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INTEGRATED SCHOOL MANAGEMENT SYSTEM

INTERNET APPLICATION PROGRAMMING

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Abstract

The Integrated School Management System is a comprehensive and user-friendly web-based program made for higher education institutions that is intended to automate and streamline numerous academic and administrative activities. The system was created utilizing MVC design tools, namely Laravel, and is intended to coordinate the actions of three key entities: staff, teachers, and students.

The system spans a student's whole academic career at a certain institution, from the time they apply to enroll to the time they graduate. This covers the administration of admission letters, enrollment in particular programs, registration requests for various units, and teacher assignment to classes. The approach attempts to make the duties of school administrators—who are in charge of these procedures—easier and more effective.

The system offers a variety of tools for teachers to help them in their work. By broadcasting messages to all or a selected group of students, they can communicate with those taking their classes or online courses. Additionally, they are able to oversee class materials, tests, and attendance while managing curriculum and educational activities for various classes. Teachers can interact with and assist their students more effectively thanks to these features.

Overall, higher education institutions can benefit greatly from the Integrated School Management System if they want to increase the efficacy and efficiency of their management procedures. In order to ensure that all parties involved have access to the knowledge and resources they require for success, it offers a variety of features that address the needs of staff members, teachers, and students.

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MVC: Model View Controller

ICT: Information Communication Technology

LMS: Learning Management System

Chapter 1 : Introduction

1.1 Background Information

Higher education institutions are essential to society because they give students the knowledge and abilities they need to be successful in their chosen careers. However, large institutions can be difficult to manage because of the multiple academic and administrative procedures that must be coordinated and kept track of. There are numerous actions and choices that must be done from the time a student applies to enroll in a program to the time they graduate. For school administrators, who are in charge of overseeing these procedures and making sure everything goes as planned, this can be a challenging responsibility.

A system that can simplify and automate higher education institution management is required to handle these issues. This need is addressed by the Integrated School Management System, which offers a thorough and user-friendly system that addresses every stage of a student's time in an institution. The system comprises capabilities for managing the activities of staff members, teachers, and students. It was created utilizing MVC design tools, notably Laravel.

The system offers tools for hiring and managing employees, classifying them into departments, and imposing access controls to departmental data. By ensuring that only pertinent staff members have access to critical information, this increases security and lowers the possibility of data breaches.

The technology gives professors a variety of tools to make their jobs easier. They can interact with students in their classes or courses, broadcast messages to all or particular students, and control the content and educational activities for various classes, such as the supply of course materials, administration of quizzes, and attendance. With the use of these tools, teachers may interact with and assist their students more effectively, enhancing the learning process and promoting student success.

The approach also takes into account the whole lifetime of a student's time spent in a certain institution, from the time they apply to enroll to the time they graduate. This covers handling admission letters, enrolling in particular programs, requesting registration for various units, and assigning teachers to classrooms. The system makes sure that students get the support they need to succeed while easing the stress on school administrators by automating these operations.

In general, higher education institutions can benefit greatly from the Integrated School Management System as they work to streamline their administrative procedures and better serve their constituents. It is a complete and user-friendly solution that automates and streamlines the management of employees, instructors, and students, increasing efficiency and lowering the administrative burden. By implementing the Integrated School Management System, higher education institutions can take a big step towards improving their management practices and providing the best possible education to their students.

1.2 Problem Statement

The management of a sizable number of academic and administrative processes is one of the major difficulties that higher education institutions must overcome. The proper operation of the institution and the success of its students depend on these procedures, which include duties like the administration of acceptance letters, enrollment in particular programs, registration requests for various units, and assignment of teachers to courses. Manually maintaining these procedures, however, can be laborious and prone to mistakes, creating inefficiencies and adding stress to school administrators.

Higher education institutions must manage these procedures in addition to the difficulty of supporting staff, instructors, and students. Staff employees must have access to the resources and knowledge they require to properly perform their jobs, and teachers require resources to interact with and assist their students. Students, in turn, require access to the tools and assistance they require to excel in their academic endeavors. Higher education institutions may find it difficult to effectively address these objectives without a comprehensive and user-friendly system to manage these procedures and offer help to stakeholders.

