
Software Design Specification

for

BakaResearch

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1. Introduction

This section provides an overview of everything included in this SDS document. The purpose of this document is described and a list of definitions and abbreviations is provided.

1.1 Purpose of this document

The purpose of this document is to describe the technical and UI design of BKR system. It includes the architectural design and the detailed design. It also includes the design of operational database.

- The architectural design describes the overall architecture of the system, and the architecture of each main component and subsystem.
- The detailed design describes static and dynamic structure for each component and function.
- It includes class diagrams, class explanations, and sequence diagrams of the main use cases.
- The database design describes the relationship between entities, and details of each entity.

1.2 Scope of the development project

This Web-based system will be a social network site named BakaResearch. It is for scientists and researchers to share documents, their own research and find collaborators, colleagues. Users may also follow the activities of other users and engage in discussions with them. More specifically, this system support users to confirm colleague relationship or friend relationship with others. Users can search the documents uploaded by others and can have interactions with them such as like, download, discuss, vote,.. and the system can store the information of the relationship among users and documents.

1.3 Definitions, acronyms, and abbreviations

Term	Definition
Admin	Abbreviation for “Administrator” - who manages the website and has permission to control user accounts and their article.
BKR	Abbreviation for “BakaResearch”, it is the name of the software whose requirements to be specified in this document.
DB	Abbreviation for “Database”, it is an organized collection of data, stored and accessed electronically.
DD	Abbreviation for “Detailed Design”
GUI	Abbreviation for “Graphical User Interface”, it is a type of user interface that allows users to interact with electronic devices through graphical icons and visual indicators.
IDE	Abbreviation for “Integrated development environment”, it is a software application that provides comprehensive facilities to computer programmers for software development.
Logged-in User	User who have logged into the system.

MVC	Abbreviation for “Model View Controller”, it is a architecture which specifically used in applications where user interfaces are prone to data changes.
SDS	Abbreviation for “Software Design Specification” which is a written description of a software product, that a software designer writes in order to give a software development team overall guidance to the architecture of the software project.
SRS	Abbreviation for “Software Requirements Specification”: A document that completely describes all of the functions of a proposed system and the constraints under which it must operate. For example, this document.
Stakeholder	Any person with an interest in the project who is not a developer.
User	A person who interacts with the system.

1.4 References

- Sample Design at Introduction to software engineering (I2SE) course in cms.fpt.edu.vn
- Software Architecture Design Illuminated Book
- FMO_Architecture_Design_v1.0.docx
- FMO_Detailed_Design_v1.0.docx
- FMO_Functional_Requirement_Specification_v1.0.docx
- JYH_FinalReport.pdf
- RedundantSystem_Sample.pdf

1.5 Overview of document

The Software Architecture Document contains the following subsection:

Choice of Architecture: describe the architecture of system.

Architecture Representation: describe the purpose of each view of the system.

Architecture Goal and Constraints: describe the architecture constraints of the system.

Scenarios: describe the major use cases of the system

Logical View: describe the logical parts of the system

Process View: describe the main processes of the system and the external system that it interacts with.

Development View: describe how the system will be implemented, in development perspective.

Physical View: describe how the system will be deployed.

System Design: describe the system design

Database Design: describe the database design

Class diagram: this section contains the definition and diagram of all classes in BKR system

UC detail design: include the description of screen design and sequence diagram for all functions in BKR system

2. System architecture description

2.1 Architecture Overview

2.1.1 Choice of Architecture Design

As the overall architecture of BKR System, the architecture we supposed that suitable for the situation is MVC structure combined with layer architecture.

2.1.1.1 MVC Architecture

About BKR:

BKR is a Web portal system, which interacts with customers as well. It is an interactive applications where multiple views are needed for a single data and the interfaces are prone to frequent data changes.

About MVC architecture:

About MVC architecture, it allows separation of presentation and business logic, and hence the flexibility in extension and modification. The basic idea of MVC is to use a model to maintain the data of the system, a view for presenting the data, and a controller to serve as a middleman between view and model.

Besides, MVC can be implemented on many platforms including Java. For example, on Java platforms, JSP pages are usually used as View, Java Servlet classes are used as Controller, and Java Bean objects and back-end databases are used as Model.

All of those things make it very easy to change or plug in new interface views, allowing updating of interface views with new technologies without overhauling the rest of the system.

2.1.1.2 Multi-tier Architecture

In a client server architecture, the functionality of the system is organized into services, with each service delivered from separate server. Clients are users of these services and access to make use of them.

We will use this Multi-tier Client Server Architecture because, when data in a shared database has to be accessed from a range of locations. Because servers can be replicated, may also be used when the load on a system is a variable.

BKR System has the application would be deployed on Web, the application is the presentation layer. Client send request to application server, application server then handle request by itself.

The server will handle their own data source of the data layer, which consists of operational database (for application server).

Finally, common services, which are used by our system, are placed on the external service component, independent from BKR system.

2.1.2 Architectural representation

The BKR Architecture is represented by five views defined in 4+1 view model. The views of the system includes Scenarios defining key functionality, the Logical View is concerned with the functionality that the system provides to end-users, the Process View deals with the dynamic aspects of the system, explains the system processes and how they communicate and focuses on the runtime behavior of the system, the Development View illustrates a system from a programmer's perspective and is concerned with software management and the Physical View depicts the system from a system engineer's point of view - it is concerned with the topology of software components on the physical layer as well as the physical connections between these components.

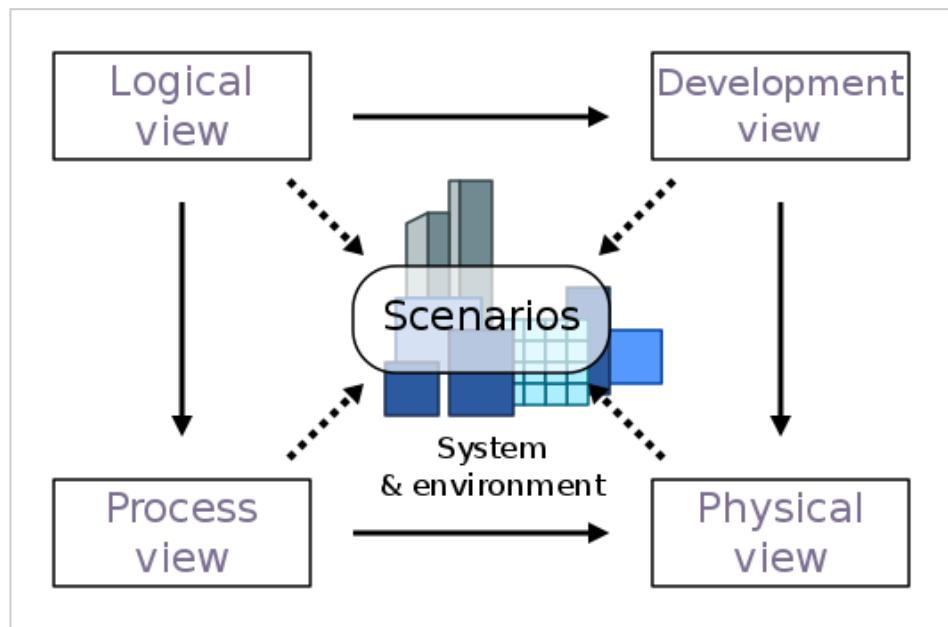


Figure 2.1.2: The 4+1 View Model

1. Scenarios:

Audience: All stakeholders

Related Artifacts: Use Case Diagram.

Area: This view overviews BKR's use cases that define the functions expected of the software. It describes major use cases that have significant impact on the system architecture.

2. Logical View:

Audience: Designers

Related Artifacts: Design Model

Area: This view contains diagrams and descriptions of the software tiers and components within each tier needed to perform the functions documented in the Scenarios.

3. Process View:

Audience: Integrators

Related Artifacts: N/A

Area: This view describes the set up, break down, and run-time architecture of the system in terms of the processes and threads that execute on each system platform.

4. Development View:

Audience: Programmers

Related Artifacts: Implementation Model, components

Area: This view describes the actual software components that support the implementation of the logical and process views. The view contains an enumeration of all subsystems in the implementation model, package diagrams illustrating how subsystems are organized as bodies of programming code.

5. Physical View

Audience: Deployment Managers

Related Artifacts: Deployment Model

Area: This view describes the mapping of the software onto the hardware (network topology) in various deployments along with the software configurations needed to support these deployments.

2.1.3 Architectural goals and constraints

2.1.3.1 System Throughput

- The system must be capable of scaling up-to 100 users with the addition of faster or greater capacity hardware without software changes. It can support for 50 concurrent logged users into the system.
- The system must be able to process and still meet the response-time targets up-to a maximum of 5000 user-transactions per day for insert, update, & query transactions.
- The system must be able to process and still meet the response-time targets (see below) for up-to a maximum of 30 user-transactions per second for normal function and sustained for at least 5 minutes.

2.1.3.2 Response Time

All user commands and functions must complete and return control to the user within period defined in the following table. These requirements are defined for local network that has bandwidth ≥ 1 Gigabit/s and respond times are calculated base on one standard system; it does not include the time data transferred through network devices and wires.

Function Type	Description	Response Time (seconds)
Data Validation	The system will validate data	3
Simple	The function has < 2 transactions per request	5
Medium	The function has ≥ 2 and < 4 transactions per request	7
Complex	The function has ≥ 4 and < 6 transactions per request	10
Very Complex	The function has ≥ 6 and < 8 transactions per request	13

2.1.3.3 Safety

System have to backup data every 30 minutes

2.1.3.4 Scalability

BKR system should be designed and developed so that system can be deployed in the clustering & load balancing servers – for database, business server and web server.

2.1.3.5 Security

The HTTP protocol will be used to facilitate communications between the client and server and HTTPs protocol will be used for all BKR functions. Basic password authentication and role based security mechanisms will be used to protect BKR site from unauthorized access. All information of users must be secured per requirements of HIPAA and TRUSTe.

2.1.3.6 Availability

The application must be available 95% of time. Users can access to it everywhere from there. Web browser with internet connection.

2.1.3.7 Maintainability

- Coding standards and naming conventions:
 - Output of the project must include coding standards and naming conventions documentations. Implementation code must be easy to maintain.
 - All code must be clearly commented, including class, method documentations.
 - If some components are reused, the documentations of those components must also be included.
- Design:
 - The design of the system must be loosely coupled that changes on some module will not affect others.
- Logging:
 - All the errors should be logged, supporting for bug fixing and maintenance.
 - All strange or sensitive situations also be logged.

2.1.3.8 Usability

Usability Requirements support the following from the perspective of its primary users.

2.1.4 Scenarios

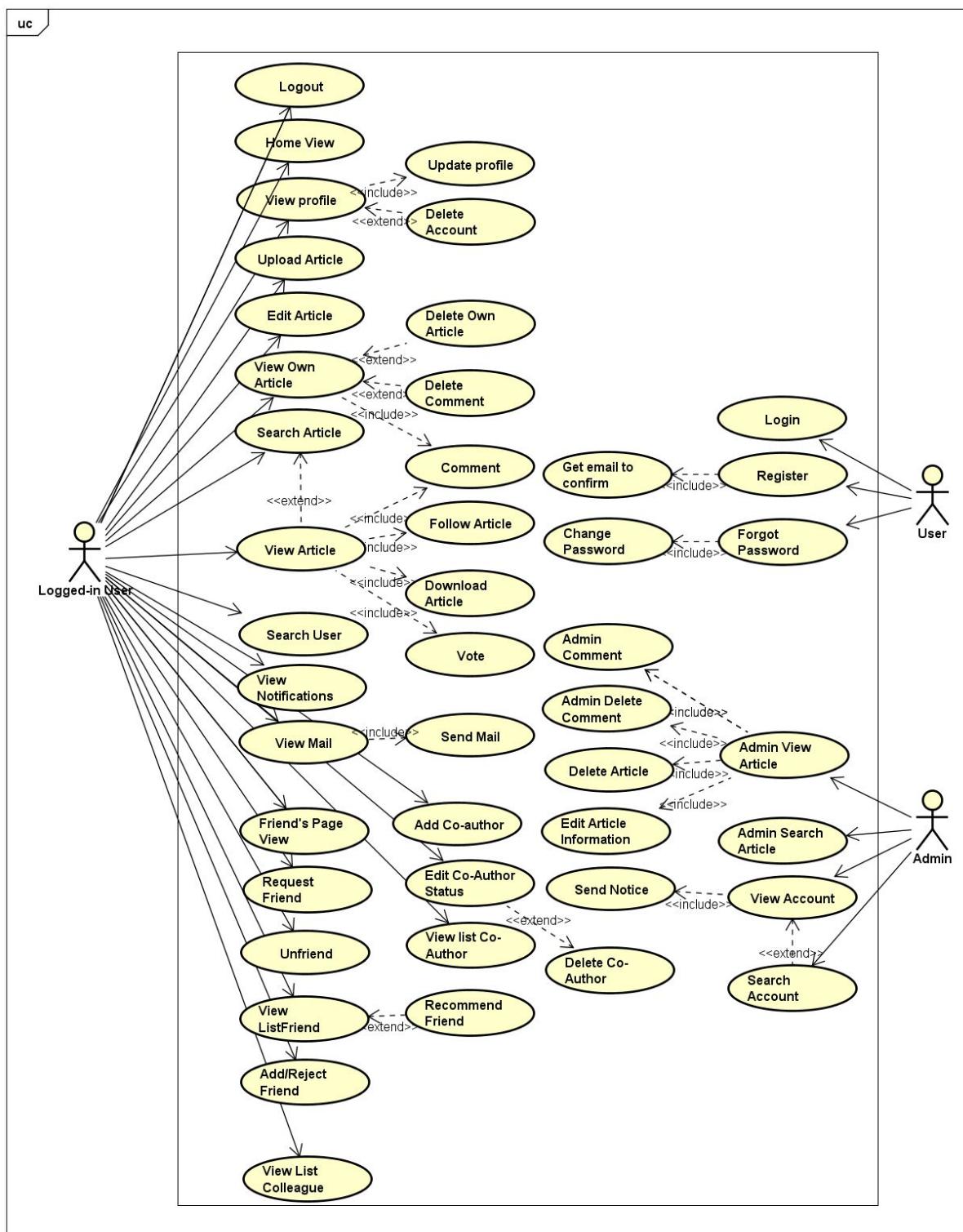


Figure 2.1.4: Use case diagram

Scenarios include 6 modules, one module include a list of use cases. And all the use cases that represent significant and major functionality of the system. The use cases that have impact on the system are:

2.1.4.1 Authentication Module

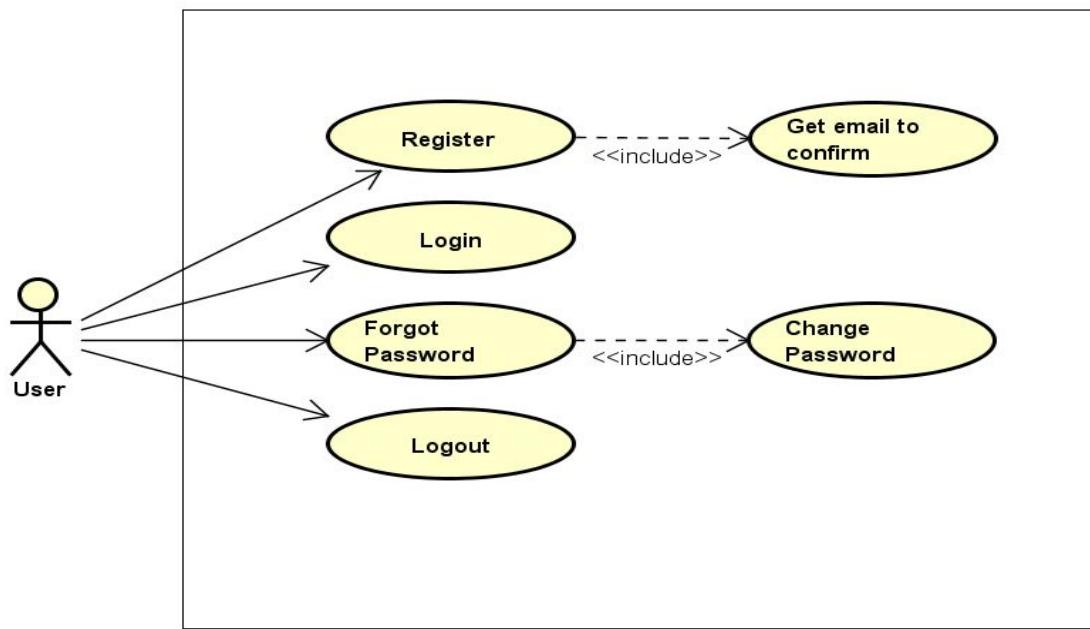


Figure 2.1.4.1: Authentication module

No	Use-case name	Actor	Description
1	Register	Guest	Create an account to access system
2	Get email to confirm	Guest	Verify the email of user
3	Login	User	Using account to access and use system's feature
4	Forgot password	Logged-in User	Support member who forgot password can receive new password
5	Change password	Member	Change password of an account
6	Logout	Logged-in User	Logout from system

2.1.4.2 Profile View Module

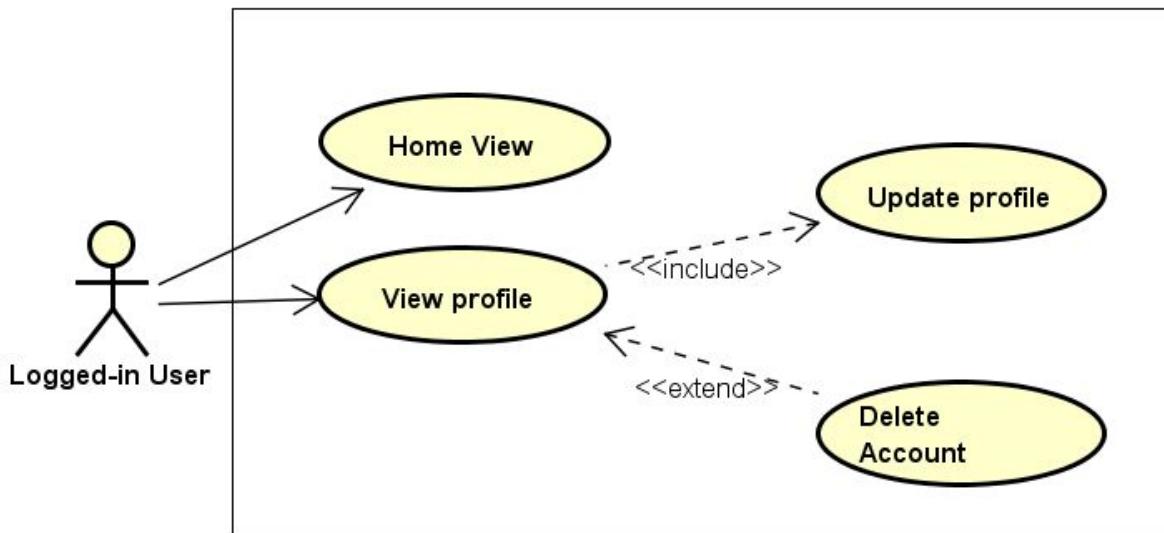


Figure 2.1.4.2: Profile View Module

No	Use-case name	Actor	Description
1	Home View	Logged-in User	Include all the article sort by time that user have rights to read.
2	View profile	Logged-in User	View profile of an account.
3	Update profile	Logged-in User	Update the information that user want to change.
4	Delete Account	Logged-in User	Delete all the information, data, documents,... which relate with the account.

2.1.4.3 Article Module

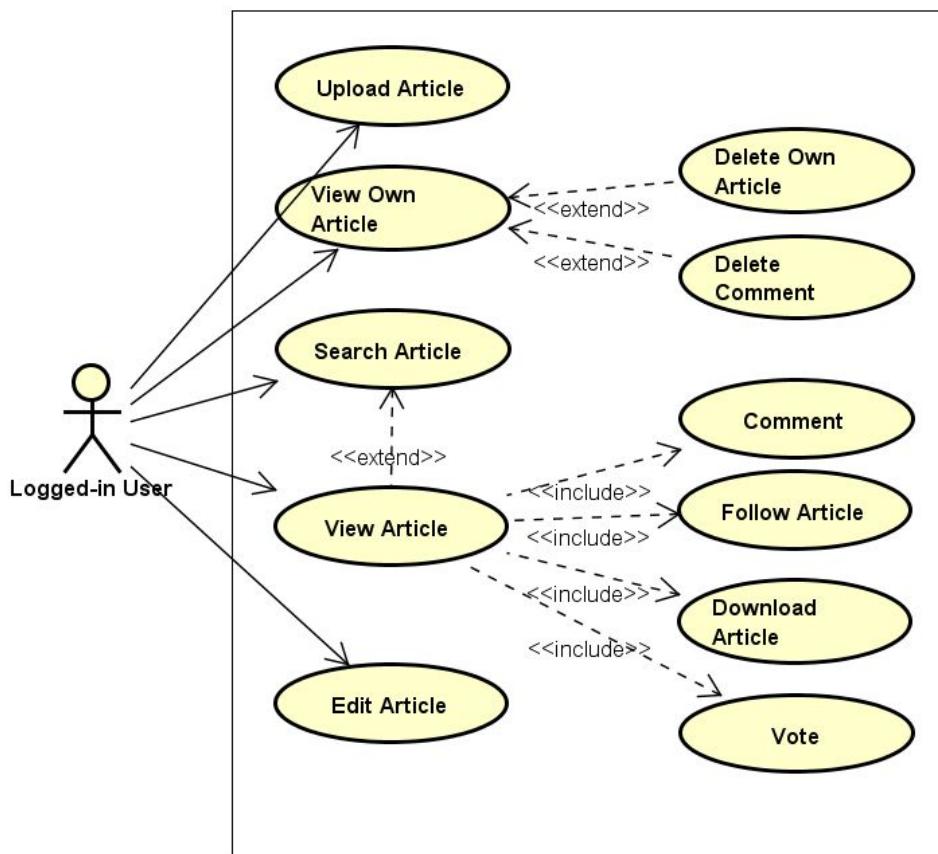


Figure 2.1.4.3: Article Module

No	Use-case name	Actor	Description
1	Upload Article	Logged-in User	Create new Article and upload it to server
2	View Own Article	Logged-in User	User views and manages data of his/her own Article
3	Delete Own Article	Logged-in User	User deletes his/her own Article or removes user's ownership if selected Article is co-author
4	Edit Article	Logged-in User	Edit the information of the Article of user.
5	Search Article	Logged-in User	Search Article by selected predefined filters.
6	View Article	Logged-in User	User views the details of selected Article
7	Delete comment (on Article)	Logged-in User	Delete the unwanted comment.
8	Comment (on Article)	Logged-in User	User leaves a comment below of selected Article
9	Follow (Article)	Logged-in User	User follows a Article to receive notification for all changes of it

10	Download (Article)	Logged-in User	User downloads a Article to local
11	Vote	Logged-in User	User vote up/down a Article to review it

2.1.4.4 Interaction Module

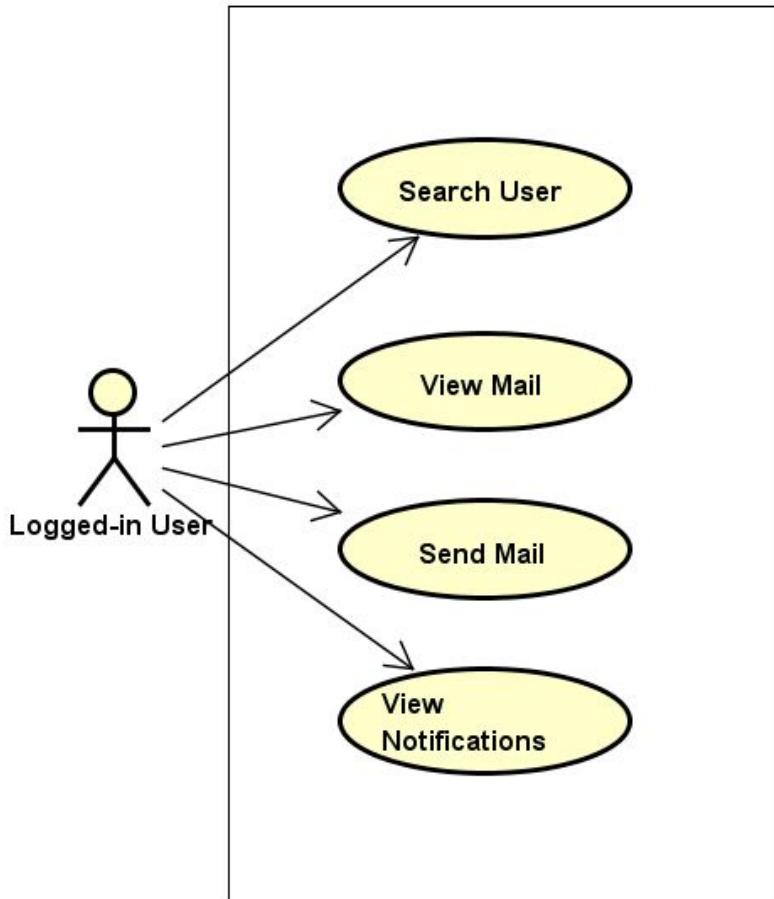


Figure 2.1.4.4: Interaction Module

No	Use-case name	Actor	Description
1	View Notification	Logged-in User	View notifications from the system which can be friend request, react of other users on the document user are following...
2	Search User	Logged-in User	User can search user by name or mail.
3	View Mail	Logged-in User	User can receive mails from another user.
4	Send Mail	Logged-in User	User can send mail to reply or send a new mail.

