

**Lab 1 - AskMissy Product Description**

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## **1. Introduction**

A student's ability to find resources right for them is essential to their growth academically as it is to them entering adulthood. The Standards of Learning exams, or SOLs, will often mark the performance of middle and high school students in subject areas like reading, math and science for that given year of school. SOL scores will contribute to whether a school earns good accreditation and towards the placement of students in classes (VDOE, 2021).

Without a proper way to search for resources needed for these exams, students find that their non-optimized lack of learning materials holds them back as they underperform on these SOLs. Their interest for learning wanes as students struggle to find resources that fit their specific learning preferences whether that be in the lack of the resource provided to start with or a lack of knowledge on how to properly search for specific resources for their course/classes.

A solution is needed where users can easily find the resources necessary to bridge the gap between conventional learning and digital learning. A personalized learning experience for them can be found in AskMissy that addresses this need in the form of an application that offers a more personalized experience for students in finding resources. AskMissy is a software application that will apply machine learning tactics towards learning from a user's input in personalized searches specific to the user. This will aid in helping them achieve better results through each iterative use as the software learns to give better recommendations for resources that can help students gain useful searching habits. With this software being integrated into the school, teachers and librarians can play a role by posting lesson plans, making recommendations and creating groups that make a best fit to what the student is currently learning. AskMissy will

be offered to students in grades 6-12 to help them boost their preparedness for SOLs through a learning style that works best for them.

## **2. AskMissy Product Description**

AskMissy is a web based software application created to help users search for useful and well founded resources. With a device that has internet access, a user who is registered through the school can make a user profile capable of operating searches backed by a resource tagging system that uses machine learning to pair that user with recommendations for the best working resources for that search learned by the software.

The overall goals of this software solution are to improve a student, teacher or librarian's approach to finding resources they need as the software will also inherently build and grow one's searching skills as they find success in their searches. Academically, this solution will also look to boost a student's reading comprehension and habits from back to back uses of the application. Boosted reading habits will lead to the end goal of having positive effects on future SOL preparedness by those students acquiring the lesson specific academic materials needed.

### **2.1 Key Product Features and Capabilities**

Any guests of the AskMissy application who haven't made an account will have the option to create one given they have a working school ID, otherwise, they will find that guest users without a profile will only be able to use basic searches for resources found in the database. As a web based application, AskMissy users will have the ability to access the app in and outside of the school system through school identification.

The authentication process of non-registered users will be easy as they are referred to as guests in the system but will oftentimes have limited features that they can use. These guest users could also be first time users that have not yet made a profile with the ability to create one. Reducing the number of anonymous users and restricting their access to the AskMissy trained search will make it so unregistered users cannot hamper with the machine learning search algorithms.

Once registered, that now registered user can authenticate their accounts through the school system and have access to the AskMissy searching algorithms. The system will have three different school users being students, teachers and librarians.

For students, they will have this access to the application's built in search algorithms, the ability to share resources they have found helpful with other users and the ability to private message their teachers and librarian users. Students will also be able to view any publicized reviews on a resource made within their respective class/course groups.

For teachers, they will have all the previous features in addition to the ability to create and manage class/course groups and create and manage their own lesson plans. Teachers will be able to request resources for students and request resources from the school librarians. The last feature for teachers will be having access to their own student's resource reviews within their own respective class/course groups.

For librarians, they will have all previous student and teacher features. Librarians will have the ability to maintain and update their current school library inventory within AskMissy as they also receive lists of requests for resources by students and teachers that can be managed

through the application. Librarians will have contact with administrators for any technical issues with the AskMissy application's functions or data.

Administrators will also be included as users but not within the school system.

Administrators will have the highest access in the AskMissy application as they secure all data and maintain external databases and the access to them. They will be given access to all user profiles and any metadata linked to them in the case something goes wrong or must be updated or wiped when needed. They will authorize librarians to create their own school groups.

Administrators will also keep in contact with school specific administrators for any data requests to be made.

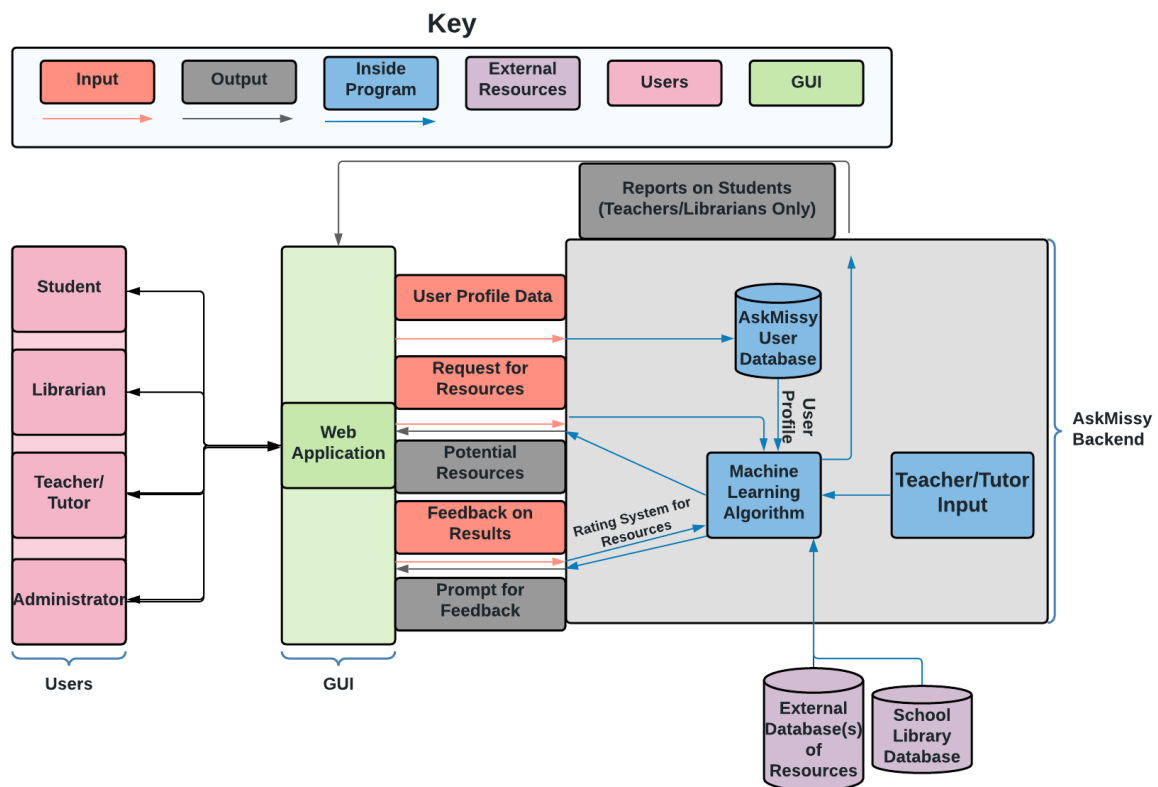
Within AskMissy, there exists a feedback and ratings system for the resources recommendations. After each resource recommendation, a prompt regarding the feedback on that resource will become available to the user. The feedback given on a successful or unsuccessful result will be fed into the machine learning algorithm to learn about that experience with the user. The overall rating of a specific resource will not affect a user's personal profile recommendations as it is intended to keep the user's personalized searching in mind and keep that specific to each user.