Therefore, there is an urgent need for a solution that can automate and streamline the management of higher education institutions, increasing productivity and offering stakeholders improved assistance. Higher education institutions looking to improve their management practices and give their students the best education possible would benefit greatly from a system that can handle the full range of academic and administrative processes, from the time a student applies to join an institution to the time they graduate.

1.3 Objectives

1.3.1 General Objective

The general objective of the Integrated School Management System project is to develop a comprehensive and user-friendly web-based application that streamlines and automates the management of higher education institutions.

1.4 Specific Objectives

i) To design and build a system that covers the entire lifecycle of a student's journey in an institution, from the moment they apply to join, to the moment they graduate.

ii) To provide tools for hiring and managing staff members, including the ability to categorize employees according to departments and enforce authorization to departmental data.

iii) To provide teachers with tools to communicate with and support their students, including the ability to broadcast messages, manage content and learning activities, and track attendance and quiz scores.

iv) To improve efficiency and reduce the workload for school administrators by automating academic and administrative processes.

v) To provide a user-friendly interface that is easy for stakeholders to navigate and use.

vi) To ensure that the system is secure and protects sensitive data from unauthorized access.

1.5 Research Questions

The research questions that guided this study were:

i) What are the main challenges faced by higher education institutions in the management of academic and administrative processes?

ii) What features should be included in an Integrated School Management System to streamline and automate the management of higher education institutions?

iii) How can the Integrated School Management System improve efficiency and reduce the workload for school administrators?

iv) How can the Integrated School Management System support the needs of staff members, teachers, and students?

v) What design considerations should be taken into account to ensure that the system is user-friendly and easy for stakeholders to navigate and use?

vi) How can the system be secured to protect sensitive data from unauthorized access?

1.6 Justification

Higher education institution management can be challenging because there are many academic and administrative procedures that must be coordinated and kept track of. There are numerous actions and choices that must be done from the time a student applies to enroll in a program to the time they graduate. For school administrators, who are in charge of overseeing these procedures and making sure everything goes as planned, this can be a challenging responsibility.

A system that can simplify and automate higher education institution management is required to handle these issues. This need is addressed by the Integrated School Management System, which offers a thorough and user-friendly solution that addresses every stage of a student's journey in an integrated manner. It includes features for managing the activities of staff members, teachers, and students, and is built using MVC design tools, specifically Laravel.

Higher education institutions can enhance their management procedures and offer greater support to their stakeholders by deploying the Integrated School Management System. By lessening their burden, it can increase efficiency and free up administrators to work on other things. Additionally, it can give employees the resources and knowledge they need to properly perform their jobs as well as give teachers the tools they need to interact with and support their students. The system can give students access to the tools and assistance they need to excel in their academic endeavors.

Overall, the Integrated School Management System is a useful tool for higher education institutions seeking to enhance their administrative procedures and give their students the best instruction possible. It improves efficiency and lessens the workload for school administrators by streamlining and automating the management of academic and administrative operations. Higher education institutions can significantly advance their management strategies and give their students the greatest education possible by putting the system into place.

1.7 Scope of the study

The scope of the study for the Integrated School Management System project covers the development of a comprehensive and user-friendly web-based application that streamlines and automates the management of higher education institutions. The system is designed to cover the entire lifecycle of a student's journey in an institution, from the moment they apply to join, to the moment they graduate. It includes features for managing the activities of staff members, teachers, and students, and is built using MVC design tools, specifically Laravel.

1.8 Limitation of the study

One of the main limitations of this study is that the system is designed to cover a wide range of academic and administrative processes, but it may not be able to address every possible scenario or requirement of every higher education institution. It also has not been deployed in an existing academic institution of higher education.

Chapter 2 : Literature Review

2.1 Introduction

The management of higher education institutions is a complex task, requiring the coordination and tracking of numerous academic and administrative processes. These processes, which include tasks such as the management of acceptance letters, enrolment in specific programs, registration requests for different units, and assignment of teachers to classes, are essential for the smooth functioning of the institution and the success of its students. However, managing these processes manually can be time-consuming and prone to errors, leading to inefficiencies and a burden on school administrators. To address these challenges, various approaches have been proposed in the literature. These approaches are discussed in greater detail in this chapter.