2.1.4.5 Relationship Module

2.1.4.5.1 Friend Relationship Management

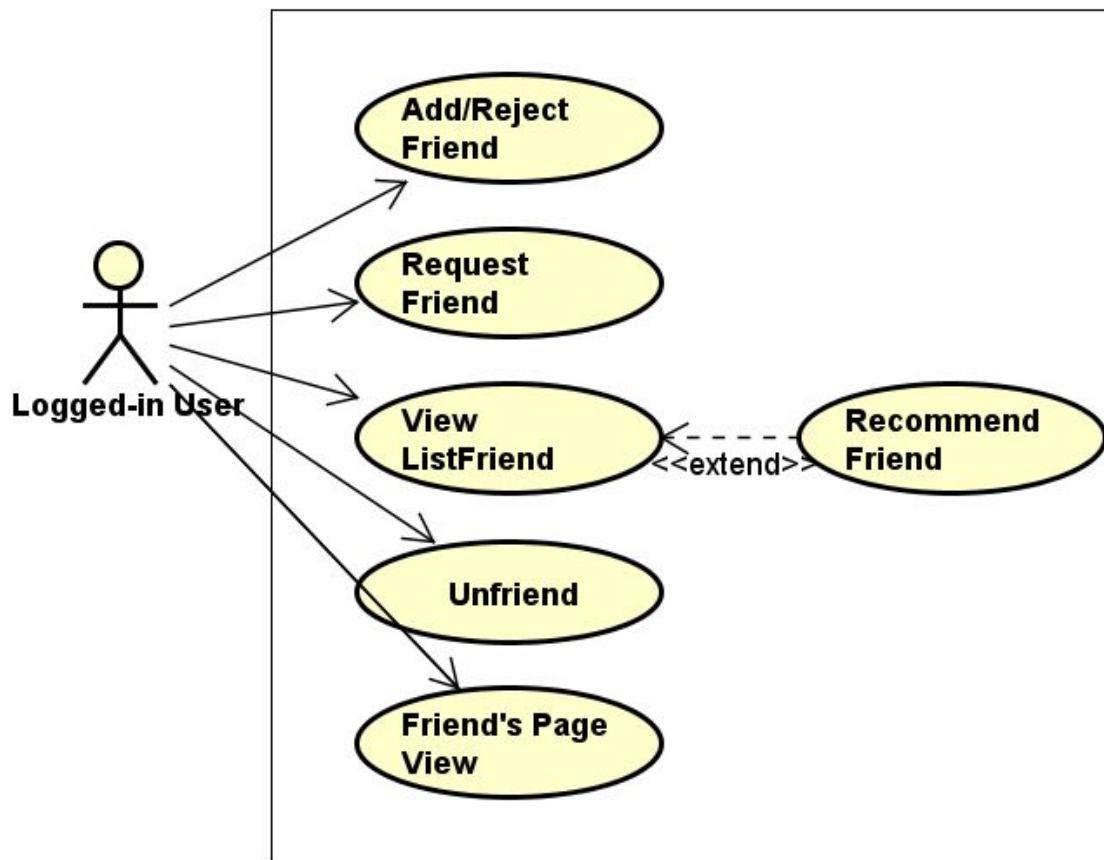


Figure 2.1.4.5.1: Friend Relationship Management

No	Use-case name	Actor	Description
1	Add/ Reject Friend	Logged-in User	Answer to a request to become a friend to another user.
2	Request Friend	Logged-in User	View all friend request which is sent to current user.
3	View List Friend	Logged-in User	View all friend of current user.
4	Recommend Friend	Logged-in User	Recommend some friend to other user.
5	Unfriend	Logged-in User	Delete someone from current friend list.
6	Friend's Page View	Logged-in User	View all information about friend.

2.1.4.5.2 Article Relationship Management

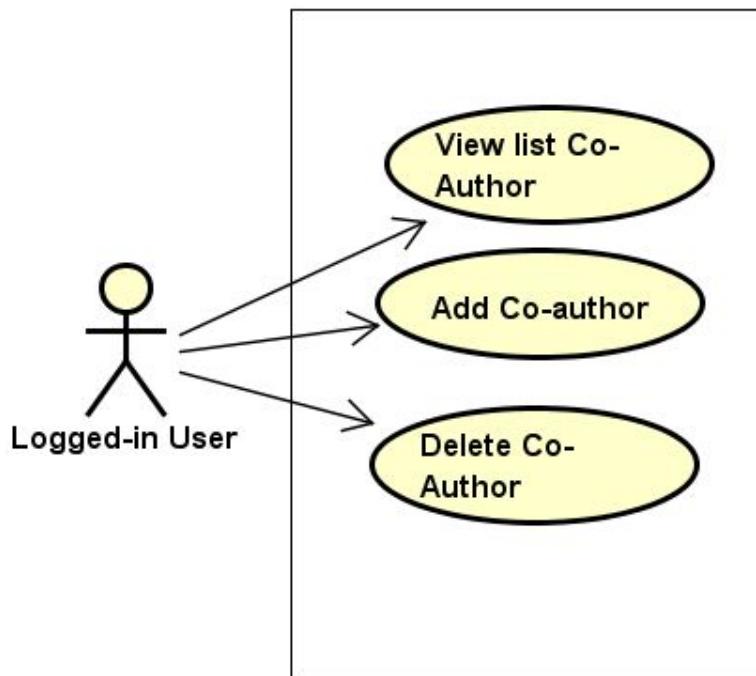


Figure 2.1.4.5.2: Article Relationship Management

No	Use-case name	Actor	Description
1	View list Co-author	Logged-in User	View all Co-author of an article.
2	Add Co-author	Logged-in User	Add a Co-author to eh article information.
3	Delete Co-author	Logged-in User	Remove the Co-author from the list of Co-author of article information.

2.1.4.5.3 Colleagues Relationship Management

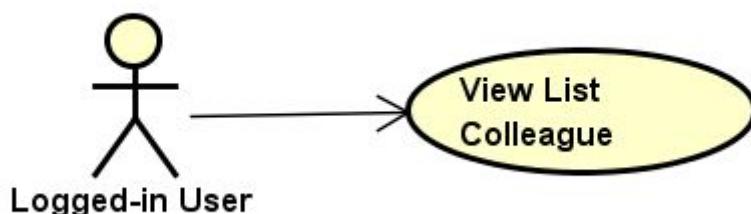


Figure 2.1.4.5.3: Colleague Relationship Management

No	Use-case name	Actor	Description
1	View List Colleague	Logged-in User	View all colleague of current user.

2.1.4.6 Admin Module

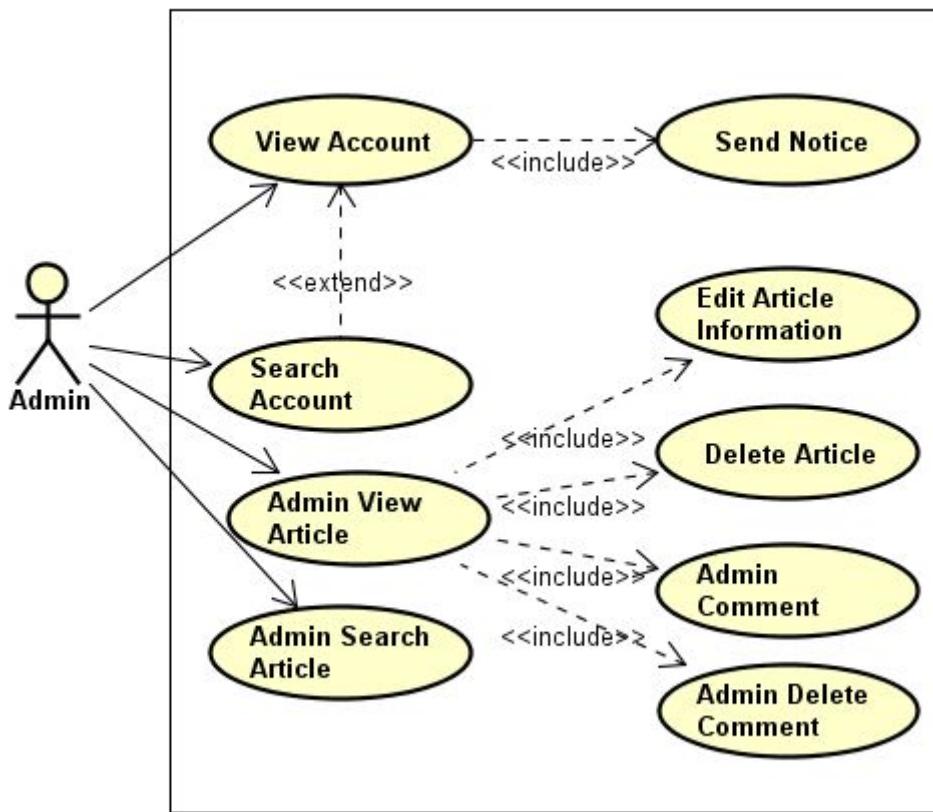
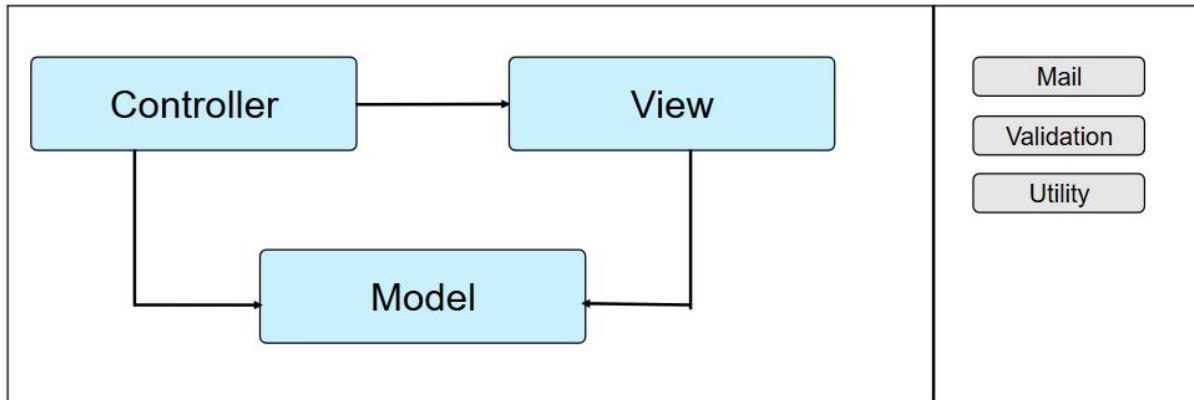


Figure 2.1.4.5: Admin Module

No	Use-case name	Actor	Description
1	View Account	Admin	Admin can view all the information of all accounts..
2	Send Notice	Admin	Admin send notice through mail system.
3	Search Account	Admin	Admin can search account in an effective way.
4	Admin View Article	Admin	Admin can view all articles.
5	Edit Article Information	Admin	Admin can edit article information.
6	Delete Article	Admin	Admin can delete any articles that violates to copyright law or have bad content which has adversely affect.
7	Admin Delete Comment	Admin	Admin can delete any comment which has adversely affect.
8	Admin Comment	Admin	Admin can comment in any post of article document.

2.1.5 Logical view

This section describes the architecturally significant parts of BKR from a logical perspective, independent of technology. The key functional components of the BKR architecture are presented in the following diagram:



Model: The Model manages the behavior and data of the application domain, responds to requests for information about its state and responds to instructions to change state.

View: The View manages the display of information. It renders the model into the suitable form of user interface elements.

Controller: The controller receives user inputs, informing the model and/or the view to change appropriately.

Common: This is the container of all shared modules that are used by three tier above.

- *Mail*: the Mail module contains functions to send notification mail and verify mail.
- *Validation*: The Validation module contains functions to validate input data, input request,...
- *Utility*: The Utility module contains utility functions (eg. Number and String functions...).

The diagram below explains how the Model, View, Controller work together in a simple request flow:

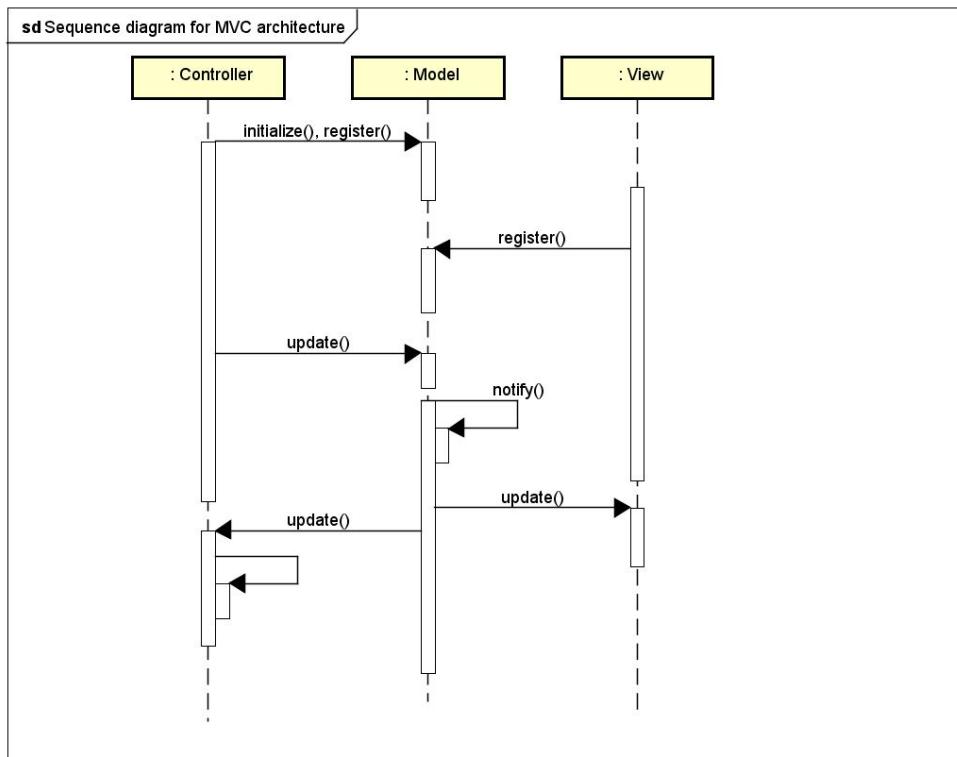


Figure 2.1.5: Logical View - How MVC Works

2.1.6 Process View

This section describes the decomposition of the software into independent execution processes, and the methods and modes by which these processes interact.

2.1.6.1 Client Environment

The client element of the BRK application will run on website using the default browser.

2.1.6.2 Server Environment

The application server components of BRK runs the presentation layer, business layer and data layer.

2.1.7 Development View

2.1.7.1 Development Technology

The BKD implementation includes:

- The major implementation language will be Java with MVC 2 as framework.
- HTML5 for presentation layer which enables the quality of UI.
- MongoDB will be the core database servers.

2.1.7.1.1 Why MVC2:

The MVC pattern helps developers create applications that separate the different aspects of the application (input logic, business logic, and UI logic), while providing a loose coupling between these elements. The pattern specifies where each kind of logic should be located in the application. The UI logic belongs in the view. Input logic belongs in the controller. Business logic belongs in the model. This separation helps developers manage complexity when they build an application, because it enables them to focus on one aspect of the implementation at a time. For example, developer can focus on the view without depending on the business logic.

The loose coupling between the three main components of an MVC application also promotes parallel development. For example, one developer can work on the view, a second developer can work on the controller logic, and a third one can focus on the business logic in the model.

MVC web application advantages:

- It makes it easier to manage complexity by dividing an application into the model, the view, and the controller.
- It does not use view state or server-based forms. This makes MVC framework ideal for developers who want full control over the behavior of an application.
- It provides better support for test-driven development (TDD).
- It works well for Web applications that are supported by large teams of developers and for Web designers who need a high degree of control over the application behavior.

2.1.7.2 Technology

2.1.7.2.1 View

The presentation layer will be implemented using HTML5 which provides richer web applications and improved usability. The new features of HTML5 standardize the use cases and technologies that are common in web applications to day.

2.1.7.2.2 Controller

The controllers will be implemented by Java based on MVC 2 framework.

2.1.7.2.3 Model

The Model will work with MongoDB.

2.1.7.2.4 Common

Mail: The Mail service API for Java supports the JavaMail (javax.mail) interface for sending email messages. Gmail API Client Library for Java support services interface for verify email.

Validation: This includes classes and methods which are used to validate input data.

Utility: This includes classes and methods which are used in different modules and can be reused, e.g. mathematics functions, date time functions...

2.1.8 Physical View

2.1.8.1 Hardware recommendations for servers

Processor: Minimum Intel Pentium IV with EM64T support, recommended: 64-bit, four cores. Processor speed - minimum: 1.4GHz, recommended: 2.0 GHz or faster.

RAM: Minimum: 2GB, Recommended 4GB or more, Maximum: 64GB to 2TB

Hard disk: 80GB for system drive

2.1.8.2 Software recommendations for servers

Application server: Window 2008 R2 64-bit x64 Standard OR Windows Server 2008 SP2 64bit x64 Enterprise; IIS 7 or above.

Database server: Window 2008 R2 64-bit x64 Standard OR Windows Server 2008 SP2 64bit x64 Enterprise; MongoDB

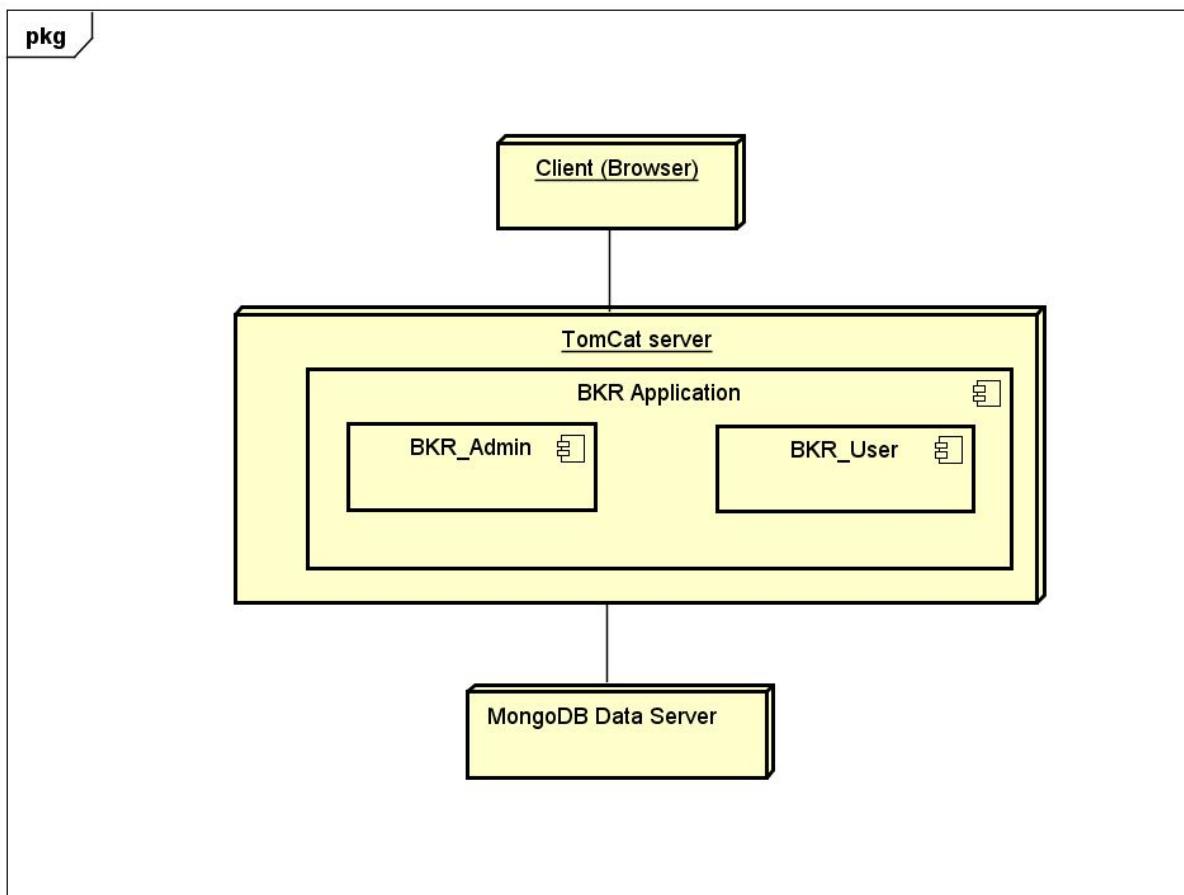


Figure 2.1.8: Deployment Diagram

2.2 System Design

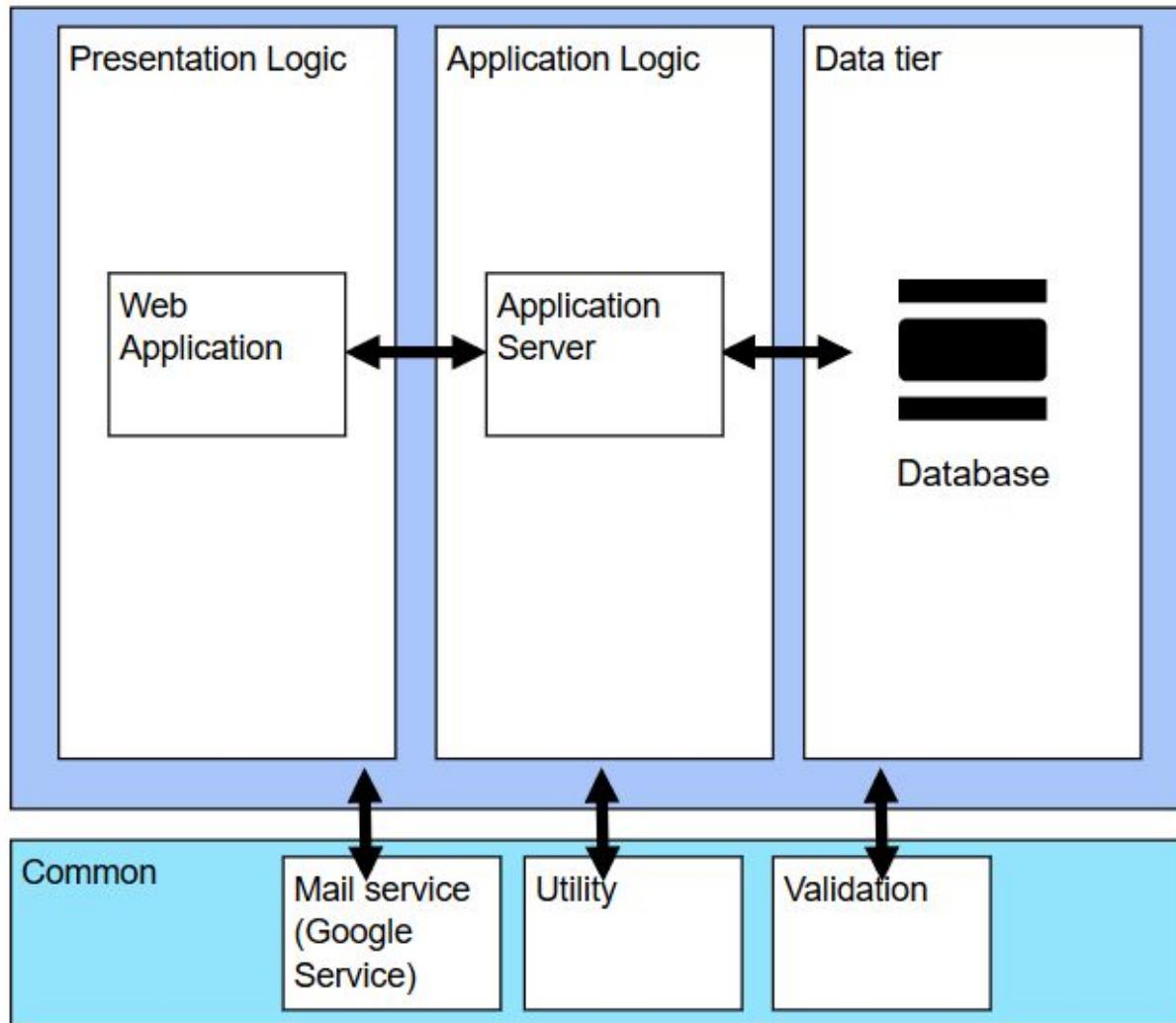
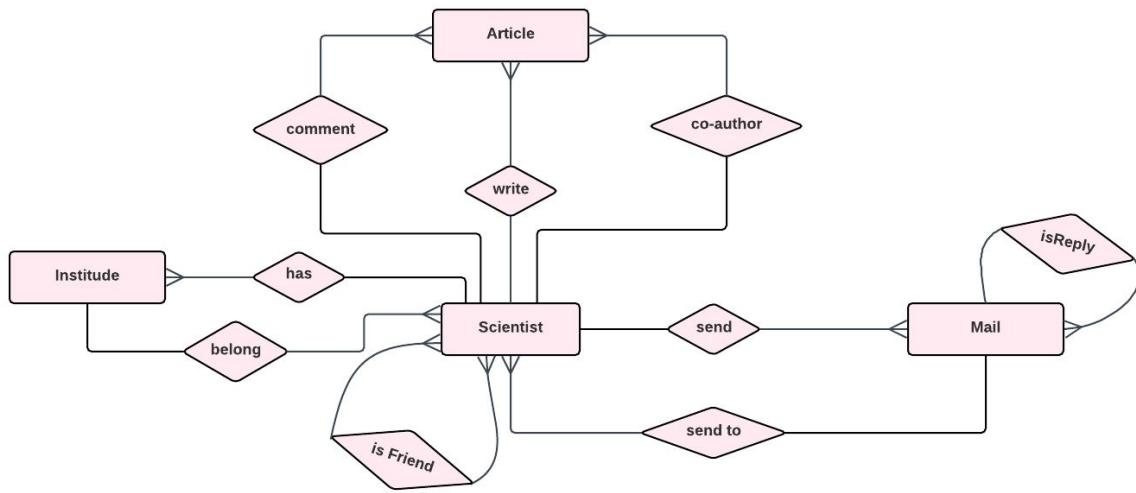