The internal database of AskMissy pertains to any data stored by the school whether that be the school library inventory and resources which is managed by the librarians or any user information which is managed by the administrators. There will be administrators that manage an external database that keeps track of the appropriate external resources collected through identifiers such as their ISBNs for books and any synopsis or metadata collected through working web scraping APIs and language recognition.

There are two current Machine learning algorithms in AskMissy that will regard how the personalized search results are linked to past recommended resources by the tags created for searches and the feedback and rating algorithm that is prompted with it. As a learning system, the more the software is used and fed data, the better the system can approach accurate resource results.

## **2.2 Major Components (Hardware/Software)**

The hardware required by the user will be a device capable of supporting modern internet access and a browser. There will be five servers that will be needed to be provided for the AskMissy application to function as far as the hardware is concerned. Those five servers will be the frontend server, a main backend server, a web scraping backend server, a machine learning backend server and a main database backend server. Figure 1 shows the major function component diagram and all the interactions between its components making up the AskMissy application.

**Figure 1***AskMissy Major Functional Component Diagram*

The software and languages required for AskMissy will be the use of HTML5, CSS3 and JavaScript for the frontend since the application will be web based. The backend will be established in Python. The IDE chosen for a group wide coding environment will be Microsoft Visual Studio Code with a GitLab repository. Databases will be stored in a mySQL database. The machine learning and natural language processing algorithms will be written in Python.

### 3 Identification of Case Study

AskMissy is targeted towards users who are students of grades 6-12 as the intent is for the application to be centered around SOL based learning by providing students with a



personalized resource finding tool. The resources found through the AskMissy search feature will help students prepare for upcoming future SOL tests. Teacher and librarian users are also integrated into the application working alongside students while also looking for resources that are best suited for their own lesson plans and library catalogues respectively.

The Machine Learning algorithms nested in the AskMissy application will be trained enough to accurately learn a student's personal resource preferences as well as appropriately match resources to their current profiles. Enabling teachers and librarians to have access to the application will also give them insight on which resources are helpful to the cause of better academic performance. These resources can then be found to be suggested to students or ordered for the library.

AskMissy will ultimately extend its usefulness to resource publishers who want attention to their resources and any new editions. Student's parents could also find the AskMissy effective for their kids and explore the benefits of personalized resources at home.

#### **4      Product Prototype Description**

## 5 Glossary

**Administrator:** A user who is responsible for managing a majority of AskMissy's working data.

**Agile:** Set of frameworks and practices where solutions evolve through collaboration between self-organizing cross-functional teams

**AskMissy:** A software application that will help users find more relevant resources

**API:** Application Programming Interface

**Data Retention:** The continued storage of an organization's data for compliance or business reasons

**Database:** Structured data held in a computer

**Economically Disadvantaged:** A student in Virginia is considered economically disadvantaged if the student:

- is eligible for Free/Reduced Meals
- receives TANF, or
- is eligible for Medicaid

**Exact Match Search:** A search for a single specific resource.

**File Server:** Controls access to separately stored files

**Guest:** A user who is not a student, teacher, librarian, or administrator; has limited access to the AskMissy program.

**Librarian:** Responsible for managing the library's inventory/database, communicating with teacher and students

**Personal Learning:** An educational approach that aims to customize learning for each user's strengths, needs, skills, and interests.

**Student:** A person studying at a K-12 education institution in need of reliable resources.

**Teacher:** A person who helps students (K-12) to acquire knowledge; Responsible for making plans, managing students' groups/communication.

**Temporary Assistance for Needy Families (TANF):** Provides eligible families with a monthly cash payment to meet their basic needs

**Tester:** Responsible for designing and conducting testing suites for usability testing

**User:** A user will be anyone using the AskMissy Interface and will fall into the category of a guest, student, teacher/mentor, librarian or admin.

**Web Scraping:** Extracting/scraping data from websites

**Web Server:** A computer that runs websites.

**Windows:** Series of operating systems developed by Microsoft

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books!,” Detailed Book review summaries. [Online]. Available: <http://allreaders.com/>.

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