expressed an interest in, in the form of an academic course or major. The system will provide users with information about the name of the study group and what subjects are being studied in that group, as well as the level of difficulty of each group and frequency of meetings. Therefore, students will have the ability to search and review all options available to them for finding study groups that meet their own individual learning requirements. The ability to find study groups and participate in study groups through EduConnect provides students with the opportunity to work cooperatively with other students that have been determined to be significant to their academic achievement and academic growth.



The EduConnect platform is designed to assist its members with their own learning profiles and to help members improve the quality of their learning experiences. On the Member Profile Page, members can enter or change their own contact information and set learning goals. Members can choose their learning goals, subjects, skills, and availability to share with other members, providing suggestions and recommendations for more

suitable matching opportunities when finding a tutor or study group partner. The Member Profile page is easy to use and allows all members to keep their Member Profile up to date. Our Policy recommends that all Members use the Member page's chat window to contact other Members and build Quality Teams, so they can improve their learning experience.

V. CONCLUSION

EduConnect provides students with ways to connect with others with whom they share the same subject interests, levels of skill, and availability. Eduardo uses advanced machine learning techniques such as clustering analysis and content-based filtering in order to personalize the connection between members of the study community and provide them with tailored feedback on their respective study groups as well as the connections that they have made within the community. Furthermore, EduConnect will enhance the collaboration among students who are using the service through its use of real-time communication, as well as its ability to allow the sharing of resources within the community.

Finally, the high level of peer-to-peer engagement and peer-to-peer learning that is facilitated by the use of EduConnect, provides users with a more effective way to manage their independent study activities. The EduConnect project has shown that intelligent use of technology and intelligent systems can provide users with a much higher level of interactivity, personalization, and efficiency in their overall learning experience.

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