Figure 2.2: Architecture design

2.3 Database Design

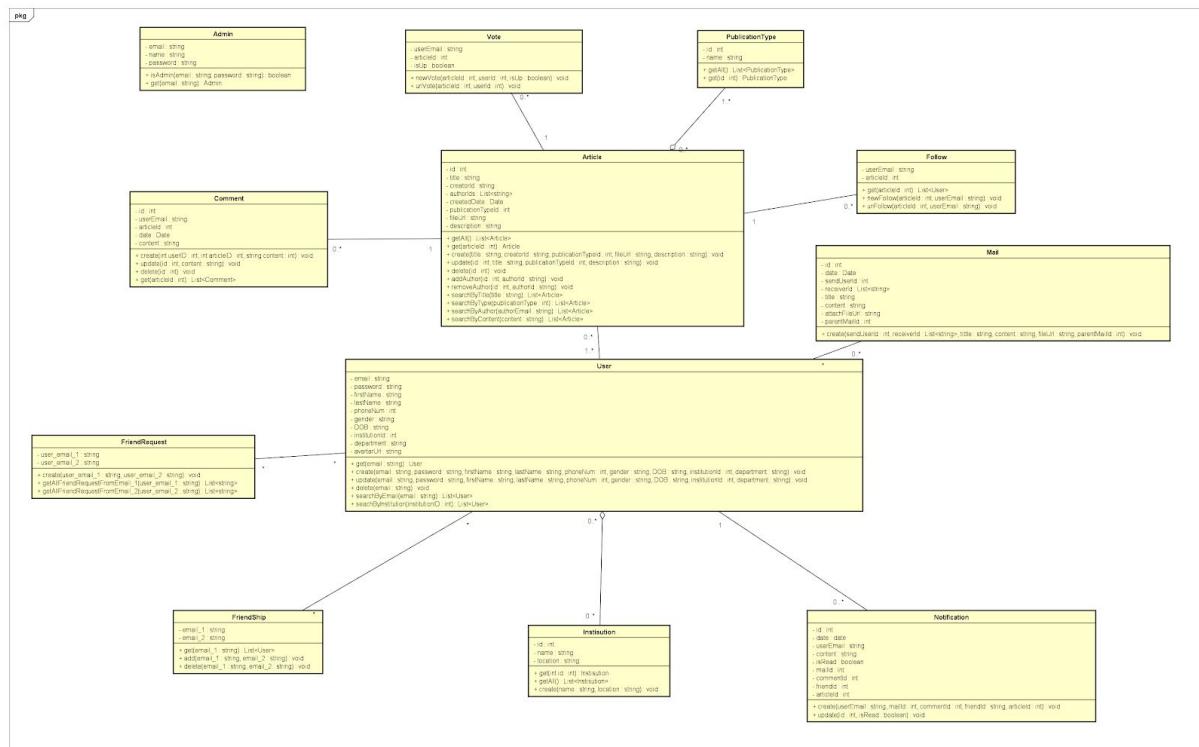
2.3.1 Entity Relationship Diagram



3. Detailed description of components

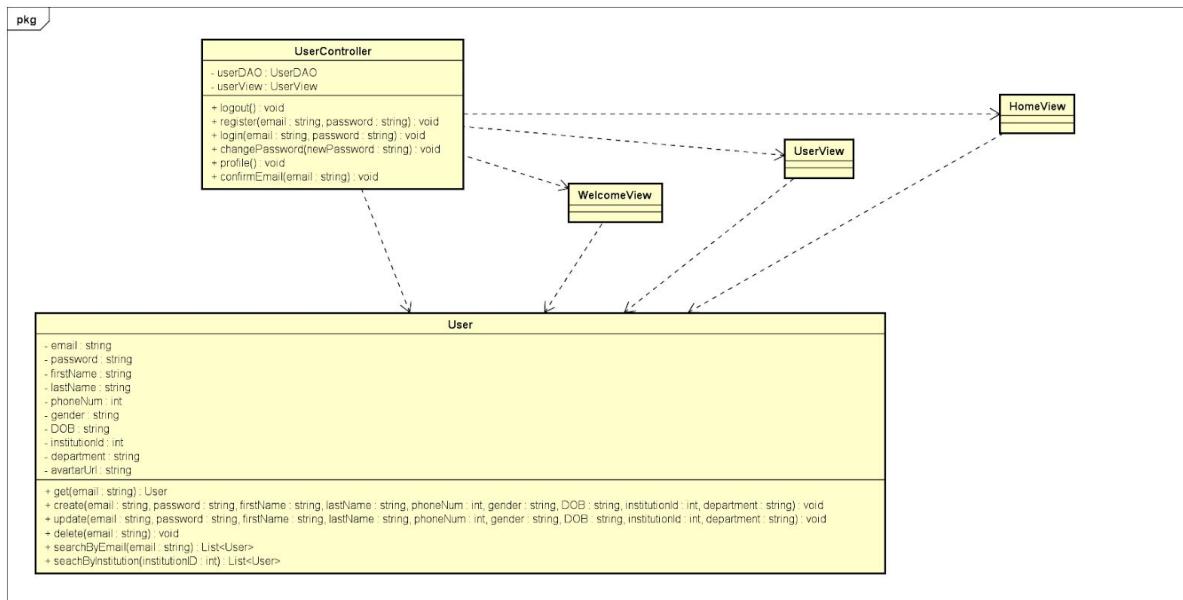
3.1 Class diagram

Figure



3.1.1 Authentication Module

[Figure](#)



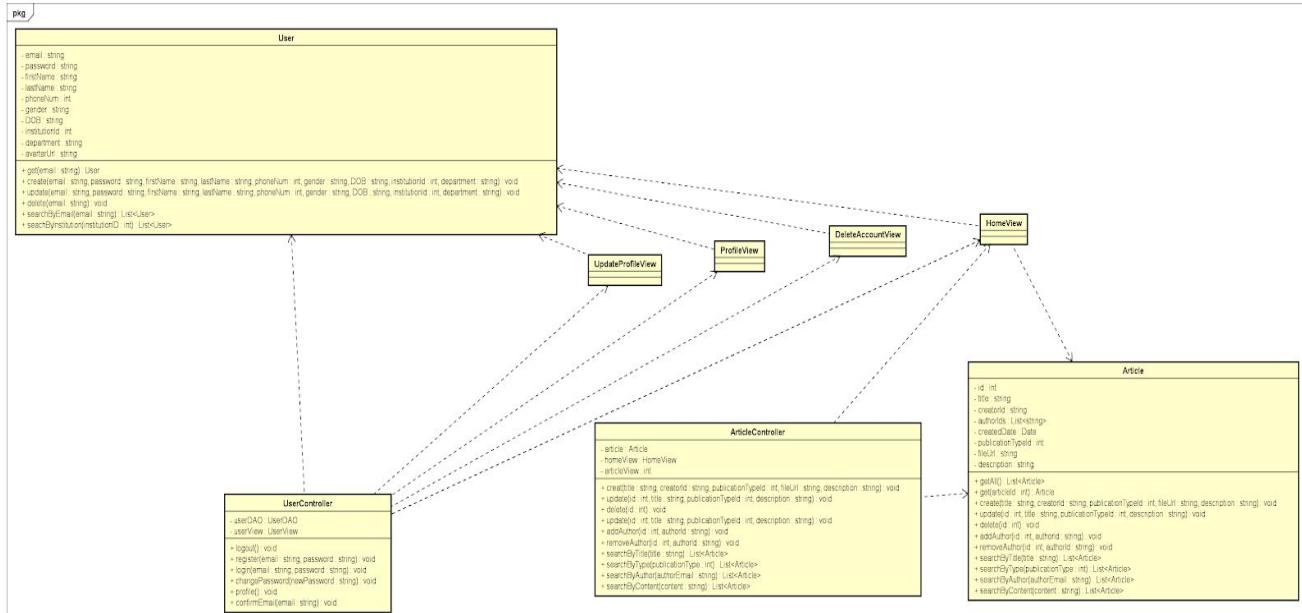
Class	User		
Description	All attributes and components of user		
Base Class			
Source File			
Namespace	Entity		
Attributes	Name	Type	Description
	Email	string	User's email
	Password	string	User's password
	FirstName	string	User's first name
	LastName	string	User's last name
	PhoneNum	int	User's telephone number
	Gender	string	User's gender
	DOB	string	User's date of birth
	InstitutionID	int	User's institution ID
	Department	string	User's department
	AvatarURL	string	User's url of avatar
Methods	Name	Input	Output
	get	string Email	User user
	create	string email, string password, string firstName, int phoneNum, string gender, string DOB, int institutionId, string department	void

	update	string email, string password, string firstName, int phoneNum, string gender, string DOB, int institutionId, string department	void	Create user account information
	delete	string email	void	Delete an user account by email
	searchByEmail	string email	User	Search user of which email matches with condition
	searchByInstitution	institutionID int	List<User>	Search all user which has the institutionID is the same as condition

Class	UserController			
Methods	Name	Input	Output	Description
	login	string Email, string password	void	Log in
	register	string email, string password, string firstName, int phoneNum, string gender, string DOB, int institutionId, string department	void	Create a new user account
	changePassword	string email, string password	void	change password of an account
	logout	string email	void	Log out
	profile()		void	Display the detail of an account
	confirmEmail	string email	void	Send a link to email to confirm
	searchByEmail	string email	User	Search user of which email matches with condition
	searchByInstitution	institutionID int	List<User>	Search all user which has the institutionID is the same as condition

3.1.2 Profile View Module

Figure



Class	User			
Description	All attributes and components of user			
Base Class				
Source File				
Namespace	Entity			
Attributes	Name	Type	Description	
	Email	string	User's email	
	Password	string	User's password	
	FirstName	string	User's first name	
	LastName	string	User's last name	
	PhoneNum	int	User's telephone number	
	Gender	string	User's gender	
	DOB	string	User's date of birth	
	InstitutionID	int	User's institution ID	
	Department	string	User's department	
	AvatarURL	string	User's url of avatar	
Methods	Name	Input	Output	
	get	string Email	User user	Get an user by it's email
	create	string email, string password, string firstName, int phoneNum, string gender, string DOB, int institutionID, string department	void	Create a new user account
	update	string email, string password, string firstName, int phoneNum, string gender, string DOB, int institutionID, string department	void	Create user account information

	delete	string email	void	Delete an user account by email
	searchByEmail	string email	User	Search user of which email matches with condition
	searchByInstitution	institutionID int	List<User>	Search all user which has the institutionID is the same as condition

Class	UserController			
Methods	Name	Input	Output	Description
	login	string Email, string password	void	Log in
	register	string email, string password, string firstName, int phoneNum, string gender, string DOB, int institutionId, string department	void	Create a new user account
	changePassword	string email, string password	void	change password of an account
	logout	string email	void	Log out
	profile()		void	Display the detail of an account
	confirmEmail	string email	void	Send a link to email to confirm
	searchByEmail	string email	User	Search user of which email matches with condition
	searchByInstitution	institutionID int	List<User>	Search all user which has the institutionID is the same as condition

Class	Article		
Description	All attributes and components of article		
Base Class			
Source File			
Namespace	Entity		
Attributes	Name	Type	Description
	ID	int	Article ID
	Title	string	Article title
	CreatorId	string	Article creator

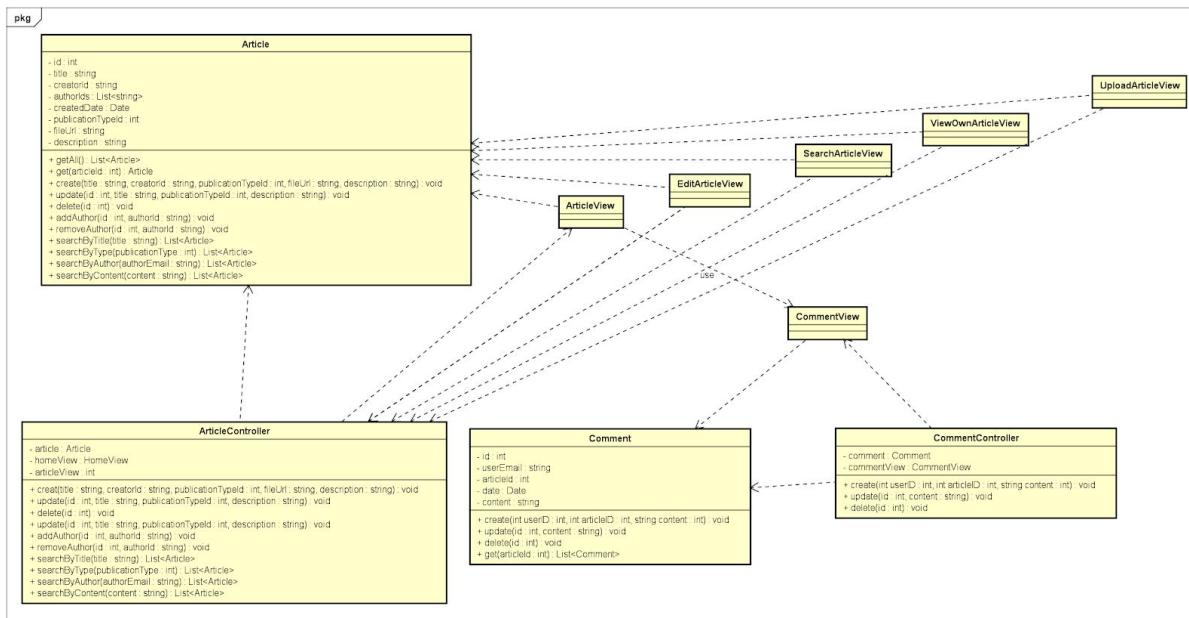
	AuthorIds	List<string>	Article list author ID
	CreatedDate	Date	Article created date
	PublicationType pId	int	Article Publication Type Id
	FileURL	string	Article file URL
	Description	string	Article description
Methods	Name	Input	Output
	getAll		List<Article>
	get	int articleID	Article
	create	string title, string creatorID, string PublicationTypeId, string fileURL, string description	void
	update	string title, string creatorID, string PublicationTypeId, string fileURL, string description	void
	delete	string articleID	void
	addAuthor	int articleID, string authorID	void
	searchByTitle	string title	Article
	searchByAuthor	string authorEmail	List<Article>
	searchByContent	string content	List<Article>

Class	ArticleController			
Methods	Name	Input	Output	Description
	listArticle		List<Article>	Get all articles
	create	string title, string creatorID, string PublicationTypeId, string fileURL, string description	void	Create a new article
	update	string title, string creatorID, string PublicationTypeId, string fileURL, string description	void	Update an article
	delete	string articleID	void	Delete an article by ID

	addAuthor	int articleID, string authorID	void	Add an user as author of an existed article
	searchByTitle	string title	Article	Search article by its title
	searchByAuthor	string authorEmail	List<Article>	Search all article which is belong to inputted author
	searchByContent	string content	List<Article>	Search all article of which content contain the input condition

3.1.3 Article Module

[Figure](#)



Class	Article
Description	All attributes and components of article
Base Class	
Source File	
Namespace	Entity

Attributes	Name	Type	Description	
	ID	int	Article ID	
	Title	string	Article title	
	CreatorId	string	Article creator	
	AuthorIds	List<string>	Article list author ID	
	CreatedDate	Date	Article created date	
	PublicationTy peld	int	Article Publication Type Id	
	FileURL	string	Article file URL	
	Description	string	Article description	
Methods	Name	Input	Output	Description
	getAll		List<Article>	Get all articles
	get	int articleID	Article	Get an article by its ID
	create	string title, string creatorID, string PublicationTypeId, string fileURL, string description	void	Create a new article
	update	string title, string creatorID, string PublicationTypeId, string fileURL, string description	void	Update an article
	delete	string articleID	void	Delete an article by ID
	addAuthor	int articleID, string authorID	void	Add an user as author of an existed article
	searchByTitle	string title	Article	Search article by its title
	searchByAutho r	string authorEmail	List<Article>	Search all article which is belong to inputted author
	seachByContent	string content	List<Article>	Search all article of which content contain the input condition

Class	ArticleController			
Methods	Name	Input	Output	Description
	listArticle		List<Article>	Get all articles
	create	string title, string creatorID, string PublicationTypeId, string fileURL, string description	void	Create a new article
	update	string title, string creatorID, string PublicationTypeId,	void	Update an article

	string fileURL, string description		
delete	string articleID	void	Delete an article by ID
addAuthor	int articleID, string authorID	void	Add an user as author of an existed article
searchByTitle	string title	Article	Search article by its title
searchByAuthor	string authorEmail	List<Article>	Search all article which is belong to inputted author
searchByContent	string content	List<Article>	Search all article of which content contain the input condition

Class	Comment			
Description	All attribute and operation of comment			
Source File				
Namespace	Entity			
Attributes	Name	Type	Description	
	ID	int	ID of comment	
	userEmail	string	Email of whom comment	
	ArticleID	int	ID of article	
	Date	Date	When comment is created	
	Content	String	Content of comment	
Methods	Name	Input	Output	Description
	create	int userID : int int articleID : int content : string	void	Create a comment below article
	update	id : int content : string	void	Edit a comment
	delete	id : int	void	Delete a comment

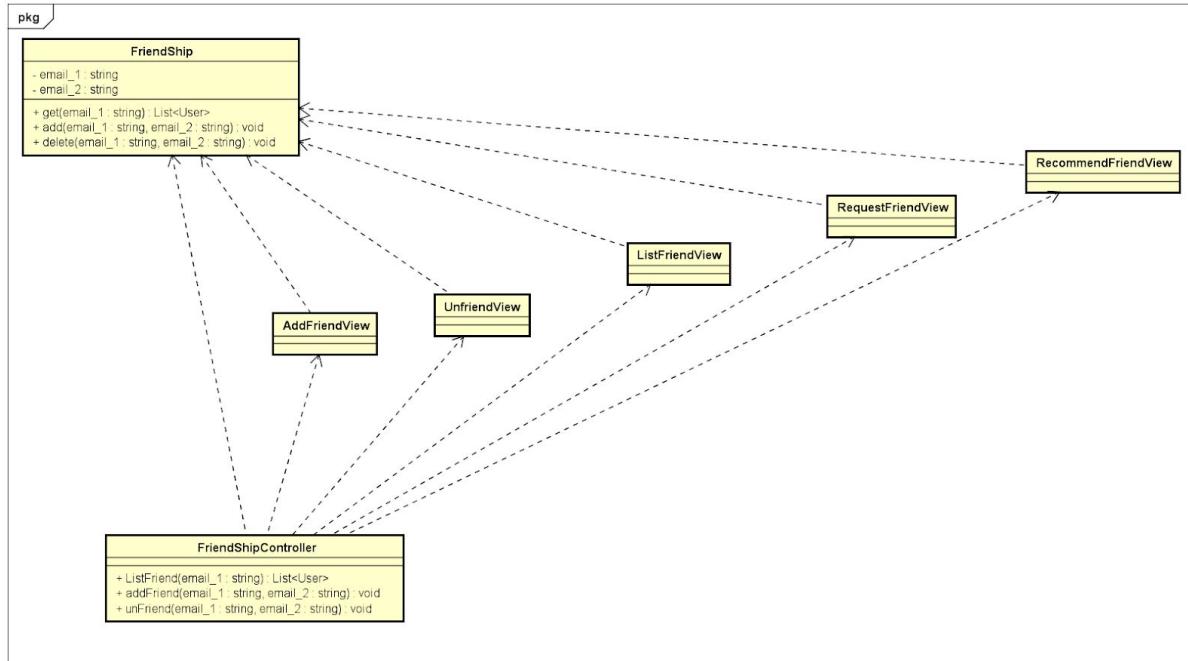
Class	CommentController			
Methods	Name	Input	Output	Description
	create	int userID : int int articleID : int	void	Create a comment below article

		content : string		
update	id : int content : string	void	Edit a comment	
delete	id : int	void	Delete a comment	

3.1.4 Relationship Module

3.1.4.1 Friend Relationship Management

[Figure](#)



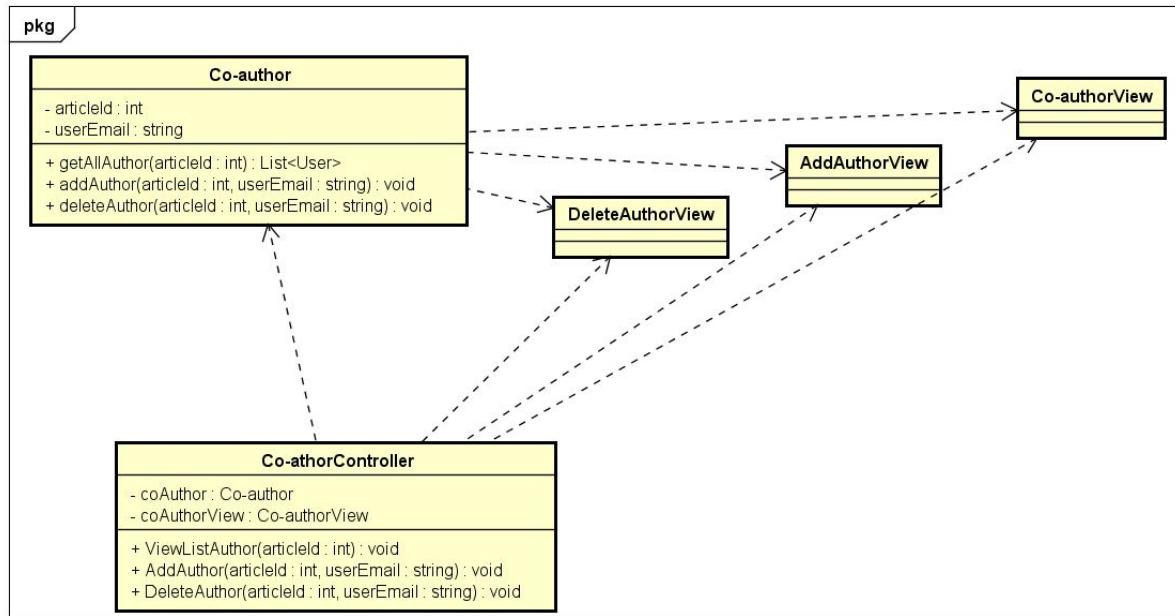
Class	FriendShip			
Description	Attribute and prototype of FriendShip			
Source File				
Namespace	Entity			
Attributes	Name	Type	Description	
	Email_1	string	Email of the first user	
	Email_2	string	Email of the second user	
Methods	Name	Input	Output	Description
	get	email_1 : string	List<User>	List all friend of this user
	add	email_1 : string email_2 : string	void	Create a new friendship
	delete	email_1 : string email_2 : string	void	Delete a friendship