2.2 Challenges with manual school management processes

The management of higher education institutions is a complex task, requiring the coordination and tracking of numerous academic and administrative processes. These processes, which include tasks such as the management of acceptance letters, enrolment in specific programs, registration requests for different units, and assignment of teachers to classes, are essential for the smooth functioning of the institution and the success of its students. However, managing these processes manually can be challenging and lead to a number of issues.

One of the main challenges with manual school management processes is the time and effort required to complete tasks. School administrators, who are responsible for coordinating and tracking these processes, may find themselves overwhelmed by the volume of work involved. This can lead to a burden on staff and a reduction in productivity, as well as an increased risk of errors and mistakes.

Another challenge with manual school management processes is the lack of transparency and visibility. Without a comprehensive and user-friendly system to track and manage processes, it can be difficult for stakeholders to access the information they need or understand the status of different tasks. This can lead to confusion and misunderstandings and may hinder communication and collaboration between different stakeholders.

Finally, manual school management processes can also be prone to errors and mistakes. Without a system to validate and verify data, there is a higher risk of incorrect information being entered or recorded.

2.3 Current Technologies that Solve the Manual School Management Problem

There are various solutions that have been proposed to address the challenges of manual school management processes. These solutions include the use of information and communication technologies (ICTs) to automate and streamline academic and administrative processes, as well as the use of learning management systems (LMSs) to support the work of teachers.

One approach that has been widely adopted is the use of web-based systems to manage student records, timetable generation, and course selection, among other tasks. These systems provide a centralized platform for storing and accessing data, and can be accessed from any device with an internet connection. By automating tasks and providing easy access to information, these systems can significantly reduce the workload for school administrators and improve efficiency.

Another solution that has gained popularity in recent years is the use of LMSs to support the work of teachers. These systems provide a range of tools for teachers to communicate with and support their students, including the ability to upload and share class materials, conduct online quizzes, and track attendance and quiz scores. By using an LMS, teachers can effectively engage with and support their students, improving the learning experience and helping students to succeed.

Overall, the use of ICTs and LMSs has the potential to significantly improve the management of higher education institutions and provide better support to stakeholders. By automating and streamlining academic and administrative processes, and providing tools to support the work of teachers, these solutions can help to reduce the workload for school administrators and improve the learning experience for students.

2.4 Challenges of the Solutions that Seek to Solve the Manual School Management Process

While the use of information and communication technologies (ICTs) and learning management systems (LMSs) has the potential to significantly improve the management of higher education institutions and provide better support to stakeholders, there are also some challenges and limitations to these solutions.

One challenge is the cost of implementing and maintaining these systems. Web-based systems and LMSs require hardware, software, and other resources to operate, and there may be ongoing costs for updates and maintenance. For higher education institutions with limited budgets, these costs may be a barrier to adoption.

Another challenge is the need for training and support. Web-based systems and LMSs may require users to learn new skills and navigate unfamiliar interfaces, which can be a challenge for those who are not tech-savvy or who are unfamiliar with the systems. This may require the provision of training and support to ensure that stakeholders are able to use the systems effectively.

Finally, there is also a risk of technological issues or failures, which can disrupt the operation of the systems and cause problems for stakeholders. This may be due to hardware or software issues, or to problems with the internet connection. Ensuring the reliability and stability of the systems is therefore an important consideration.

Overall, while the use of ICTs and LMSs can provide significant benefits, there are also challenges and limitations that need to be taken into account. Higher education institutions should carefully evaluate the costs, training and support needs, and technological risks associated with these solutions before deciding whether to adopt them.

2.5 Related Works

There have been numerous studies that have focused on the use of information and communication technologies (ICTs) and learning management systems (LMSs) to improve the management of higher education institutions and provide better support to stakeholders.

2.5.1 A review of the use of learning management systems in higher education.

This study examines the use of LMSs in higher education, with a focus on the benefits and challenges of these systems and best practices for their implementation. The study begins by providing an overview of LMSs and their role in higher education, including their key features and the types of tasks they are used for. It then goes on to discuss the benefits of LMSs, including improved access to information, greater flexibility and convenience for students, and the ability to track student progress and engagement.

However, the study also identifies a number of challenges and limitations to the use of LMSs in higher education. These include the cost of implementation and maintenance, the need for training and support, and the risk of technological issues or failures. The study also notes that there may be resistance to the adoption of LMSs from some stakeholders, such as teachers who are unfamiliar with the systems or who prefer traditional teaching methods.