Class	FriendShipController		
Description			

Methods	Name	Input	Output	Description
	listFriend	email_1 : string	List<User>	List all friend of this user
	addFriend	email_1 : string email_2 : string	void	Create a new friendship
	unFriend	email_1 : string email_2 : string	void	Delete a friendship

3.1.4.2 Article Relationship Management

Figure

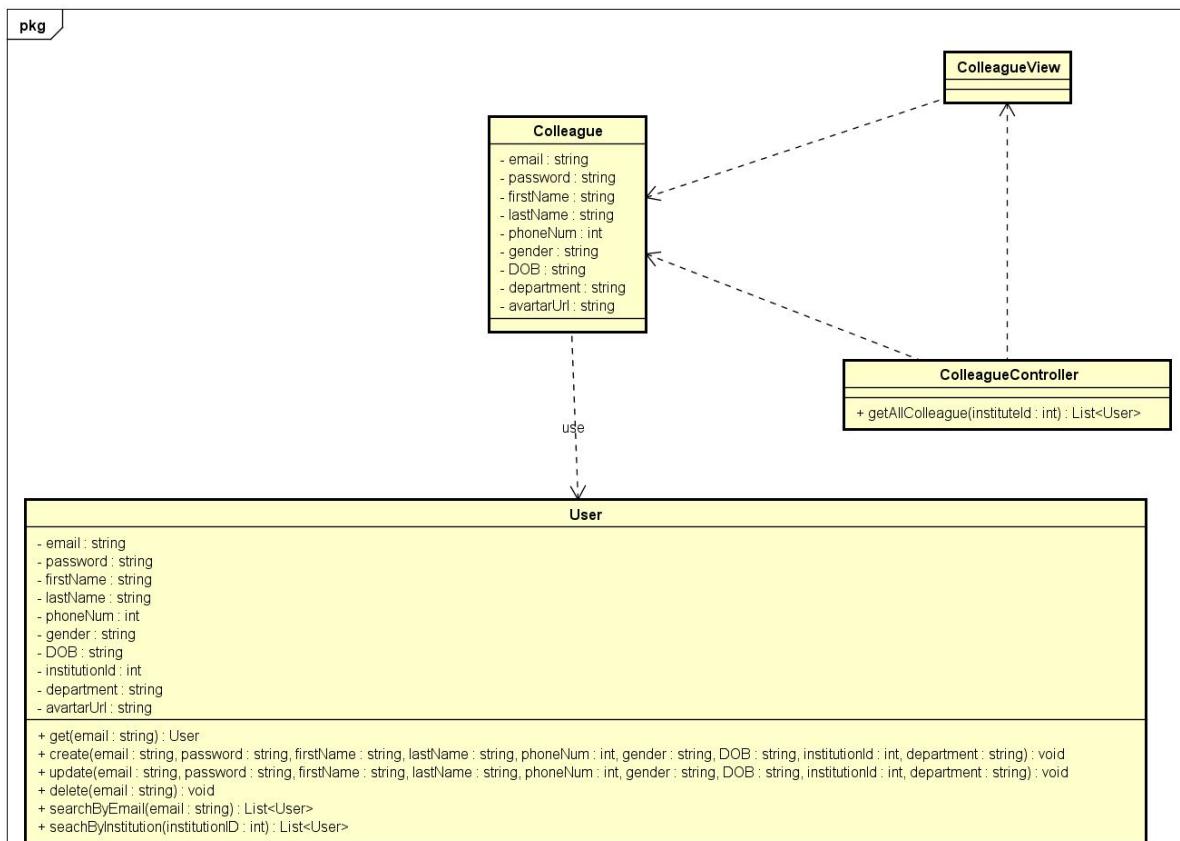


Class	Co-author			
Description	Attribute and operation of Co-author			
Source File				
Namespace	Entity			
Attributes	Name	Type	Description	
	ArticleID	int	ID of article	
	userEmail	string	Email of user	
Methods	Name	Input	Output	Description
	getAllAuthor	articleId : int	List<User>	List all author of an article
	addAuthor	articleId : int userEmail : string	void	Add a user as author of an article
	deleteAuthor	articleId : int userEmail : string	void	Remove a user from author list of an article

Class	Co-authorController			
Methods	Name	Input	Output	Description
	viewListAuthor	articleId : int	List<User>	List all author of an article
	addAuthor	articleId : int userEmail : string	void	Add a user as author of an article
	deleteAuthor	articleId : int userEmail : string	void	Remove a user from author list of an article

3.1.4.3 Colleague Relationship Management

[Figure](#)

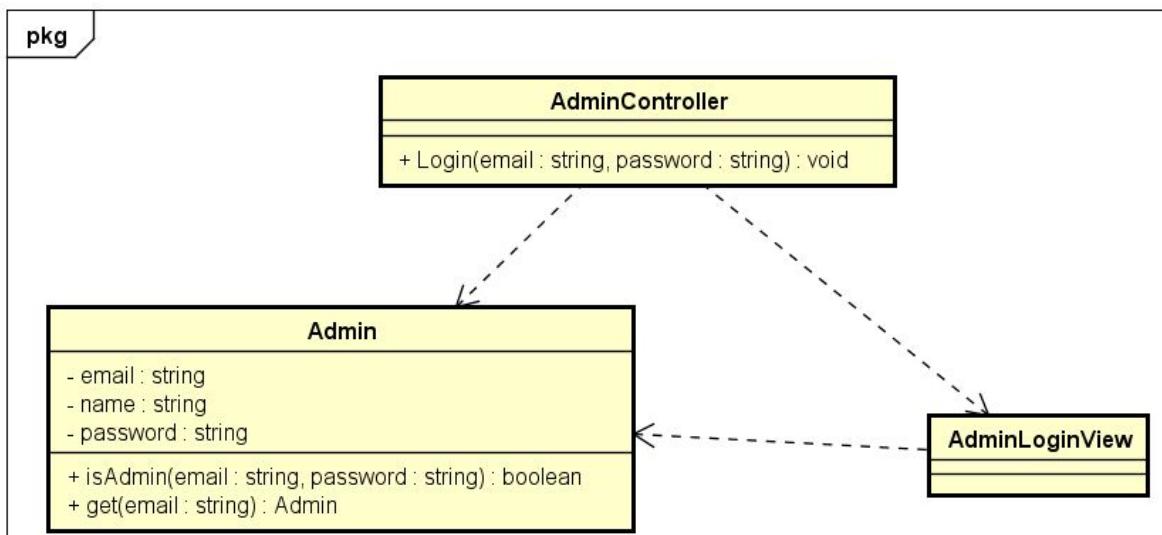


Class	Colleague		
Description	Attribute and operations of Colleague		
Source File			
Namespace	Entity		
Attributes	Name	Type	Description
	Email	string	User's email

	Password	string	User's password
	FirstName	string	User's first name
	LastName	string	User's last name
	PhoneNum	int	User's telephone number
	Gender	string	User's gender
	DOB	string	User's date of birth
	InstitutionID	int	User's institution ID
	Department	string	User's department
	AvatarURL	string	User's url of avatar
Methods	Name	Input	Output
			Description

3.1.5 Admin Module

[Figure](#)



Class	Admin			
Description	Attribute and operations of admin			
Source File				
Namespace				
Attributes	Name	Type	Description	
	email	string	Email of admin	
	name	string	Name of Admin	
	password	string	Password of Admin Account	
Methods	Name	Input	Output	
	isAdmin	string email string pass	boolean	check if it is admin account or not
	get	string email	Admin	Get admin by email

Class	Admin			
Methods	Name	Input	Output	Description
	Login	string email string pass	void	Log in as admin

3.2 UC01 - Login

3.2.1 Screen Design

Mozilla

http://bakaresearch.net

Bakaresearch

Email: Password: Log in

Forgot password?

Join 97+ million researchers, including 97 Nobel Laureates

Read the latest publications in your field Discuss your work with other specialists Collaborate with colleagues

First Name Last Name

Your institution

Department

Your institution email

Password

Confirm Password

Phone number

Female Male 2/20/1997

I agree to the [Terms of Service](#) and acknowledge the [Privacy Policy](#)

Sign Up

Figure 3.2.1: UC01 - Log in

Table 3.2.1: UC01 - Login

No	Object/Control Name	Type	Required	Length	Description
1	Log - in button	UIButton	Yes	N/A	Click to log-in
2	Email text input	UITextField	Yes	N/A	Input email with correct pattern
3	Password input	UITextField	Yes	N/A	Input password which words will be come *
4	Forgot password	UIHyperlink	Yes	N/A	Click to find password if user has forgotten.

3.2.2 Sequence Diagram

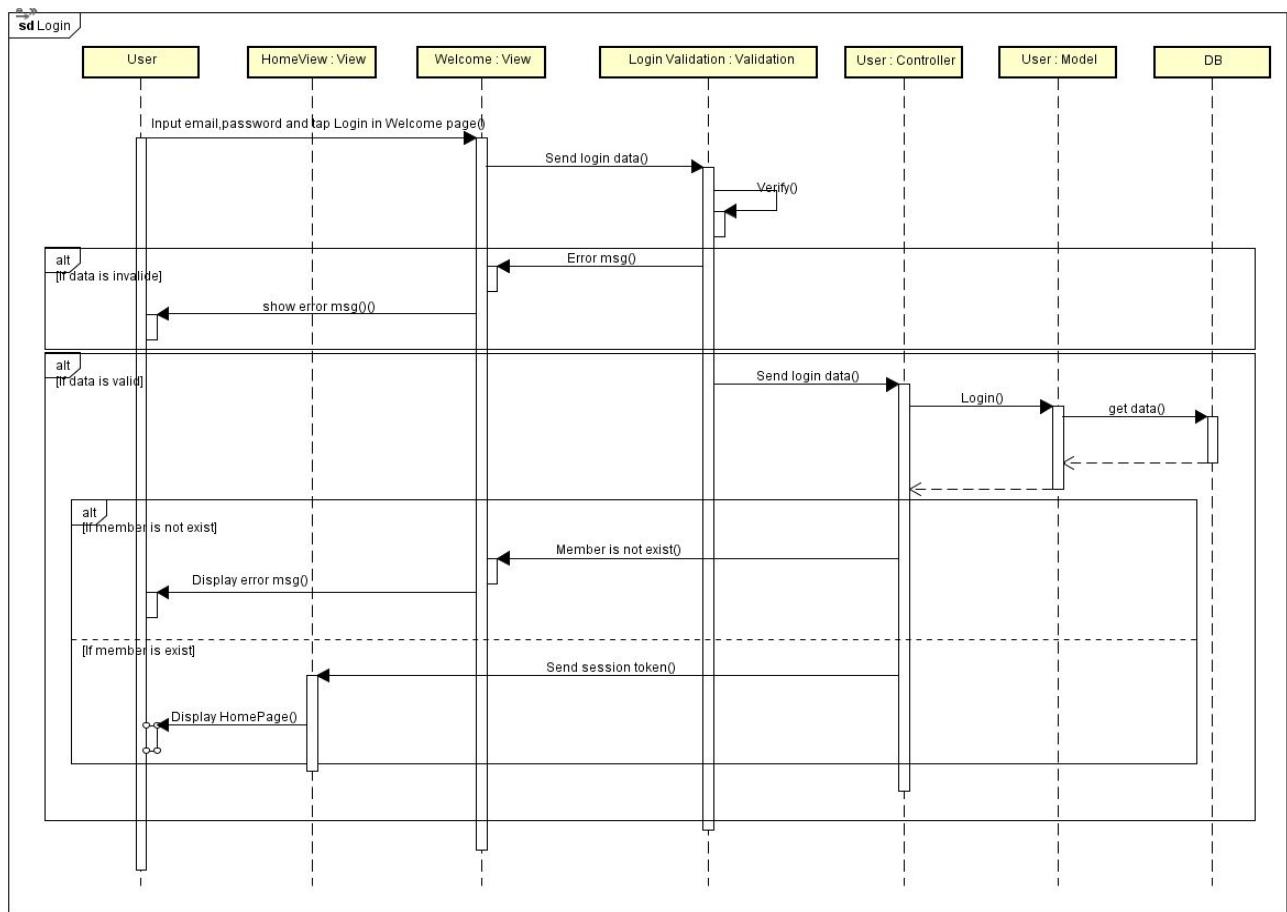


Figure 3.2.2: Sequence Diagram of UC01 - Login

3.3 UC02 - Sign up

3.3.1 Screen Design

The screenshot shows the sign-up form for Bakaresearch. The header includes a Mozilla browser icon, a back/forward button, and the URL <http://bakaresearch.net>. The main header features the Bakaresearch logo. The sign-up form consists of several input fields: Email, Password, First Name, Last Name, Your institution, Department, Your institution email, Password, Confirm Password, Phone number, and Gender (Female/Male). There is also a date input field (2/20/1997) and a dropdown menu. A checkbox for agreeing to the Terms of Service and Privacy Policy is present, along with a 'Sign Up' button.

Figure 3.3.1: UC02 - Sign up**Table 3.3.1:** UC02 - Login

No	Object/Control Name	Type	Required	Length	Description
1	Join 97+...	UILabel	No	N/A	Label to show statistics about BKR
2	First name Text Input	UITextField	Yes	N/A	Input first name of user
3	Last name Text Input	UITextField	Yes	N/A	Input last name of user
4	Your institution Text Input	UITextField	Yes	N/A	User has to input the institution that he/she are working/studying
5	Department Text Input	UITextField	Yes	N/A	Input department that user is interested in or working with.
6	Your institution email Text Input	UITextField	Yes	N/A	Input the right pattern of institution email.
7	Password Text Input	UIPasswordField	Yes	N/A	Input password which words will be come *
8	Confirm Password Text Input	UIPasswordField	Yes	N/A	Input password which words will be come *
9	Phone number Text Input	UITextField	Yes	N/A	Input phone number with the right pattern.
10	Gender radio	UIRadio	Yes	N/A	Choose male/female
11	Date of birth dropdown list	UIDropDownList	Yes	N/A	Choose date of birth or input by keyboard is accepted.
12	I agree to the ... check box	UICheckBox	Yes	N/A	User must check this box to sign up
13	Terms of Service hyperlink	UIHyperlink	No	N/A	Click to this link to redirect to the page Terms of Service which includes content of Terms of Service.
13	Privacy Policy hyperlink	UIHyperlink	No	N/A	Click to this link to redirect to the page Privacy Policy which includes content of Privacy Policy.
14	Sign up	UIButton	Yes	N/A	Click sign up to verify the information of sign-up form. After verify successfully, a verifying mail will be sent to user's box mail which includes a verifying link.

3.3.2 Sequence Diagram

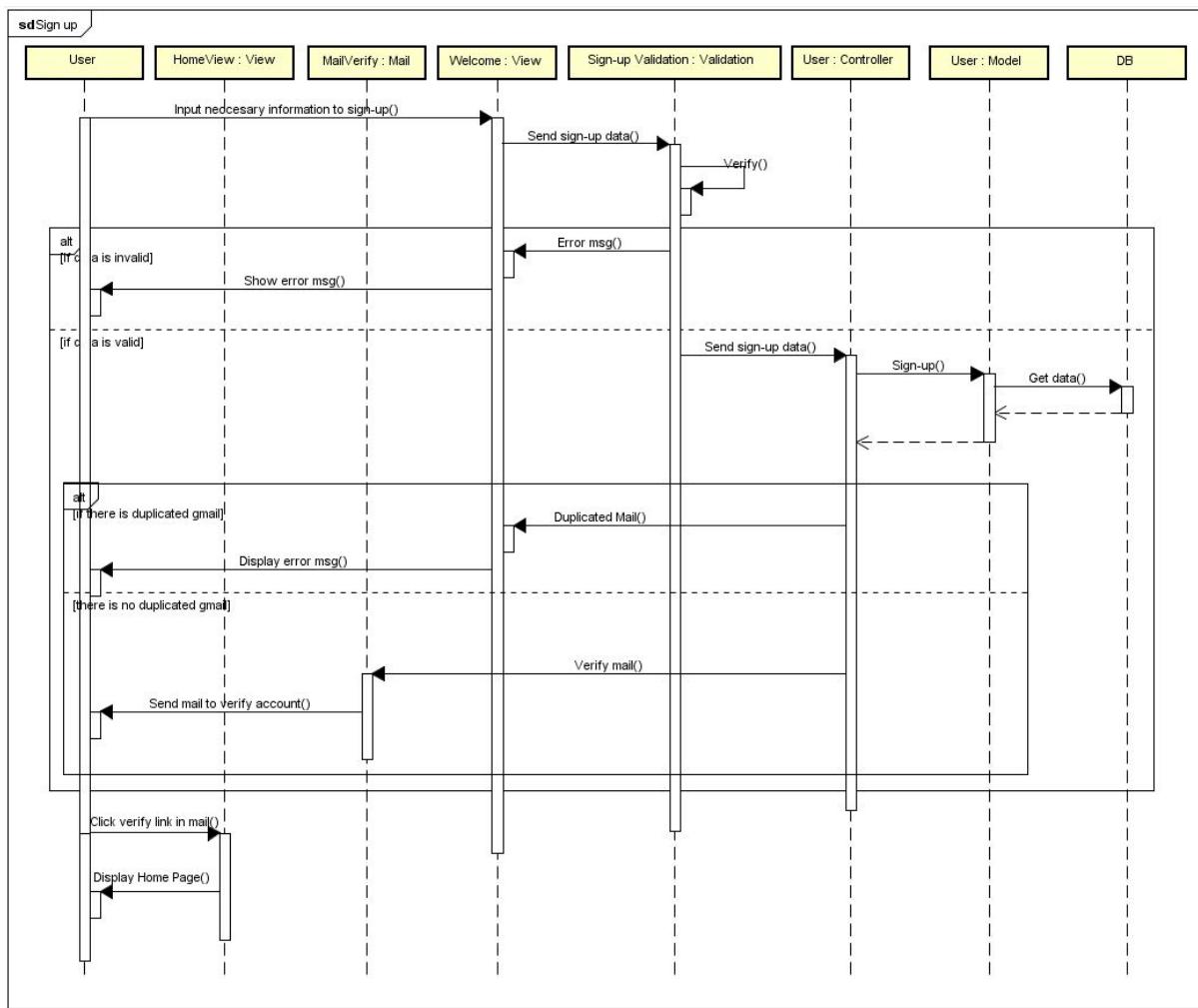


Figure 3.3.2: Sequence Diagram of UC02 - Sign-up

3.4 UC03 - Get email to confirm

3.4.1 Sequence Diagram

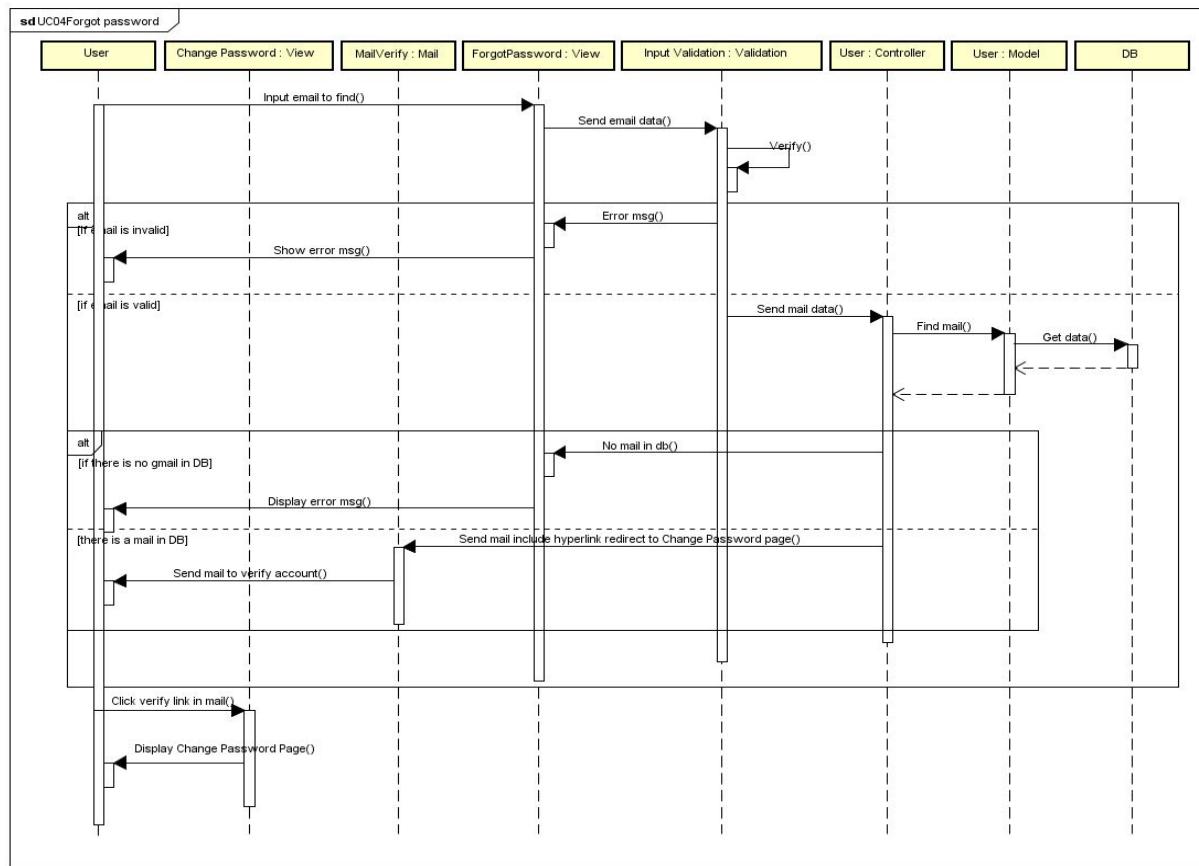


Figure 3.4: Sequence Diagram of UC03 - Get email to confirm

3.5 UC04 - Forgot Password

3.5.1 Screen Design

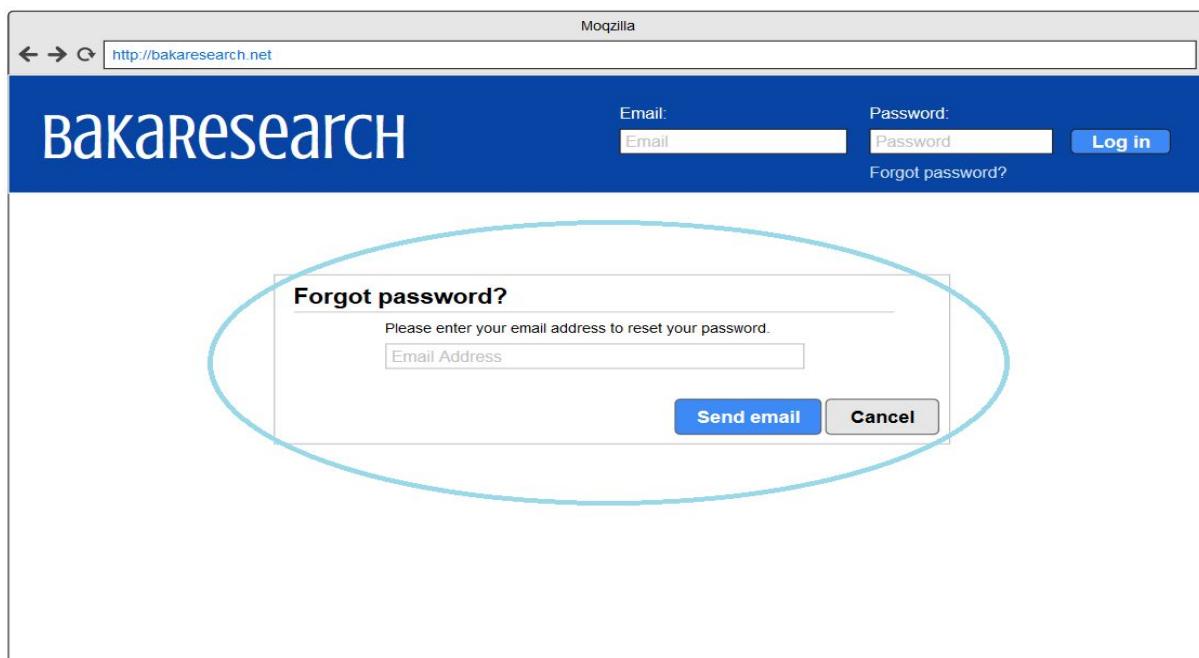


Figure 3.5.1.1: UC04 - Forgot Password**Table 3.5.1.1:** UC04 - Forgot Password

No	Object/Control Name	Type	Required	Length	Description
1	Forgot password	UILabel	No	N/A	N/A
2	Please enter your email...	UILabel	No	N/A	N/A
3	Email Address Text Input	UITextField	Yes	N/A	Input email address with right pattern
4	Send email Button	UIButton	Yes	N/A	Click to send a mail with a link to change password.

Figure 3.5.1.2: UC04 - Change password**Table 3.5.1.2:** UC04 - Change password

No	Object/Control Name	Type	Required	Length	Description
1	Set new password	UILabel	No	N/A	N/A
2	A strong password is ...	UILabel	No	N/A	N/A
3	New password input text	UITextField	Yes	N/A	Input password with (*) will be replaced normal character

4	Confirm password input text	UITextField	Yes	N/A	Have to be the same with New password
5	Create New Password button	UIButton	Yes	N/A	Click to verify the password, if the password was the same with the confirm password, page will redirect to Home view and the password will be updated in database.

3.5.2 Sequence Diagram

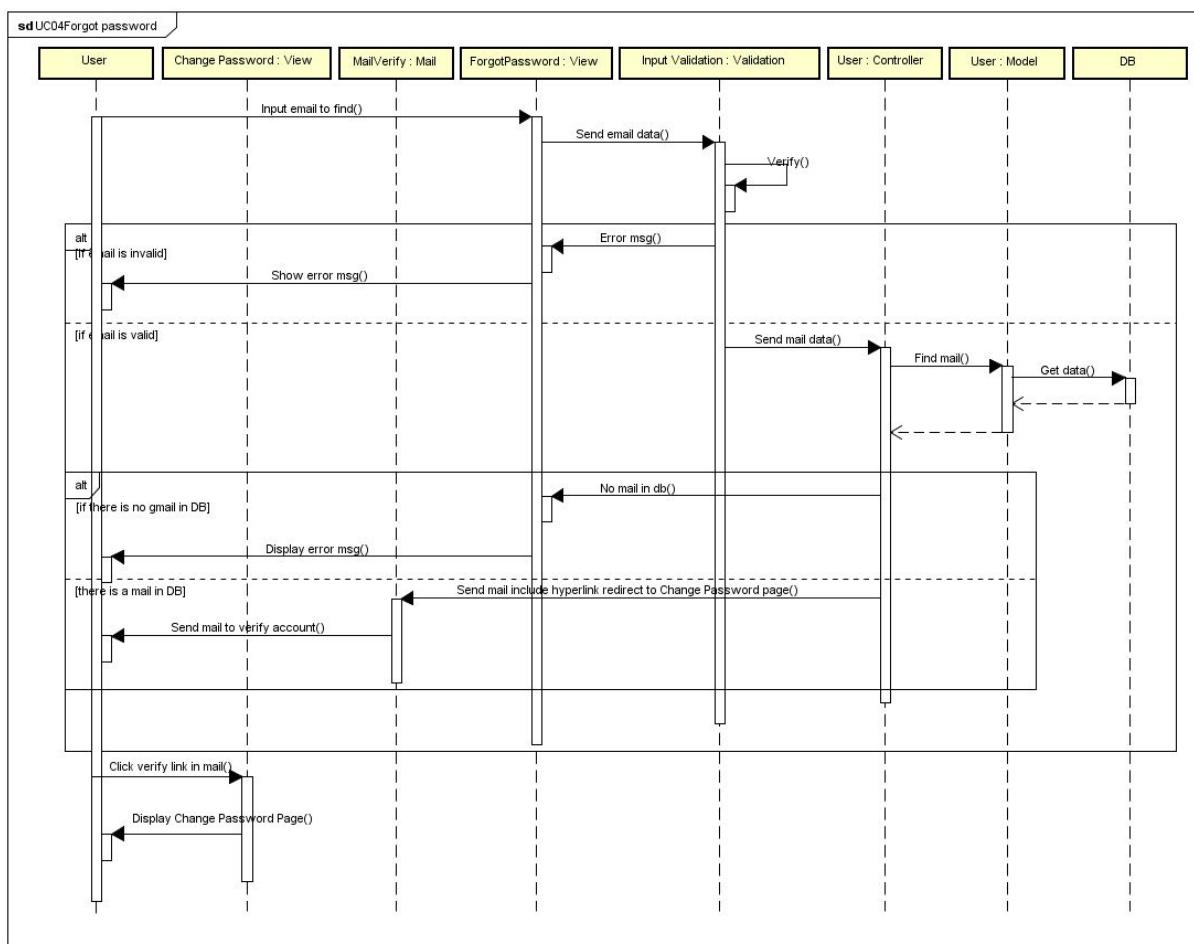


Figure 3.5.2.1: Sequence Diagram of UC04 - Forgot password

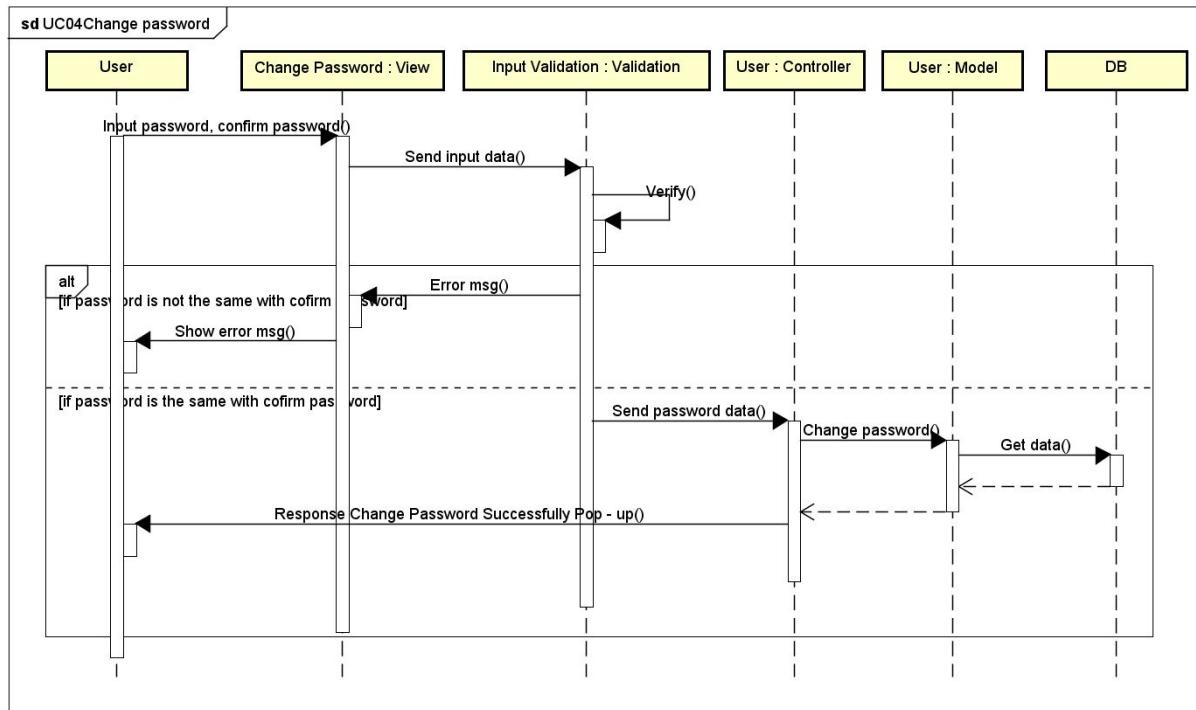


Figure 3.5.2.2: Sequence Diagram of UC04 - Change password

3.6 UC05 - View Profile

3.6.1 Screen Design

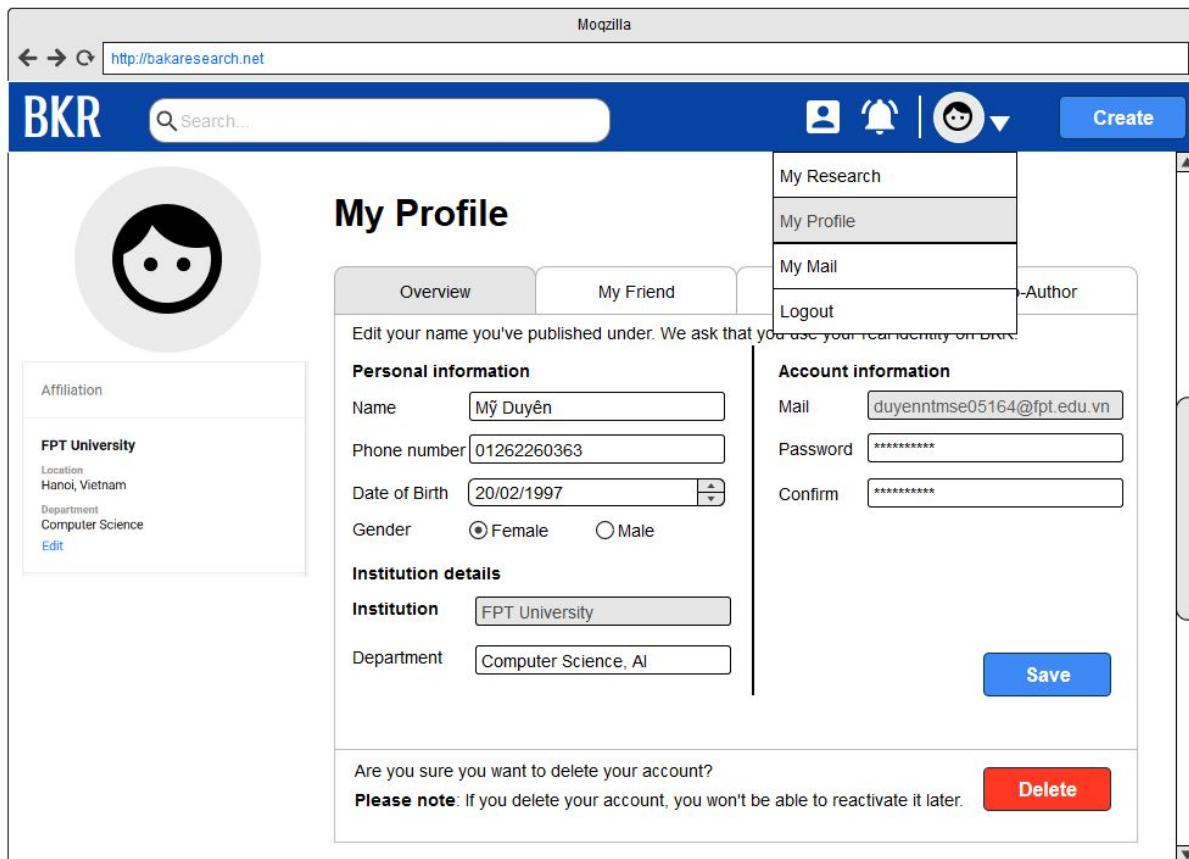


Figure 3.6.1: UC05 - View Profile

Table 3.7.1: UC05 - View Profile

No	Object/Control Name	Type	Required	Length	Description
1	Avatar Icon	UIImageView	Yes	N/A	Show the avatar and if you click to this avatar, the screen will redirect to View Profile Screen.
2	Affiliation	UILabel	No	N/A	Show the affiliation
3	FPT University	UIHyperlink	Yes	N/A	Show the name of institution of user.
4	Location	UILabel	No	N/A	N/A
5	Hanoi, VietNam	UILabel	Yes	N/A	Show the current location of user.
6	Department	UILabel	No	N/A	N/A
7	Computer Science	UILabel	Yes	N/A	Show the current department of user.
8	Edit link	UIB	Yes	N/A	Click to edit information of affiliation.
9	Tab Overview/ My Friend/ My co-Author/ My Colleague	UITab	Yes	N/A	Click to choose tab information that you are concerned about
10	Personal information	UILabel	No	N/A	N/A
11	Name	UILabel	No	N/A	N/A
12	Name input text	UITextField	Yes	N/A	Show name of user which combined first name and last name.
12	Phone number	UILabel	No	N/A	N/A
13	Phone number input text	UITextField	Yes	N/A	Show phone number of user
14	Date of birth	UILabel	No	N/A	N/A
15	Date of birth dropdown list	UIDropdown list	Yes	N/A	User can input by keyboard or choose data from dropdown

					list.
16	Gender	UILabel	No	N/A	N/A
17	Gender radio	UIRadio	Yes	N/A	N/A
18	Institutions	UILabel	No	N/A	N/A
19	Institution Text Input	UITextField	Yes	N/A	Readonly.
20	Departmentt	UILabel	No	N/A	N/A
21	Department Text Input	UITextField	Yes	N/A	Show the list of department that users are interested in and following.
22	Account Information	UILabel	No	N/A	N/A
23	Mail	UILabel	No	N/A	N/A
24	Mail text field	UITextField	Yes	N/A	This is readonly field.
25	Password	UILabel	No	N/A	N/A
26	Password Input	UITextField	Yes	N/A	Character will be presented in “*”
27	Confirm Password	UILabel	No	N/A	N/A
28	Confirm Password text input	UITextField	Yes	N/A	Character will be presented in “*”
30	Save button	UIButton	Yes	N/A	Click to update all the information that user want to change.

3.6.2 Sequence Diagram

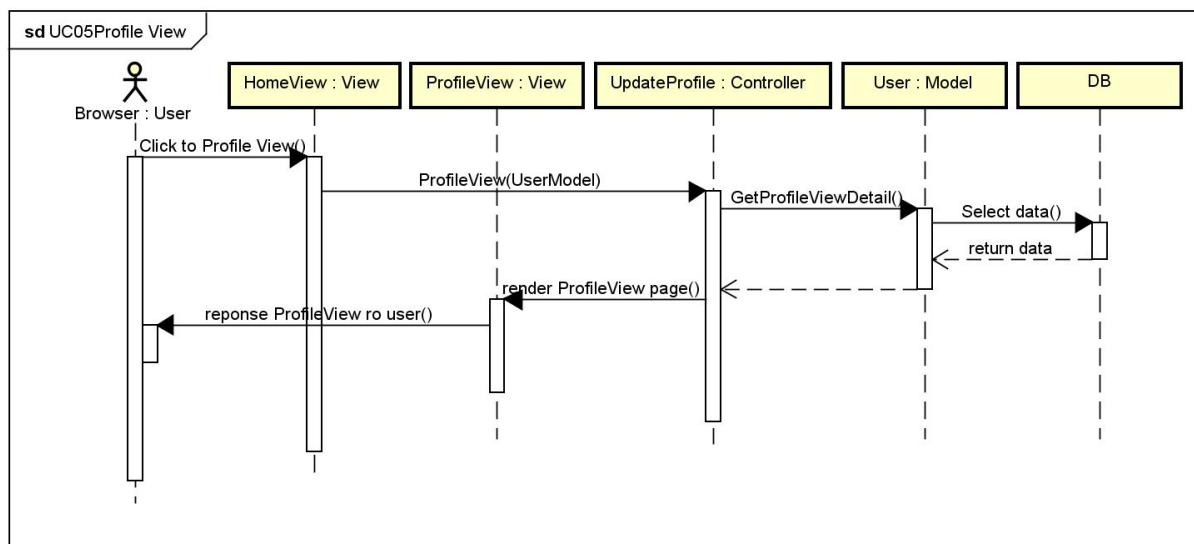


Figure 3.6.2: Sequence Diagram of UC05 - Profile View

3.7 UC06 - Update Profile

3.7.1 Screen Design

The screenshot shows the 'My Profile' update screen. At the top, there is a navigation bar with a search bar and a 'Create' button. On the left, there is a circular profile picture placeholder and a sidebar showing 'Affiliation' information: 'FPT University', 'Location: Hanoi, Vietnam', and 'Department: Computer Science' with an 'Edit' link. The main content area is titled 'My Profile' and contains tabs for 'Overview', 'My Friend', 'My Colleague', and 'Co-Author'. The 'Overview' tab is active. It features sections for 'Personal information' (Name: 'Mỹ Duyên', Phone number: '01262260363', Date of Birth: '20/02/1997', Gender: 'Female'), 'Institution details' (Institution: 'FPT University', Department: 'Computer Science, AI'), and 'Account information' (Mail: 'duyenntmse05164@fpt.edu.vn', Password: '*****', Confirm: '*****'). A large blue curved line highlights the 'Personal information', 'Institution details', and 'Account information' sections. At the bottom, there is a confirmation message 'Are you sure you want to delete your account?' and a note 'Please note: If you delete your account, you won't be able to reactivate it later.' with 'Save' and 'Delete' buttons.

Figure 3.7: UC06 - Update Profile

Table 3.7:

No	Object/Control Name	Type	Required	Length	Description
----	---------------------	------	----------	--------	-------------

1	Avatar Icon	UIImageView	Yes	N/A	Show the avatar and if you click to this avatar, the screen will redirect to View Profile Screen.
2	Affiliation	UILabel	No	N/A	Show the affiliation
3	FPT University	UIHyperlink	Yes	N/A	Show the name of institution of user.
4	Location	UILabel	No	N/A	N/A
5	Hanoi, VietNam	UILabel	Yes	N/A	Show the current location of user.
6	Department	UILabel	No	N/A	N/A
7	Computer Science	UILabel	Yes	N/A	Show the current department of user.
8	Edit link	UIB	Yes	N/A	Click to edit information of affiliation.
9	Tab Overview/ My Friend/ My co-Author/ My Colleague	UITab	Yes	N/A	Click to choose tab information that you are concerned about
10	Personal information	UILabel	No	N/A	N/A
11	Name	UILabel	No	N/A	N/A
12	Name input text	UITextField	Yes	N/A	Show name of user which combined first name and last name.
12	Phone number	UILabel	No	N/A	N/A
13	Phone number input text	UITextField	Yes	N/A	Show phone number of user
14	Date of birth	UILabel	No	N/A	N/A
15	Date of birth dropdown list	UIDropdownlist	Yes	N/A	User can input by keyboard or choose data from dropdown list.
16	Gender	UILabel	No	N/A	N/A

17	Gender radio	UIRadio	Yes	N/A	N/A
18	Institutions	UILabel	No	N/A	N/A
19	Institution Text Input	UITextField	Yes	N/A	Readonly.
20	Departmentt	UILabel	No	N/A	N/A
21	Department Text Input	UITextField	Yes	N/A	Show the list of department that users are interested in and following.
22	Account Information	UILabel	No	N/A	N/A
23	Mail	UILabel	No	N/A	N/A
24	Mail text field	UITextField	Yes	N/A	This is readonly field.
25	Password	UILabel	No	N/A	N/A
26	Password Input	UITextField	Yes	N/A	Character will be presented in “*”
27	Confirm Password	UILabel	No	N/A	N/A
28	Confirm Password text input	UITextField	Yes	N/A	Character will be presented in “*”
30	Save button	UIButton	Yes	N/A	Click to update all the information that user want to change.

3.7.2 Sequence Diagram

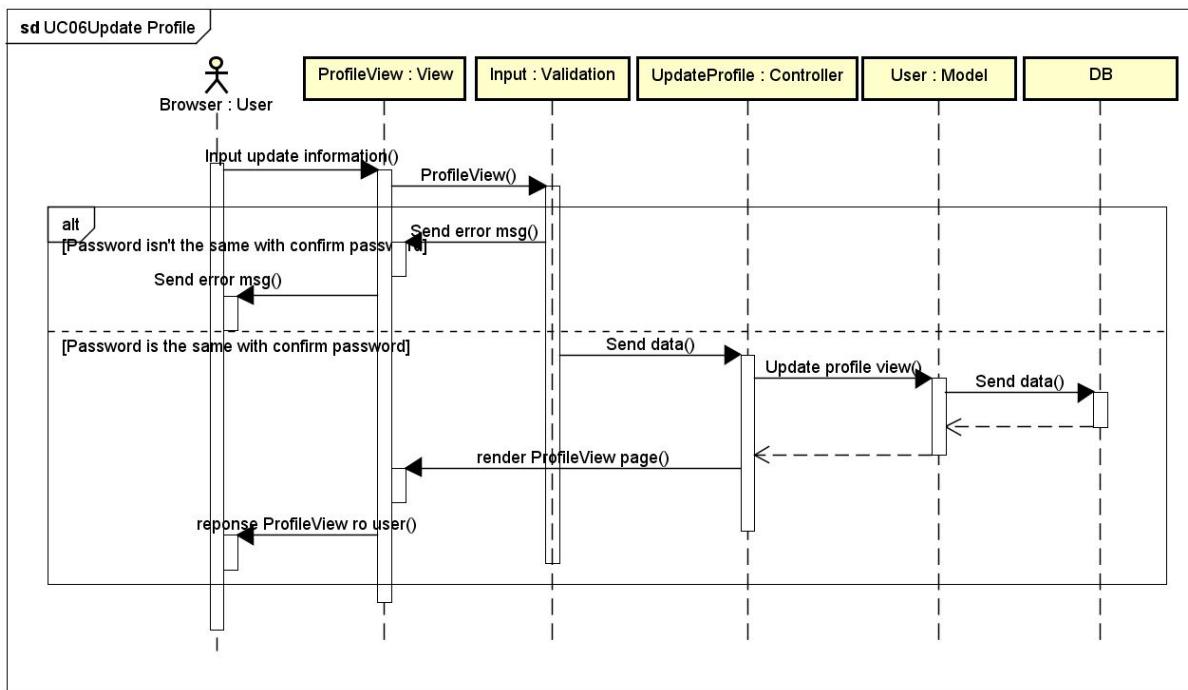


Figure 3.7: Sequence Diagram of UC06 - Update profile

3.8 UC07 - Delete Account

3.8.1 Screen Design

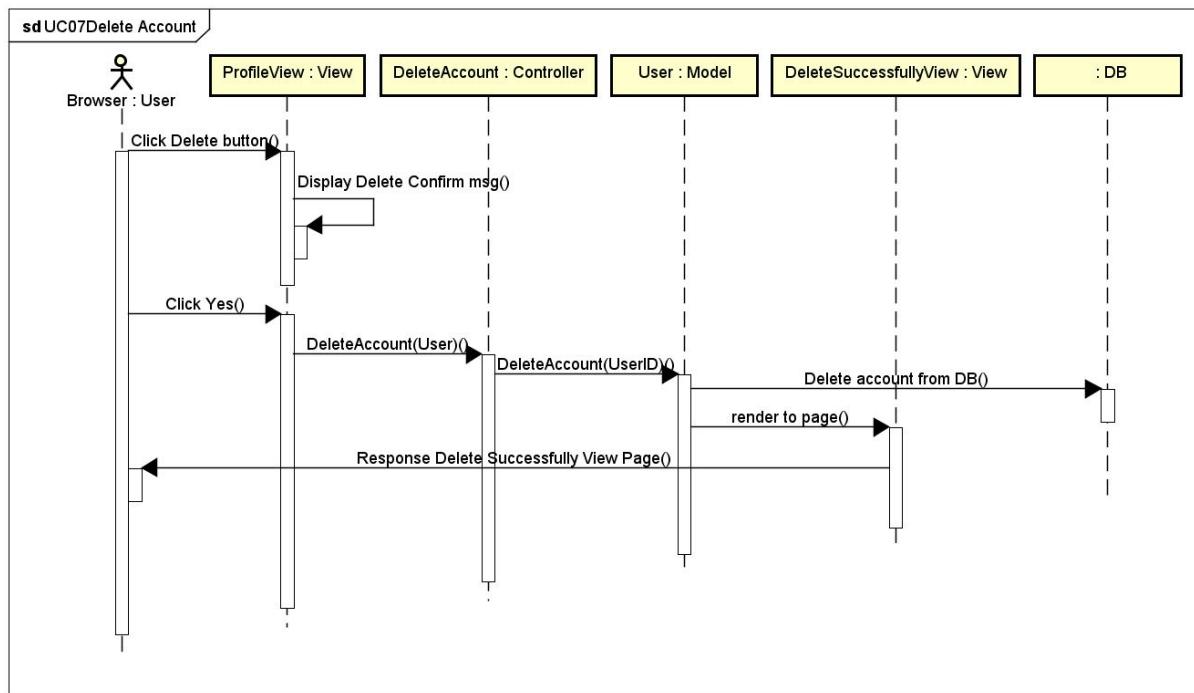
The screenshot shows the 'My Profile' page of the BKR application. The page includes a sidebar with 'Affiliation' (FPT University, Location: Hanoi, Vietnam, Department: Computer Science, Edit), a main content area with tabs for 'Overview', 'My Friend', 'My Colleague', 'Co-Author', and a 'Personal information' section with fields for Name (Mỹ Duyên), Phone number (01262260363), Date of Birth (20/02/1997), and Gender (Female). It also includes an 'Institution details' section with fields for Institution (FPT University) and Department (Computer Science, AI). On the right, there is an 'Account information' section with fields for Mail (duyenntmse05164@fpt.edu.vn), Password, and Confirm. A 'Save' button is located in this section. At the bottom, there is a warning message: 'Are you sure you want to delete your account? Please note: If you delete your account, you won't be able to reactivate it later.' with a 'Delete' button.