To address these challenges and ensure the success of LMSs in higher education, the study recommends a number of best practices for their implementation. These include the development of clear policies and guidelines for the use of LMSs, the provision of training and support to stakeholders, and the identification and addressing of potential barriers to adoption.

2.5.2 A comparative study of the effectiveness of different learning management systems in higher education

This study compares the effectiveness of different LMSs in higher education, examining factors such as user satisfaction, learning outcomes, and the adoption of the systems by teachers and students.

The study begins by reviewing the literature on the use of LMSs in higher education, including the benefits and challenges of these systems and the factors that influence their effectiveness. It then goes on to present the results of a comparative study of four different LMSs, which were evaluated based on a range of measures including user satisfaction, learning outcomes, and adoption rates.

The results of the study showed that there were significant differences in the effectiveness of the different LMSs, with some systems performing better than others in terms of user satisfaction and learning outcomes. The study also found that the adoption of LMSs by teachers and students was influenced by a range of factors, including the ease of use of the systems, the availability of training and support, and the integration of the systems into the curriculum.

Overall, this study provides valuable insights into the effectiveness of different LMSs in higher education and can help to inform the development and implementation of the Integrated School Management System. By considering the factors that influence the effectiveness of LMSs and the preferences of teachers and students, the project team can ensure that the system is designed to

2.6 Gaps in Related Works

There are several gaps in the related works that have been identified in the studies on the use of information and communication technologies (ICTs) and learning management systems (LMSs) in higher education. These gaps may provide opportunities for further research and development in the field, including for the Integrated School Management System project.

One gap that has been identified is the lack of research on the integration of ICTs and LMSs into a single, comprehensive system for managing higher education institutions. While there are numerous studies on the use of ICTs and LMSs individually, there is less research on the integration of these technologies into a single platform that covers the entire lifecycle of a student's journey in an institution. This may provide an opportunity for the Integrated School Management System project to contribute to the field by developing and evaluating a system that integrates the various components of ICTs and LMSs.

Another gap in the related works is the lack of research on the scalability and flexibility of ICTs and LMSs in higher education. While these technologies have the potential to improve the management of higher education institutions, there is a need to understand how they can be customized and adapted to meet the needs of different institutions, each with its own unique context and requirements. Further research on the scalability and flexibility of ICTs and LMSs may be useful for the Integrated School Management System project, as it considers how to design the system to be adaptable to the needs of different higher education institutions.

Overall, the gaps in the related works highlight opportunities for further research and development in the field of higher education management,

2.7 Conceptual Framework

The system has six users, the administrator, the teacher, the accountant, the librarian, the student and the parent. The figure below shows a detailed overview and functionality representation of the users and the system.