Figure 3.8: UC07 - Delete Account

Table 3.8: UC07 - Delete Account

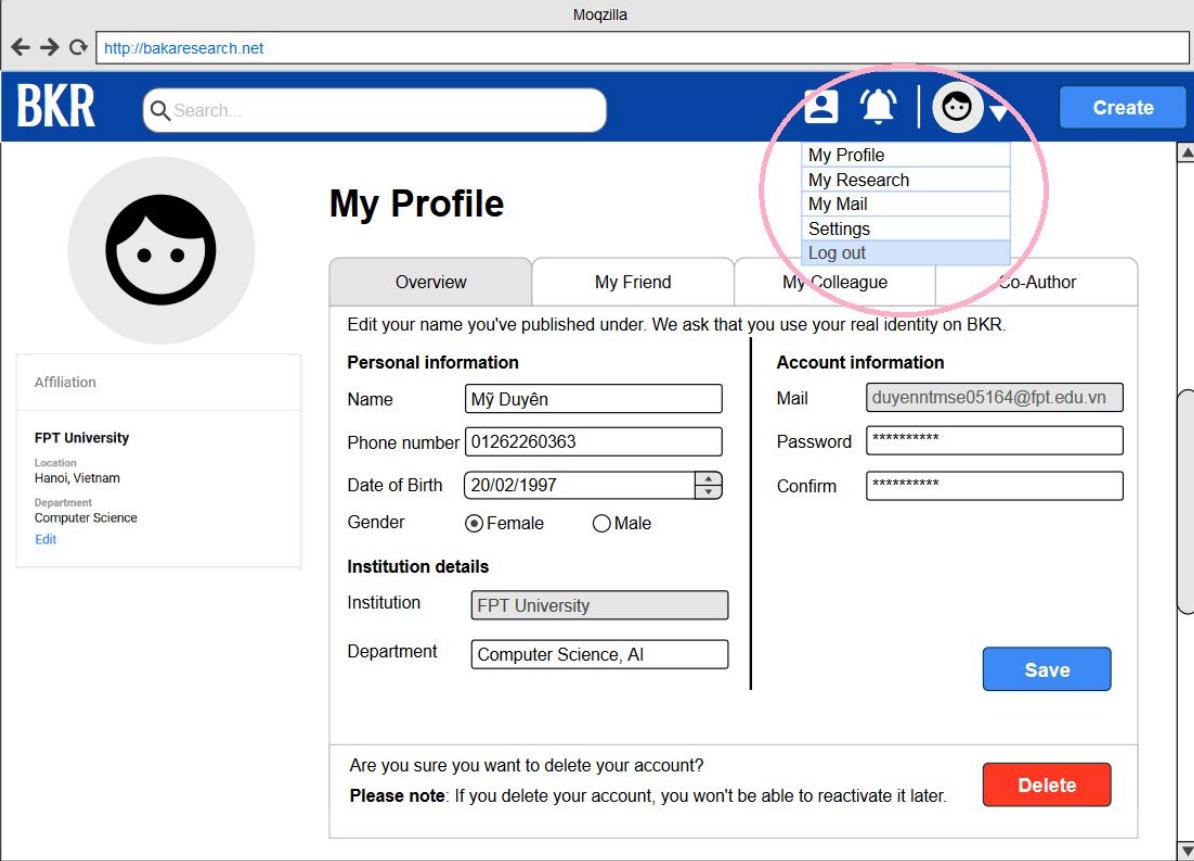
No	Object/Control Name	Type	Required	Length	Description
1	Delete Button	UIButton	Yes	N/A	Click to delete account. Before to click, a pop-up message to confirm the delete action will show up.
2	Are you sure you want to delete your account?	UILabel	No	N/A	N/A

3.8.2 Sequence Diagram

**Figure 3.8: Sequence Diagram of UC07 - Delete Account**

3.9 UC08 - Log out

3.9.1 Screen Design



The screenshot shows the BKR My Profile page. At the top right, there is a vertical menu with options: My Profile, My Research, My Mail, Settings, and Log out. The 'Log out' option is highlighted with a red circle. The main content area is titled 'My Profile' and contains sections for Personal information, Account information, Institution details, and a delete confirmation dialog. A 'Save' button is located on the right side of the main form.

Figure 3.9: UC08 - Log out

Table 3.9: UC08 - Log out

No	Object/Control Name	Type	Required	Length	Description
1	Logout button	UIDropdown	Yes	N/A	Click this to log out

3.9.2 Sequence Diagram

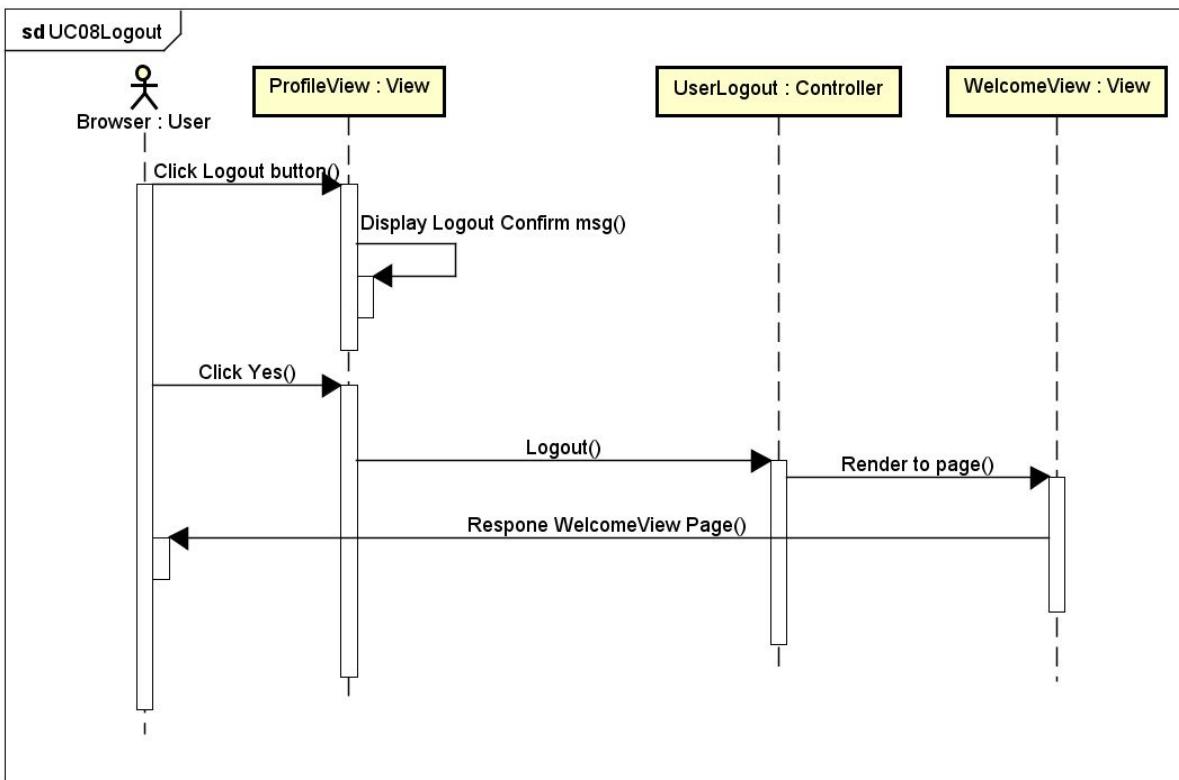


Figure 3.9: Sequence Diagram of UC08 - Log out

3.10 UC09 - Upload Article

3.10.1 Screen Design

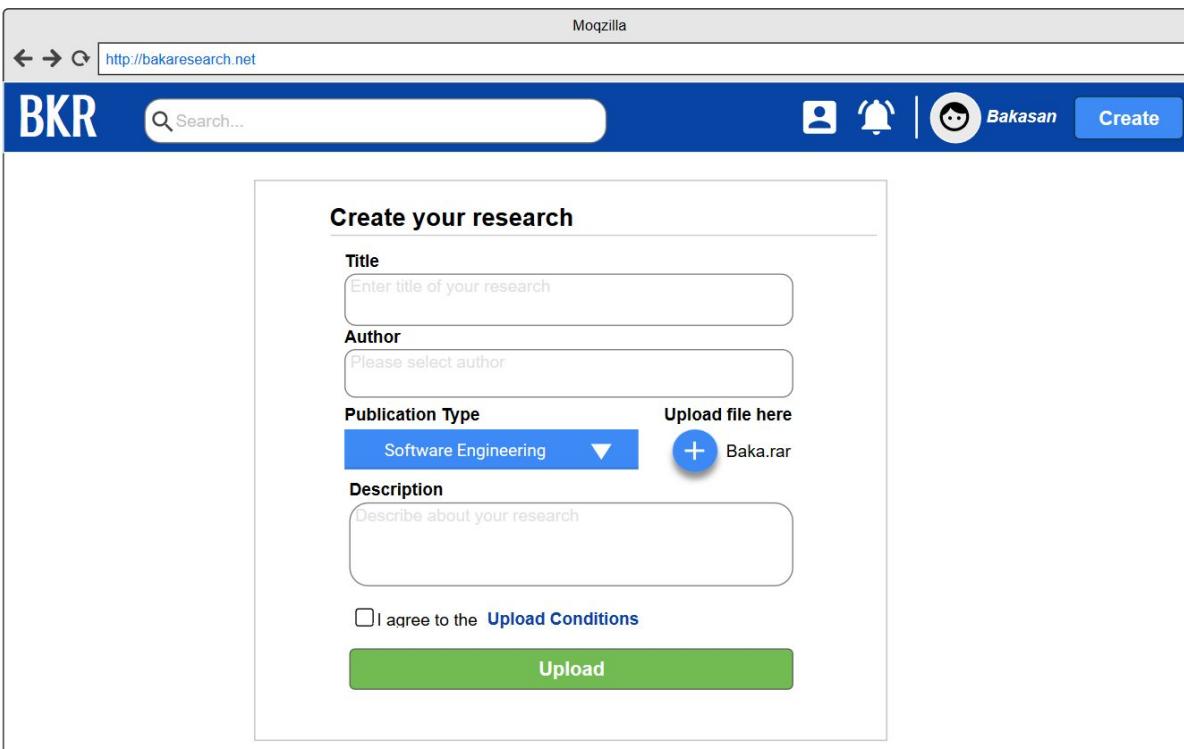


Figure 3.10.1: UC09 - Upload Article

No	Object/Control Name	Type	Required	Length	Description
1	Create your research	UILabel	No	N/A	N/A
2	Title label	UILabel	No	N/A	N/A
3	Title input text	UITextField	Yes	200	Input title of research document
4	Author label	UILabel	No	N/A	N/A
5	Author input text	UITextField	Yes	N/A	Input the author or research document. Can be more than one authors own one research. If user want to add co-author, co-author must be in friend relationship with the creator.
6	Publication Type	UILabel	No	N/A	N/A
7	Publication Type Dropdownlist	UIDropdownlist	Yes	N/A	Click to choose the right publication type of research document.
8	Upload file here	UILabel	No	N/A	N/A
9	Upload file	UIUploadFile	Yes	N/A	User can choose number types of research documents.
10	Description	UILabel	No	N/A	N/A
11	Description input text	UITextField	Yes	N/A	Input description of the research document.
12	I agree to Upload Conditions checkbox	UICheckbox	Yes	N/A	User has to check this box to complete the process.
13	Upload Conditions link.	UIHyperlink	Yes	N/A	Click to redirect to a page which contains content of Conditions of Uploading.
14	Upload button	UI Button	Yes	N/A	Click to complete the process.

3.10.2 Sequence Diagram

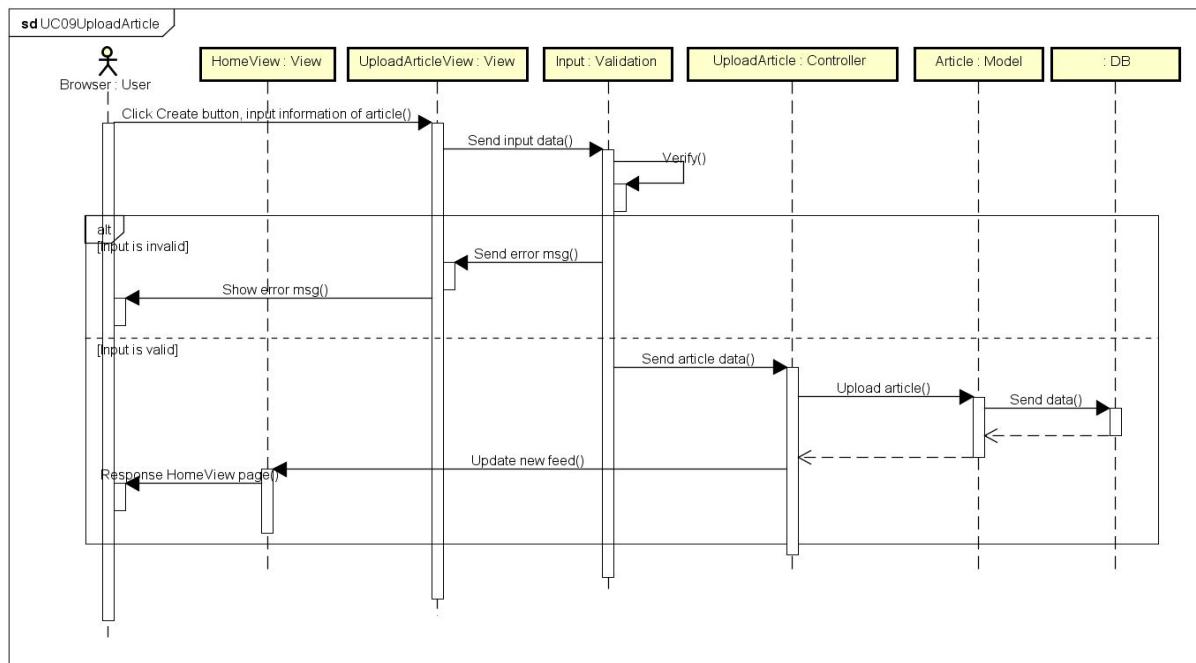


Figure 3.10.2: UC09 - Upload Article

3.11 UC10 - View Own Article

3.11.1 Screen Design

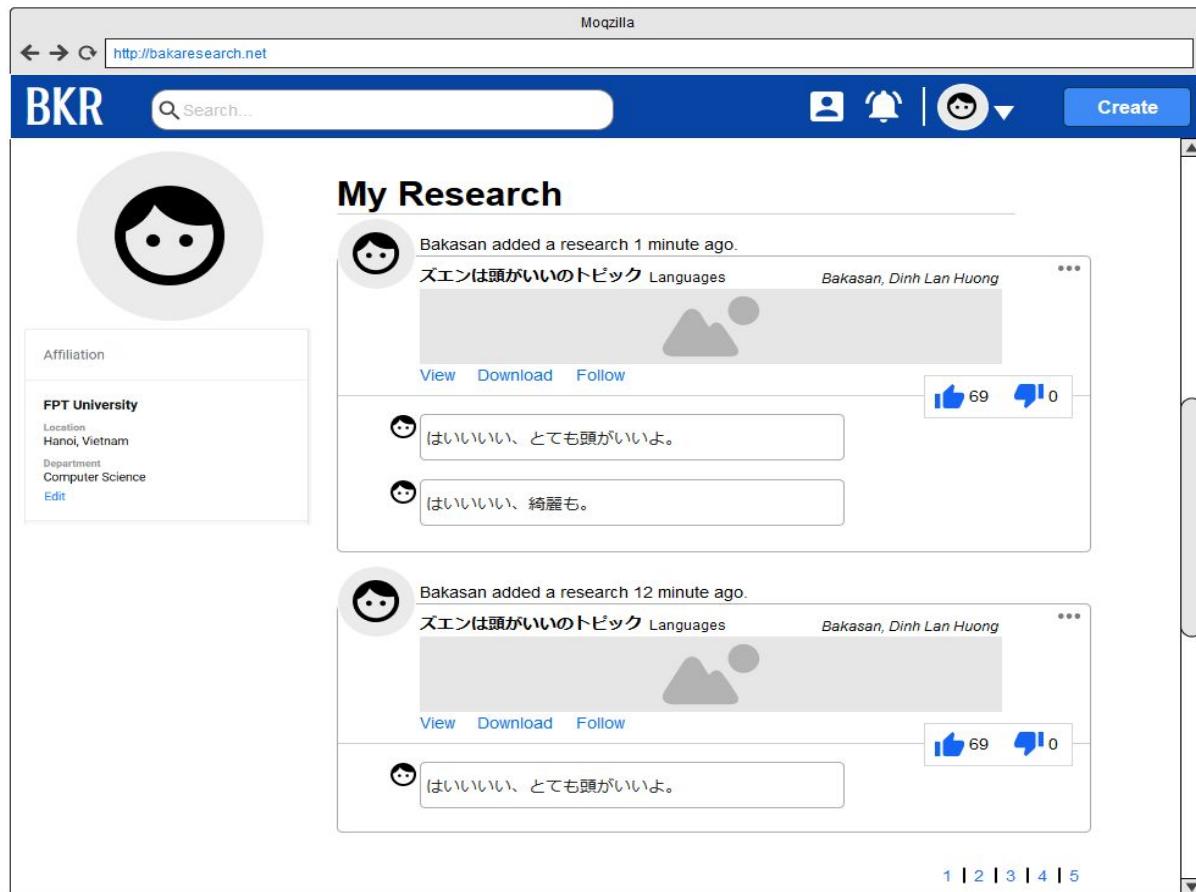


Figure 3.11.1: UC10 - View Own Article**Table 3.11.1:** UC10 - View Own Article

No	Object/Control Name	Type	Required	Length	Description
1	My Research	UILabel	No	N/A	N/A
2	[Bakasan] in “Bakasan added a research 1 min ago.”	UIHyperlink	Yes	N/A	Describe the owner of the article. Click this link to redirect to user's page.
3	Bakasan added a research 1 min ago.	UILabel	Yes	N/A	Show the time user publish the article.
4	ズエンは頭がいいのトピック	UILabel	Yes	N/A	Show the name of the article
5	Bakasan, Dinh lan Huong	UIHyperlink	Yes	N/A	Show the authors of the article. Click this link to redirect to user's page.
6	Image	UIImage	Yes	N/A	Show the summary of the article
7	View button	UIButton	Yes	N/A	Click to view the detail of article.
8	Download button	UIButton	Yes	N/A	Click to download the article attached file.
9	Follow button	UIButton	Yes	N/A	Click to follow the topic of this article. If user did follow this topic before, the Unfollow will be appeared instead.
10	Like button	UIButton	Yes	N/A	Click to increase the Like numbers of the article.
11	Unlike button	UIButton	Yes	N/A	Click to decrease the Like numbers of the article.
12	Avatar	UIImage	Yes	N/A	Click to redirect to user's page
13	Comment box	UITextbox	Yes	N/A	Show the comment of user

14	Setting button (right corner of the article object)	UIButton	Yes	N/A	Show the choice of editing or deleting the article.
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3.11.2 Sequence Diagram

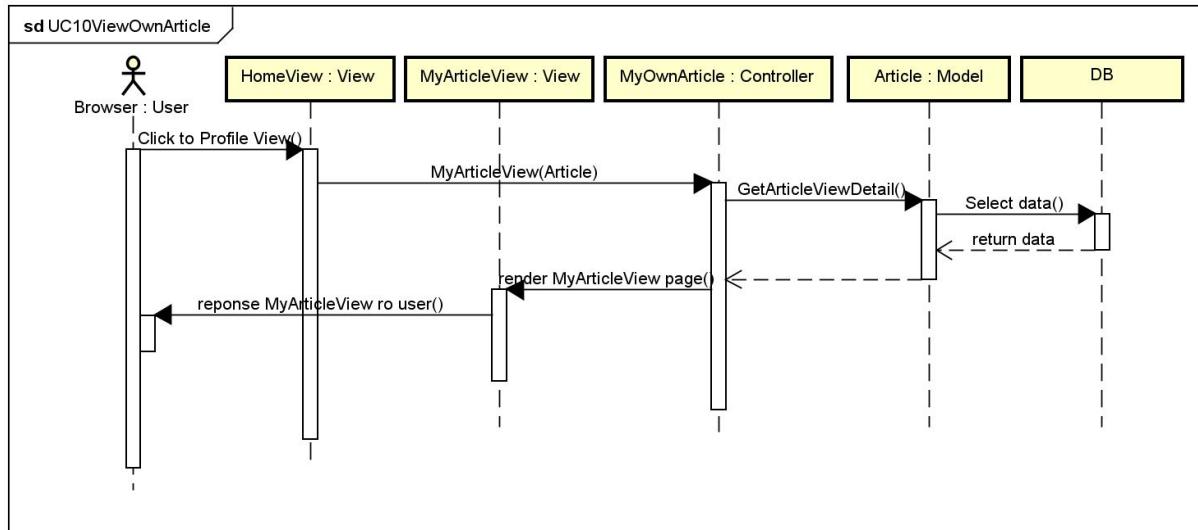


Figure 3.11.2: UC10 - View Own Article

3.12 UC11 - Delete Own Article

3.12.1 Screen Design

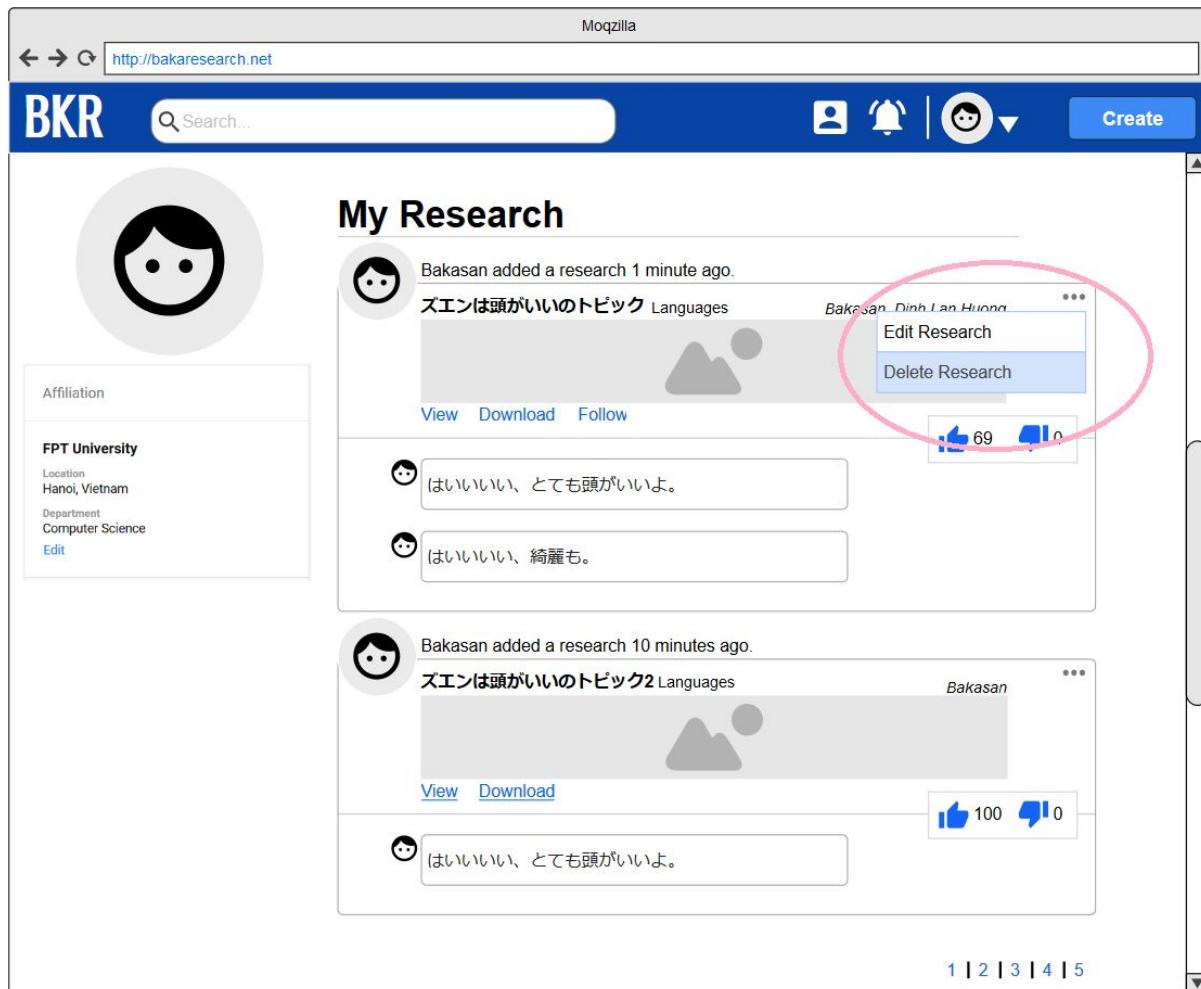


Figure 3.12.1: UC11 - Delete Own Article

No	Object/Control Name	Type	Required	Length	Description
1	Setting button	UIButton	Yes	N/A	Click the button, the dropdown list will show up with 2 options: Edit research/ Delete research
2	Edit Research button	UIButton	Yes	N/A	Click this button to redirect to Edit Article page.
3	Delete Research button	UIButton	Yes	N/A	Click this button to delete the article. Before delete completely, a confirm pop-up will show up to make sure user want to delete.

3.12.2 Sequence Diagram

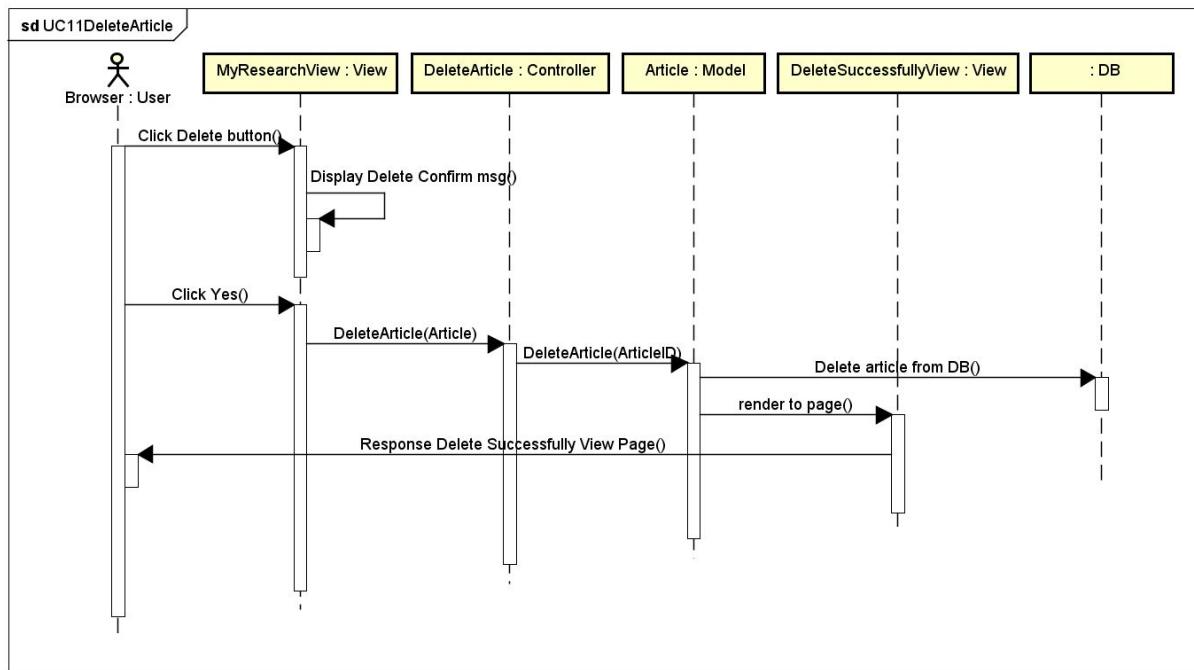


Figure 3.12.2: UC11 - Delete Article

3.13 UC12 - Edit Article

3.13.1 Screen Design

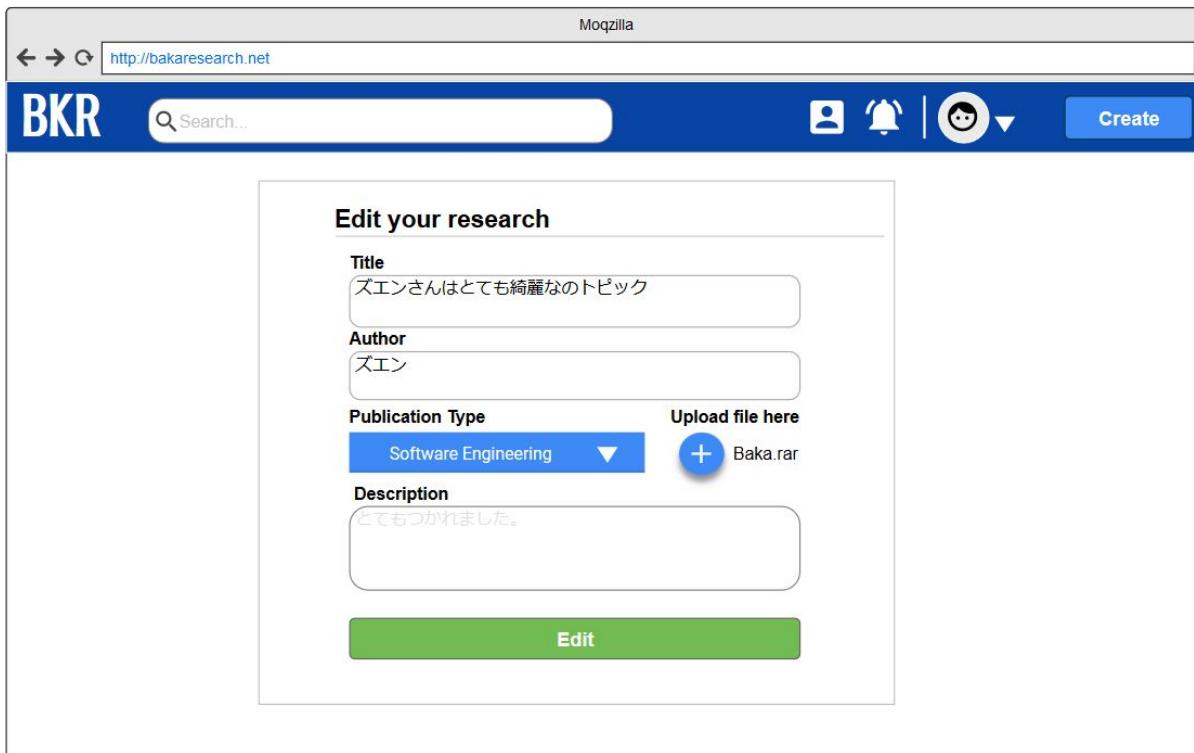


Figure 3.13.1: UC12 - Edit Article

No	Object/Control Name	Type	Required	Length	Description
1	Edit your research	UILabel	No	N/A	N/A
2	Title label	UILabel	No	N/A	N/A
3	Title input text	UITextField	Yes	200	Input title of research document
4	Author label	UILabel	No	N/A	N/A
5	Author input text	UITextField	Yes	N/A	Input the author or research document. Can be more than one authors own one research. If user want to add co-author, co-author must be in friend relationship with the creator.
6	Publication Type	UILabel	No	N/A	N/A
7	Publication Type Dropdownlist	UIDropdownlist	Yes	N/A	Click to choose the right publication type of research document.
8	Upload file here	UILabel	No	N/A	N/A
9	Upload file	UIUploadFile	Yes	N/A	User can choose number types of research documents.
10	Description	UILabel	No	N/A	N/A
11	Description input text	UITextField	Yes	N/A	Input description of the research document.
12	Edit button	UI Button	Yes	N/A	Click to complete the process.

3.13.2 Sequence Diagram

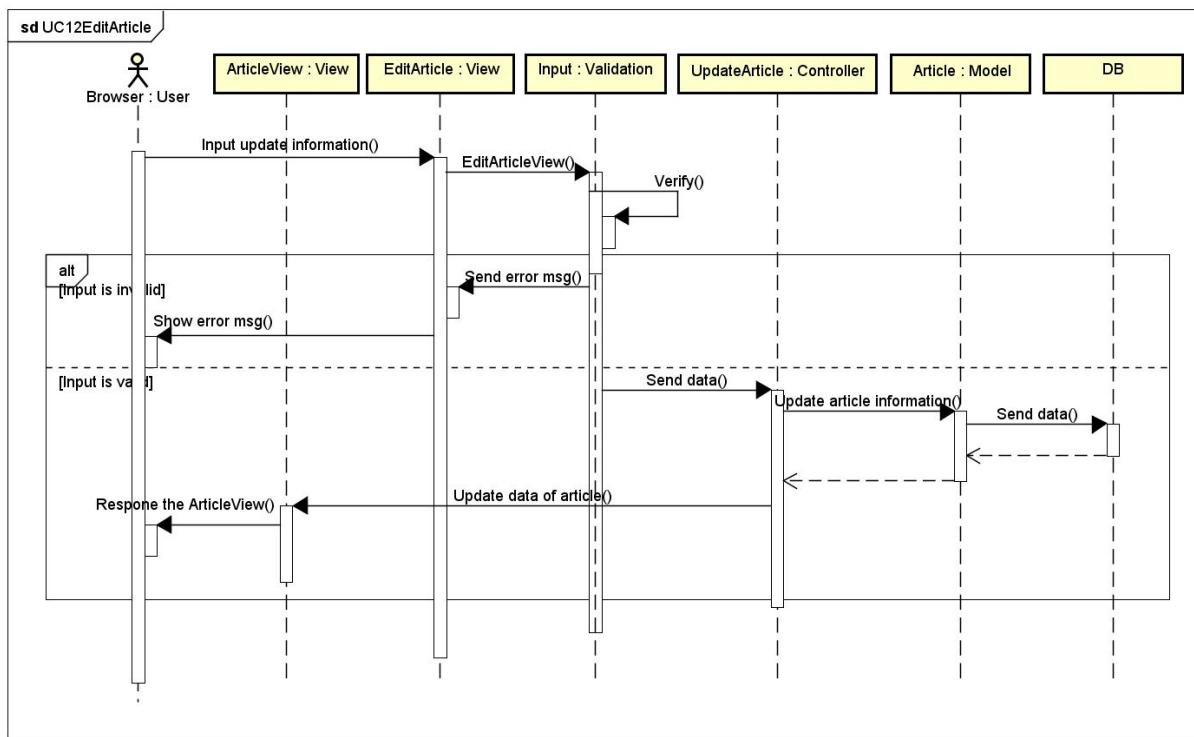


Figure 3.13.2: UC12 - Edit Article

3.14 UC13 - Delete Comment

3.14.1 Screen Design



Figure 3.14.1: UC13 - Delete Comment

Table 3.14.1: UC13 - Delete Comment

No	Object/Control Name	Type	Required	Length	Description
1	Setting button	UIButton	Yes	N/A	Click the button, the dropdown list will show up with 2 options: Edit

					comment/ Delete comment
2	Edit Comment button	UIButton	Yes	N/A	Click this button to edit comment.
3	Delete Comment button	UIButton	Yes	N/A	Click this button to delete the comment. Before delete completely, a confirm pop-up will show up to make sure user want to delete.

3.14.2 Sequence Diagram

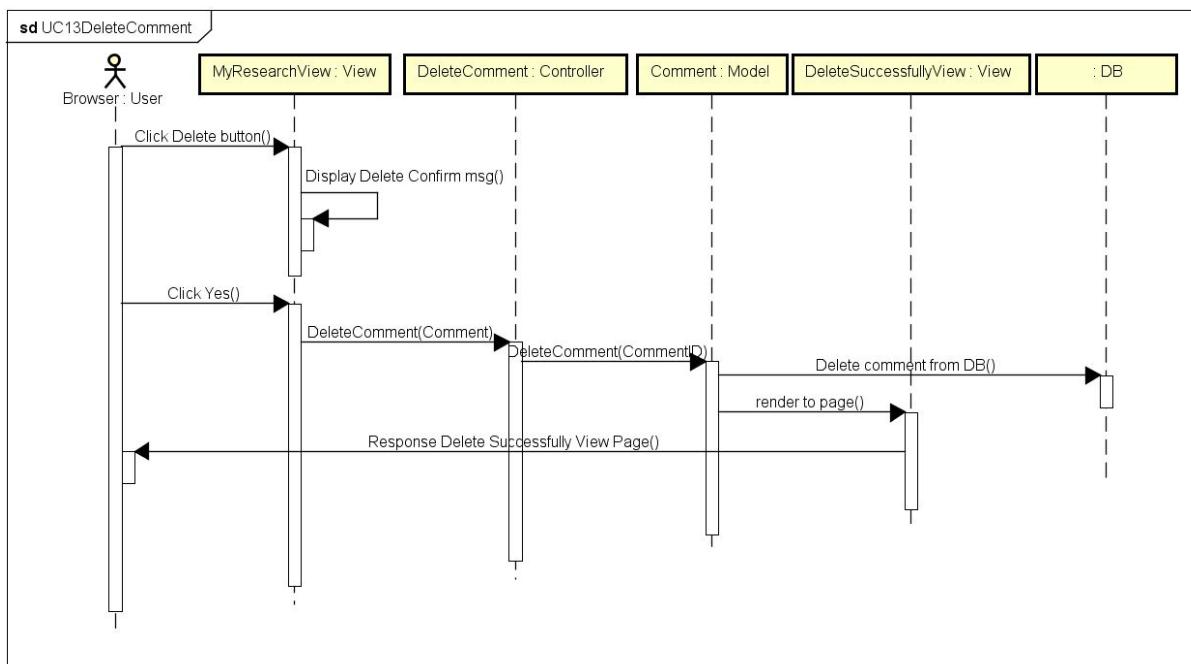


Figure 3.14.2: UC13 - Delete Comment

3.15 UC14 Search Article

3.15.1 Screen Design



Figure 3.15.1.1: UC14 - Search Article

No	Object/Control Name	Type	Required	Length	Description
1	Search	UITextField	Yes	N/A	N/A

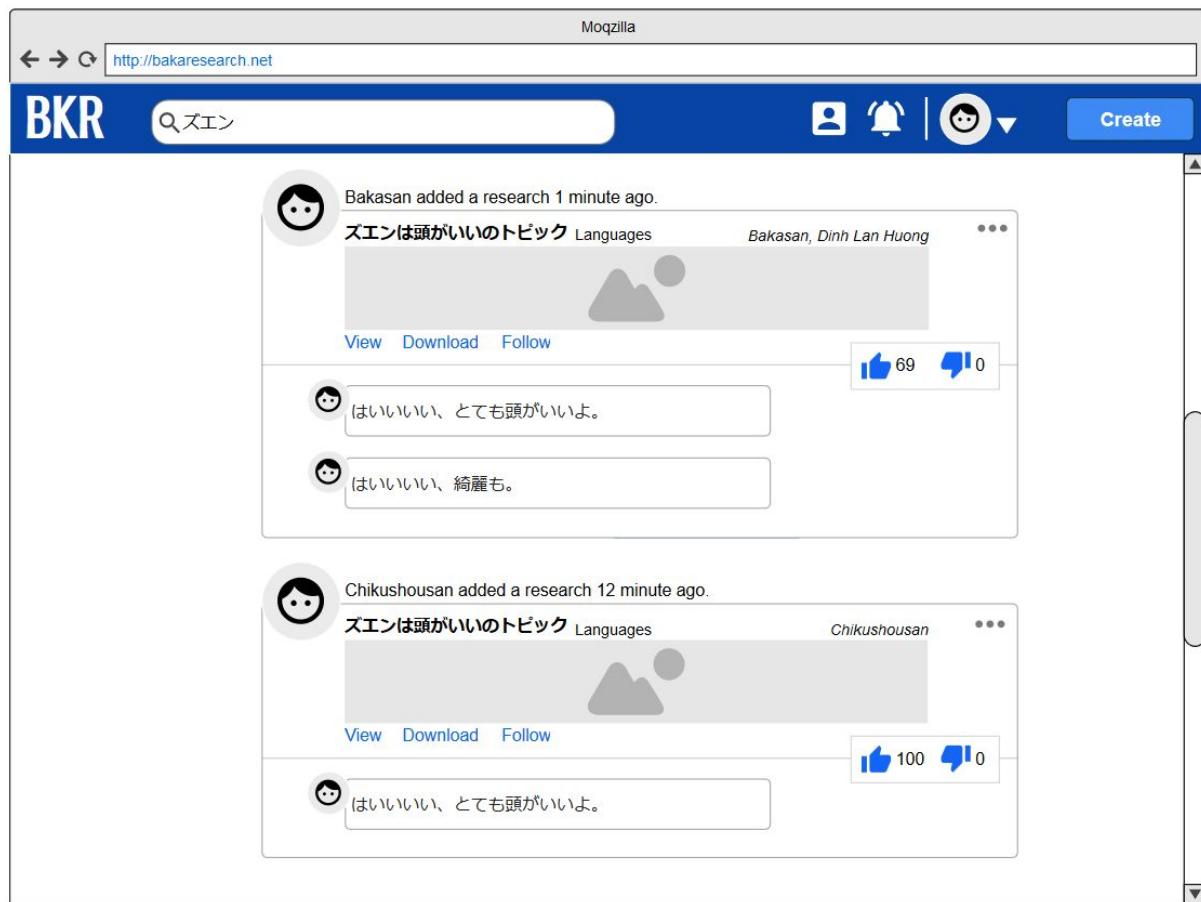


Figure 3.15.1.2: UC14 - Search Article, Search result screen

No	Object/Control Name	Type	Required	Length	Description
1	Search	UITextField	Yes	N/A	N/A

3.15.2 Sequence Diagram

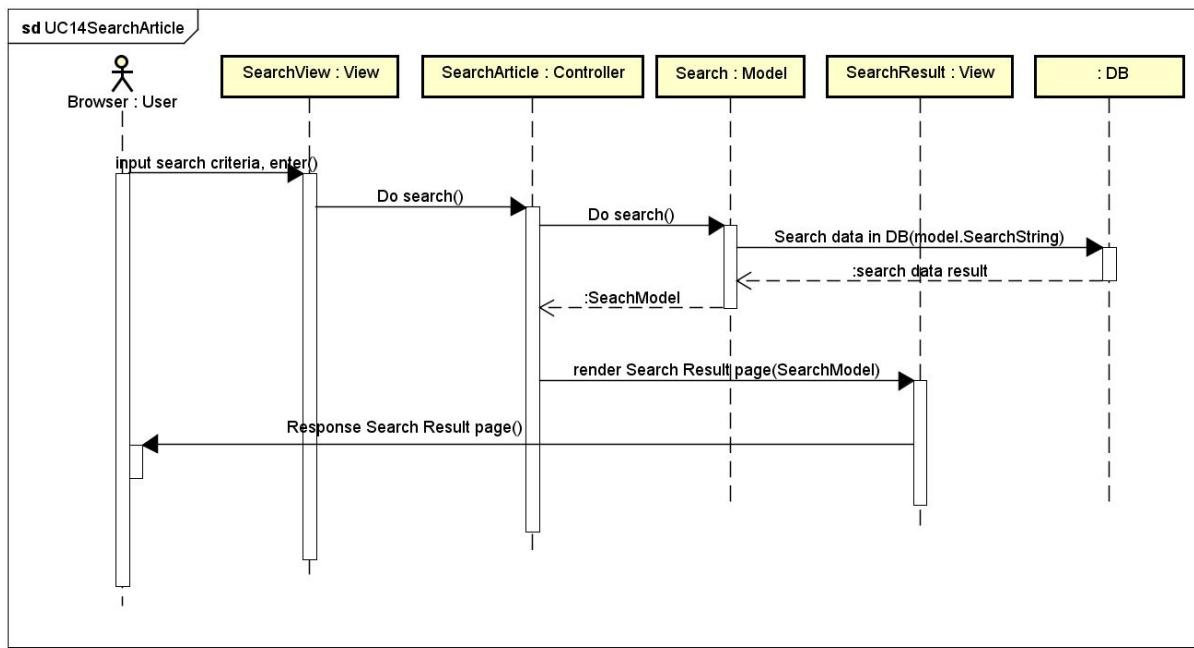


Figure 3.15.2: UC14 - Search Article

3.16 UC15 - View Article

3.16.1 Screen Design

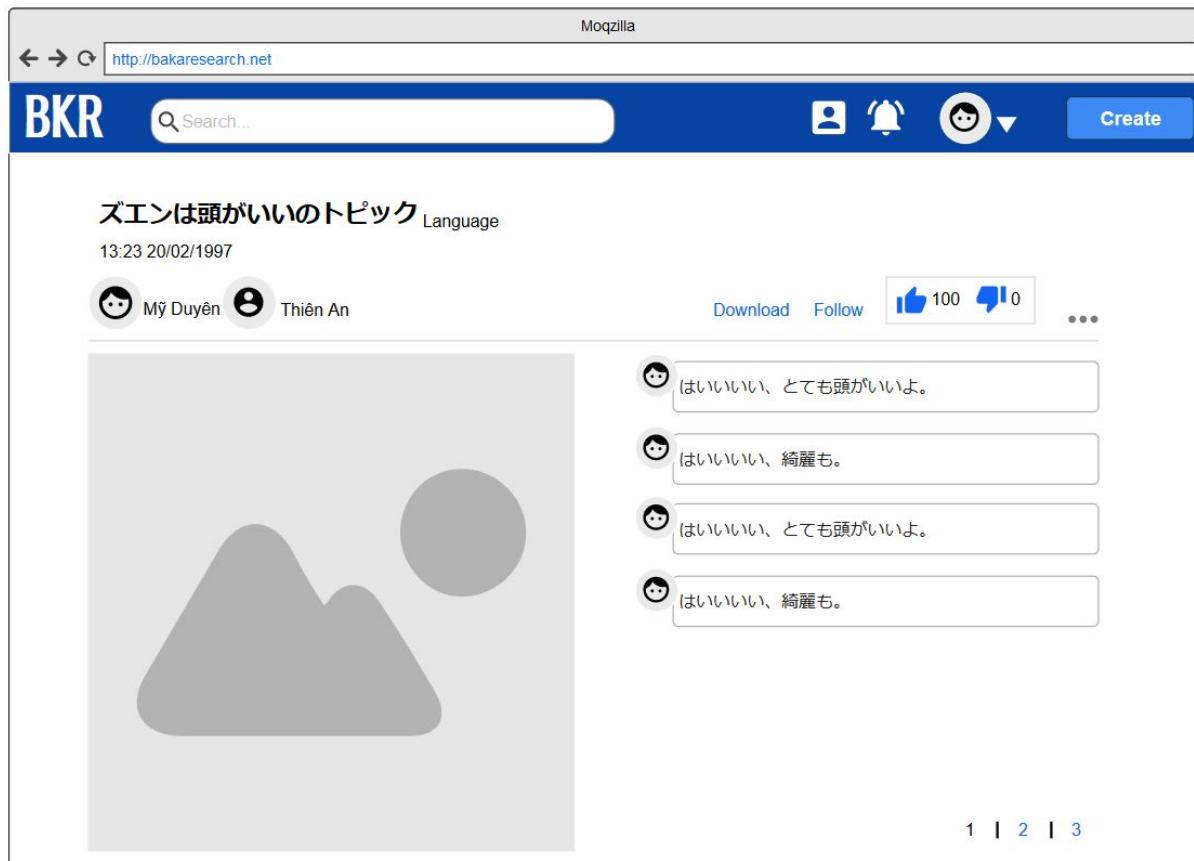
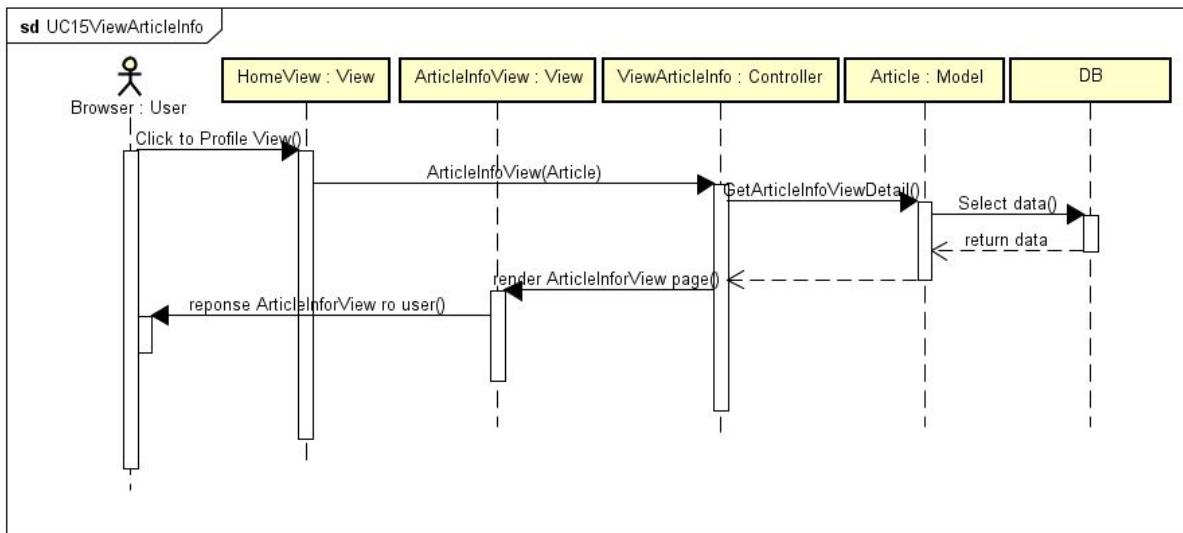