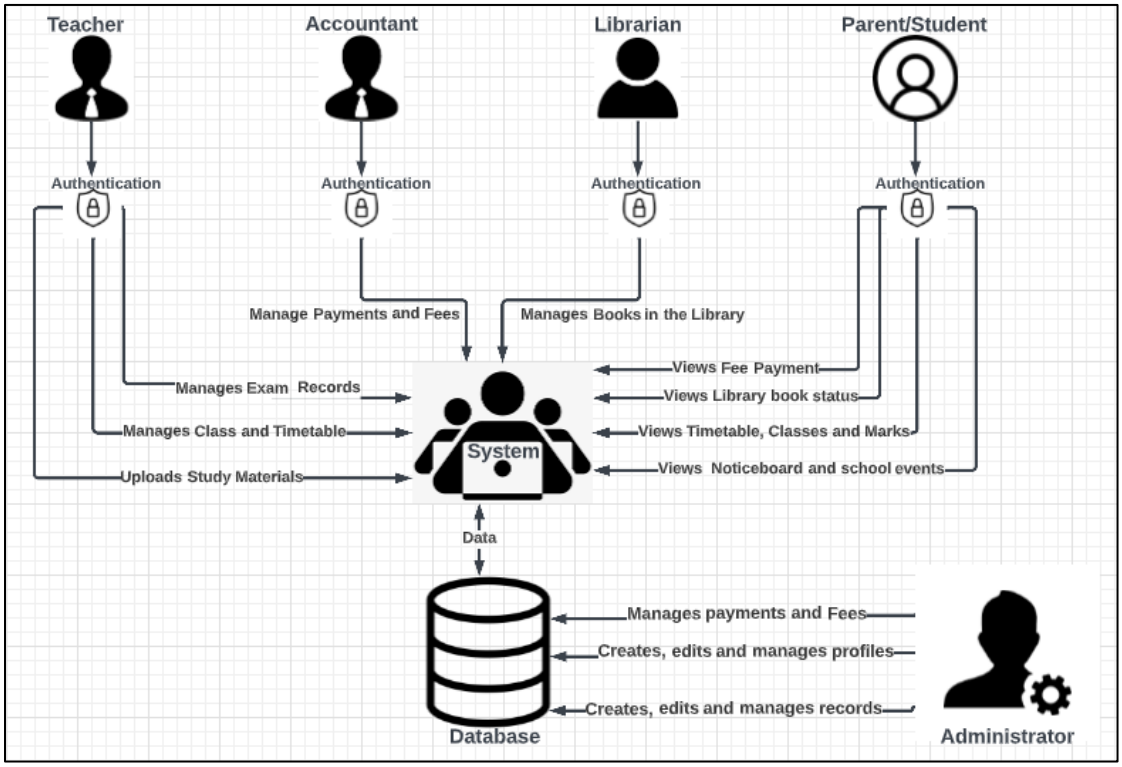

Figure 2.1 Context Diagram

The administrator manages the entire system. They can create, update and delete all profiles and records in the database. They manage the students' classes, subjects, timetables, exams and grades. They are also able to manage the payments made and view what is going on in the system. The accountant manages the payments and fees and thereafter prints the payments receipts. The teacher manages their own class, the exam records of their subjects and the timetable if assigned as a class teacher. The students view their teacher's profile, their own class subjects, their marks, the class timetables, their fees statement and the events calendar of the school. The parents have similar roles to their children, however they can only view their children's details. All users are able to manage their own profiles.

Chapter 3 : System Implementation and Testing

This section discusses the implementation and testing of the system. It entails the description of the implementation environment and the testing process.

3.1 Description of the Implementation Environment

This section focuses on the various hardware and software specifications required to operate the system effectively

3.1.1 Hosting and Deployment

The Learning Management System was deployed and hosted using digital ocean. Two droplets (Ubuntu Servers) were created host the main system and the communication module. The table below shows the specifications of the droplets that were used:

Table 3.1 Hardware Specifications

Hardware Component	Specification
Memory	1GB
SSD Storage	25GB
Operating System	Ubuntu 20.04 (LTS)
CPU	1 Regular CPU

Server management was facilitated through SSH connections that enabled us to remotely access the servers and configure them to our needs. A deployment script, Larasail, was used to install operation dependencies which include PHP, MYSQL, Composer, and Node.js.

Figure 3.1 Droplets Image

The domain name used for was purchased from name.com (the domain registrar) but it was linked to the hosting platform through listing its nameservers (e.g., ns1.digitalocean.com) in the registrar's management tool. The subdomains used for the main system and communication module were "iapuniversity.temba.live" and "communities.temba.live" respectively.

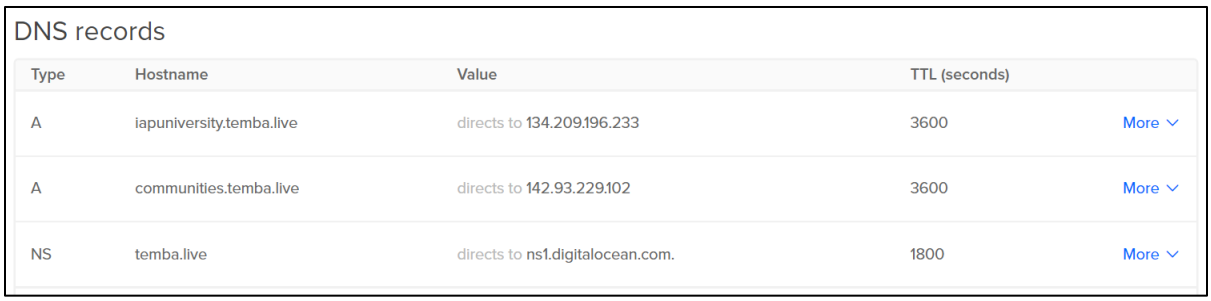

Figure 3.2 DNS Records

3.2 Description of Testing

The system was tested by performing black box testing to test the functionality of the system. This paradigm is whereby the software applications are tested without having knowledge of the internal code structure, implementation details and internal paths. Black box testing mainly focuses on the input and output of the software application.

3.3 Testing Results

Table 3.2 Testing Results

Test Case	**Test Description**	**Test Data**	**Result**	**Test Verdict (Pass/Fail)**

User Sign Up 1	Creating an account with correct credentials	Riele Downs Student 101234 rdowns@gmail.com RDowns02	Validation email and account created	Pass
User Sign Up 2	Creating an account with missing credentials	Paul Munene Student P0LMUNENE!	Error message displayed and account not created	Pass
User Login 1	Login a user with valid credentials	rdowns@gmail.com RDowns02	Redirected to the user view	Pass
User Login 1	Login a user with invalid credentials	rdowns@gmail.com rdowns02	Error message displayed and user redirected to the login	Pass
Admin crud	An admin deleted a user	Delete rdowns@gmail.com	Redirected to the list of users and the deleted record is missing	Pass

User teacher 1	A teacher uploads study materials	Adds pdf, powerpoint and recordings	Redirected to the class and the materials are uploaded and visible	Pass
User teacher 2	A teacher updated students marks and grades of Art class	Joseph Titus – 52 C Ova Mohr – 51 C Ricky Ian – 67 B Riele Downs – 74 A	Redirected to the list of students with the grades updated	Pass
User Librarian	Adds a book to list of borrowed books	Who moved the cheese? Borrowed by Riele Downs Borrowed on 27/12/2022 To be returned on 10/01/2023	Redirected to the list of borrowed books with this added to the list	Pass
User Accountant	Manages fee payment and prints out the receipt	Riele Downs – 120,000	Updated on the system.	Pass

User Student	Views the noticeboard and the school events in the calendar	Noticeboard School Events	Redirected to the noticeboard page and one with the school's events	Pass
User Parent	Views Child's mark sheet and Downloads PDF	Riele Downs Report Sheet	Redirected to the Report sheet page and allowed to download and print	Pass

Chapter 4 : Conclusion, Recommendation and Future Works

4.1 Conclusion

In conclusion, overseeing institutions of higher learning is a challenging responsibility that necessitates the coordination and monitoring of multiple academic and administrative procedures. The use of information and communication technologies (ICTs) and learning management systems (LMSs) to automate and streamline academic and administrative processes and support the work of teachers are just a few of the approaches that have been suggested in the literature to address the difficulties and limitations of manual school management processes. Although these solutions have the potential to increase management efficiency and effectiveness in higher education, they also have their own drawbacks and restrictions, such as costs, need for support and training, and potential security issues.

4.2 Recommendation

In conclusion, the management of higher education institutions is a complex task that requires the coordination and tracking of numerous academic and administrative processes. To address the challenges and limitations of manual school management processes, various approaches have been proposed in the literature, including the use of information and communication technologies (ICTs) and learning management systems (LMSs) to automate and streamline academic and administrative processes, and support the work of teachers. These solutions have the potential to improve efficiency and effectiveness in higher education management, but also come with their own challenges and limitations, including costs, training and support needs, and technological risks. Based on this literature review, it is recommended that the Integrated School Management System project consider integrating the various components of ICTs and LMSs into a single, comprehensive platform, designing the system to be scalable and flexible, making it user-friendly and intuitive, and ensuring its reliability and security. By taking these points into account, the project team can maximize the effectiveness and adoption of the system by stakeholders.

4.3 Future Works

There are several areas for future work that may be relevant to the Integrated School Management System project, based on the gaps in the related works and the challenges and limitations of current

solutions. These include evaluating the system to understand its effectiveness and impact, customizing and adapting the system to meet the needs of different higher education institutions, ensuring the scalability and sustainability of the system as it is adopted by more institutions, and integrating the system with other systems used by higher education institutions. By addressing these areas, the Integrated School Management System project has the potential to make significant contributions to the field of higher education management, and to address the challenges and limitations of current approaches.