Figure 3.16.1: UC15 - View Article

No	Object/Control Name	Type	Required	Length	Description
1	[Bakasan] in “Bakasan added a research 1 min ago.”	UIHyperlink	Yes	N/A	Describe the owner of the article. Click this link to redirect to user's page.
2	Bakasan added a research 1 min ago.	UILabel	Yes	N/A	Show the time user publish the article.
3	ズエンは頭がいい のトピック	UILabel	Yes	N/A	Show the name of the article
4	Bakasan, Dinh lan Huong	UIHyperlink	Yes	N/A	Show the authors of the article. Click this link to redirect to user's page.
5	Image	UIImage	Yes	N/A	Show the summary of the article
6	View button	UIButton	Yes	N/A	Click to view the detail of article.
7	Download button	UIButton	Yes	N/A	Click to download the article attached file.
8	Follow button	UIButton	Yes	N/A	Click to follow the topic of this article. If user did follow this topic before, the Unfollow will be appeared instead.
9	Like button	UIButton	Yes	N/A	Click to increase the Like numbers of the article.
10	Unlike button	UIButton	Yes	N/A	Click to decrease the Like numbers of the article.
11	Avatar	UIImage	Yes	N/A	Click to redirect to user's page
12	Comment box	UITextbox	Yes	N/A	Show the comment of user
13	Setting button (right corner of the article object)	UIButton	Yes	N/A	Show the choice of editing or deleting the article.
14	Pager	UIPager	No	N/A	N/A

3.16.2 Sequence Diagram



3.17 UC16 - Comment (on article)

3.17.1 Screen Design

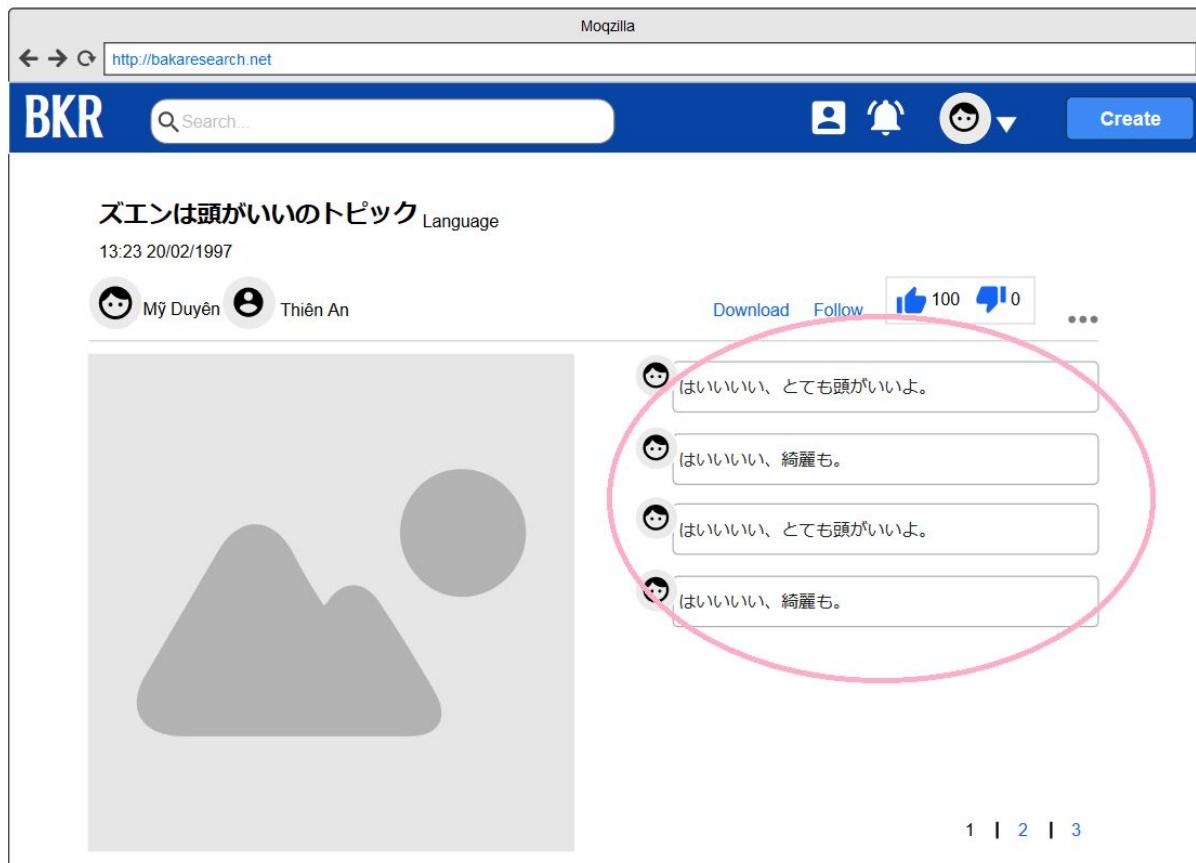


Figure 3.16.1: UC16 - Comment (on article)

No	Object/Control Name	Type	Required	Length	Description
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1	Comment box	UITextbox	Yes	N/A	Show the comment of user
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3.17.2 Sequence Diagram

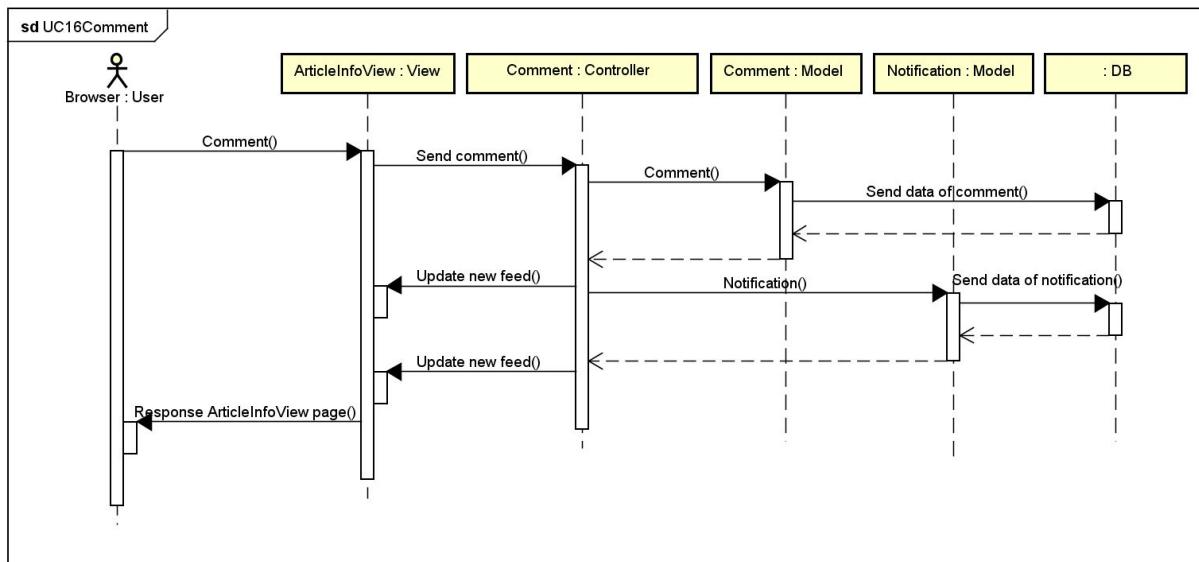


Figure 3.17.2: UC16 - Comment

3.18 UC17 - Follow (article)

3.18.1 Screen Design

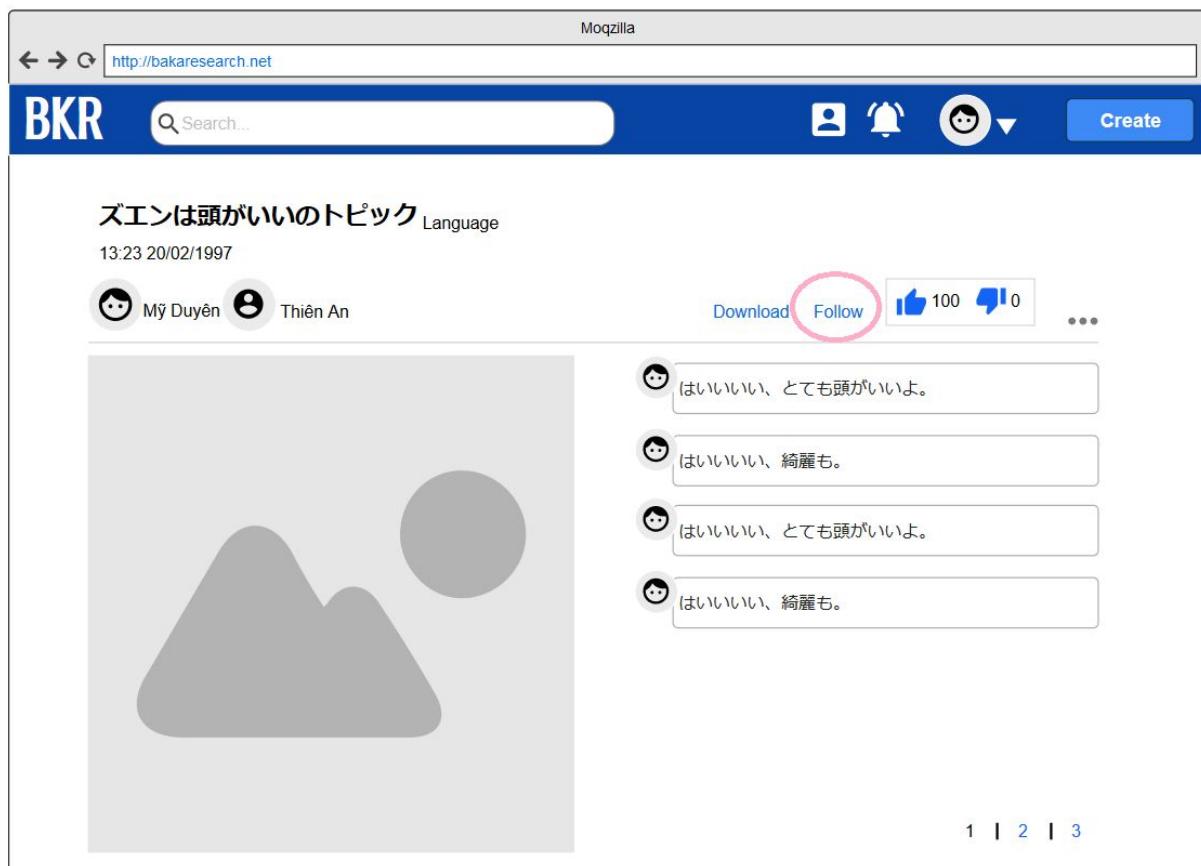


Figure 3.18.1: UC17 - Follow

No	Object/Control Name	Type	Required	Length	Description
1	Follow button	UIButton	Yes	N/A	Click to follow the topic of this article. If user did follow this topic before, the Unfollow will be appeared instead.

3.18.2 Sequence Diagram

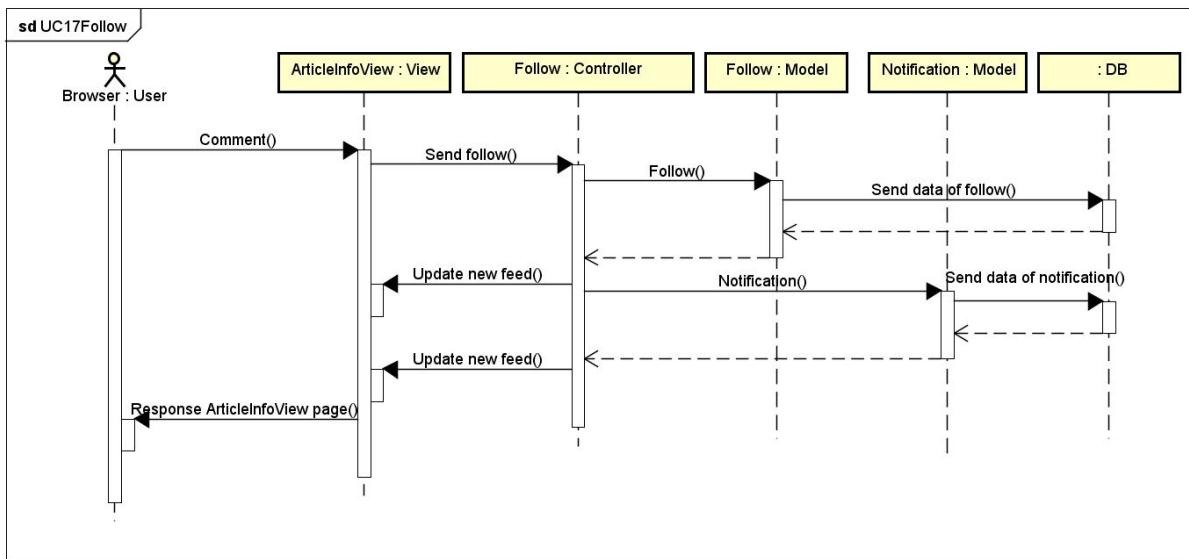


Figure 3.18.2: UC17 - Follow

3.19 UC18 - Download (article)

3.19.1 Screen Design

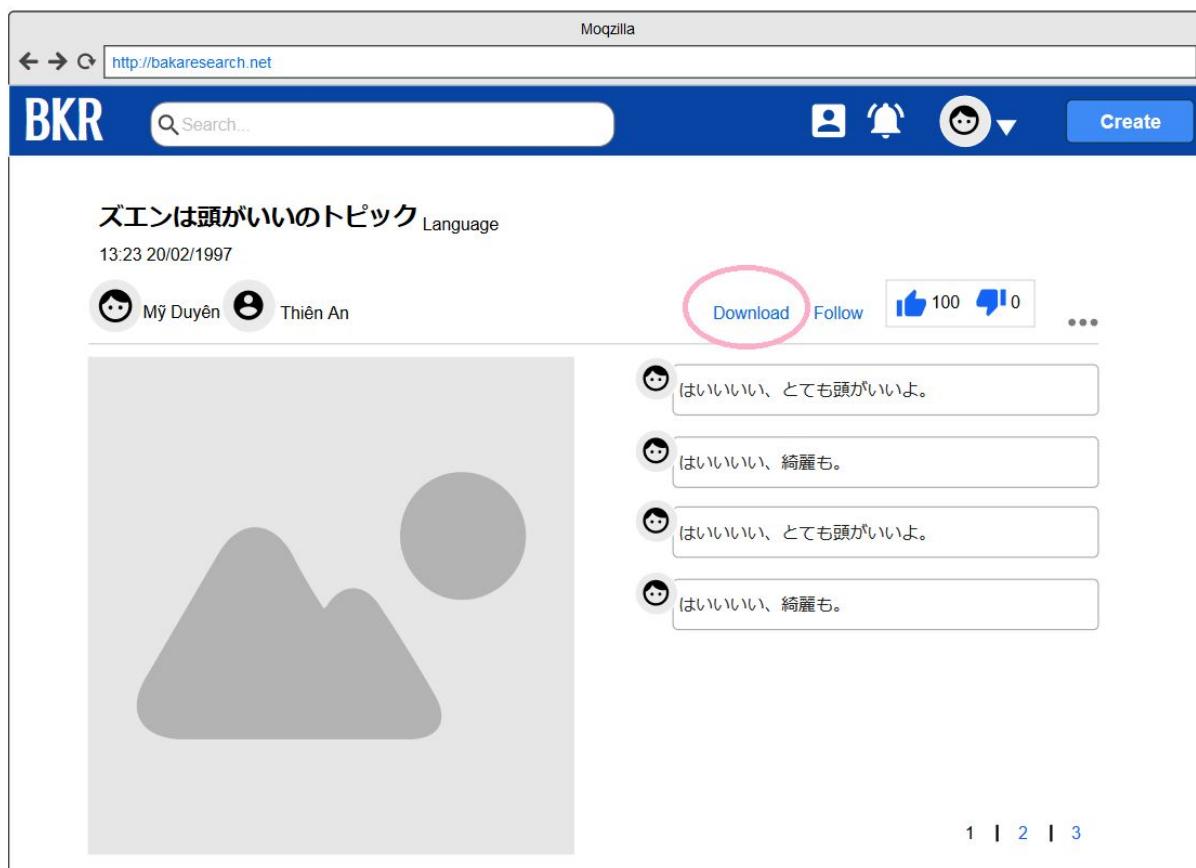


Figure 3.19.1: UC18 - Download

No	Object/Control Name	Type	Required	Length	Description
1	Download button	UIButton	Yes	N/A	Click to download the article attached file.

3.19.2 Sequence Diagram

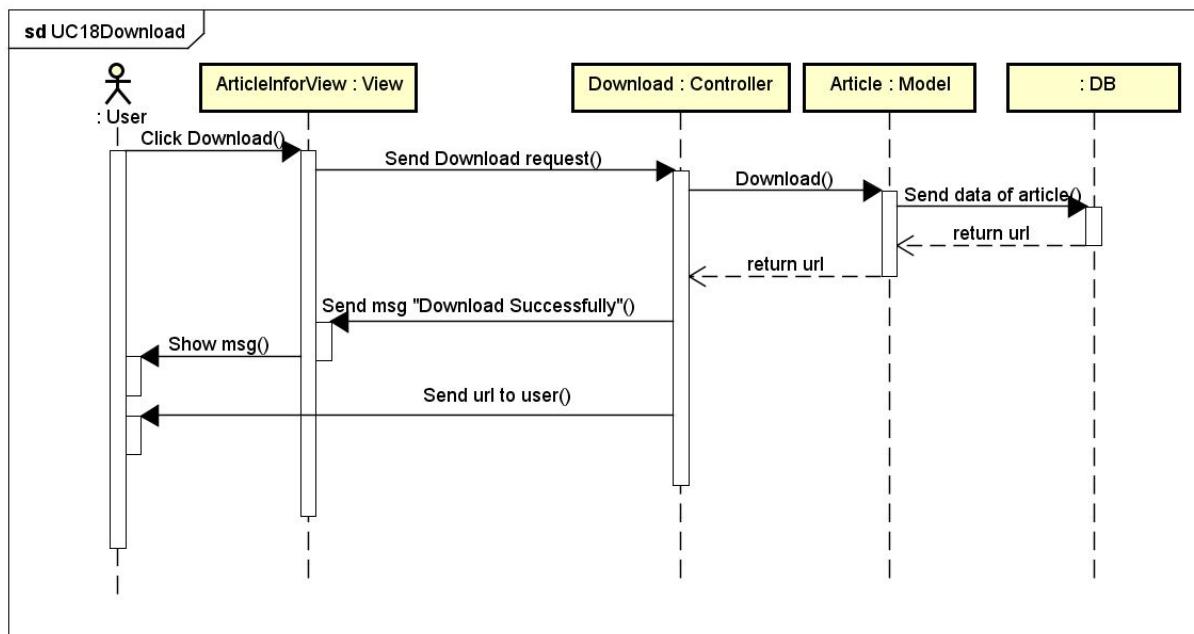


Figure 3.19.2: UC18 - Download

3.20 UC19 - Vote

3.20.1 Screen Design

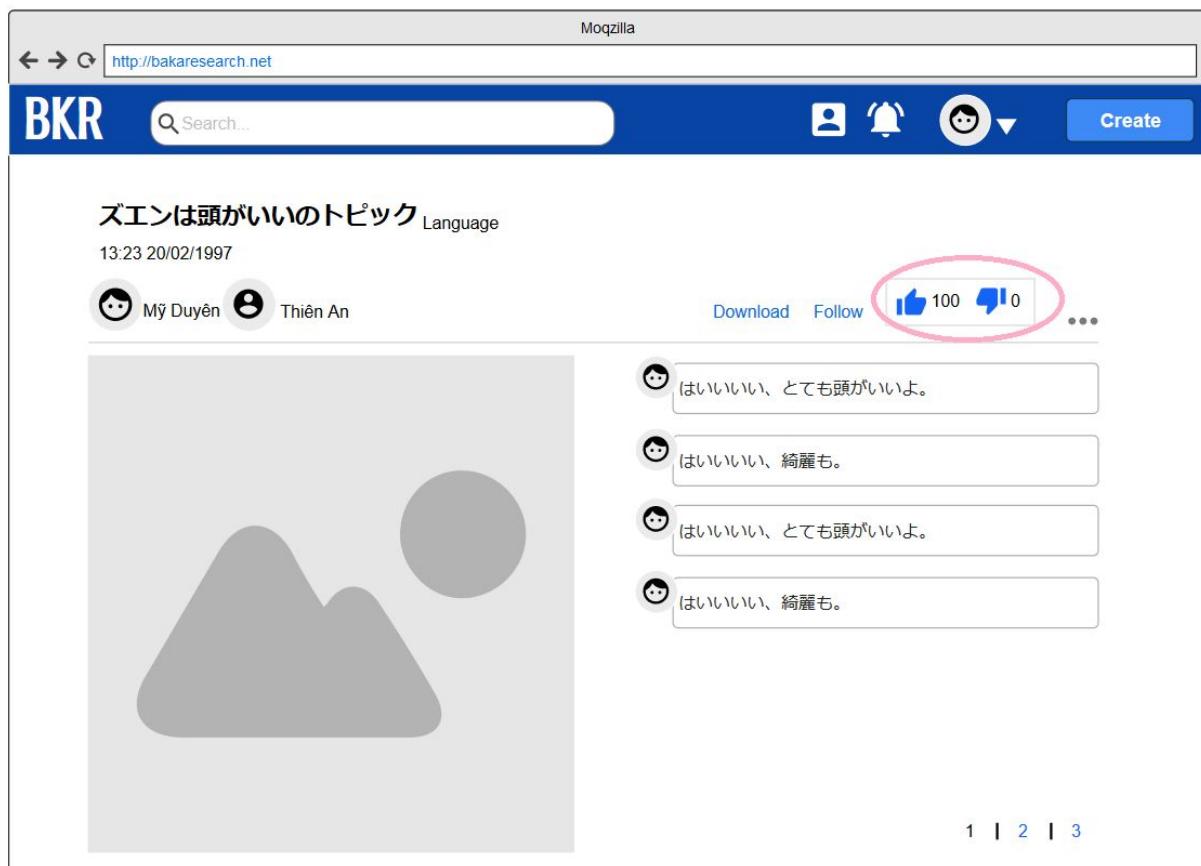


Figure 3.20.1: UC19 - Vote

No	Object/Control Name	Type	Required	Length	Description
1	Like button	UIButton	Yes	N/A	Click to increase the Like numbers of the article.
2	Unlike button	UIButton	Yes	N/A	Click to decrease the Like numbers of the article.

3.20.2 Sequence Diagram

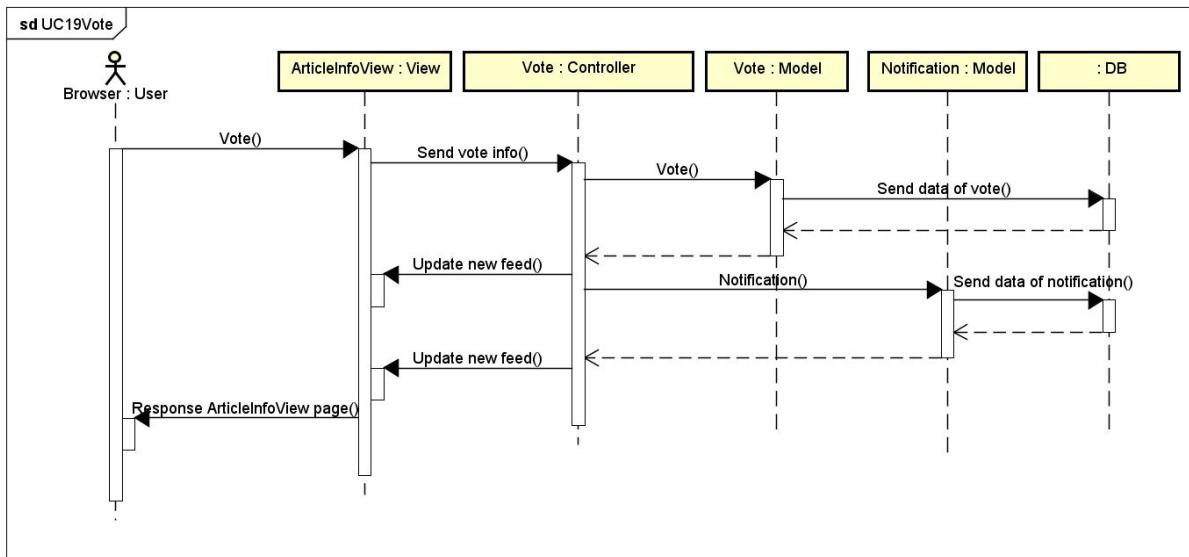


Figure 3.20.2: UC19 - Vote

3.21 UC20 - View Notifications

3.21.1 Screen Design



Figure 3.21.1: View Notifications

No	Object/Control Name	Type	Required	Length	Description
1	Notifications button	UIButton	Yes	N/A	Click to redirect to Notifications Page

3.21.2 Sequence Diagram

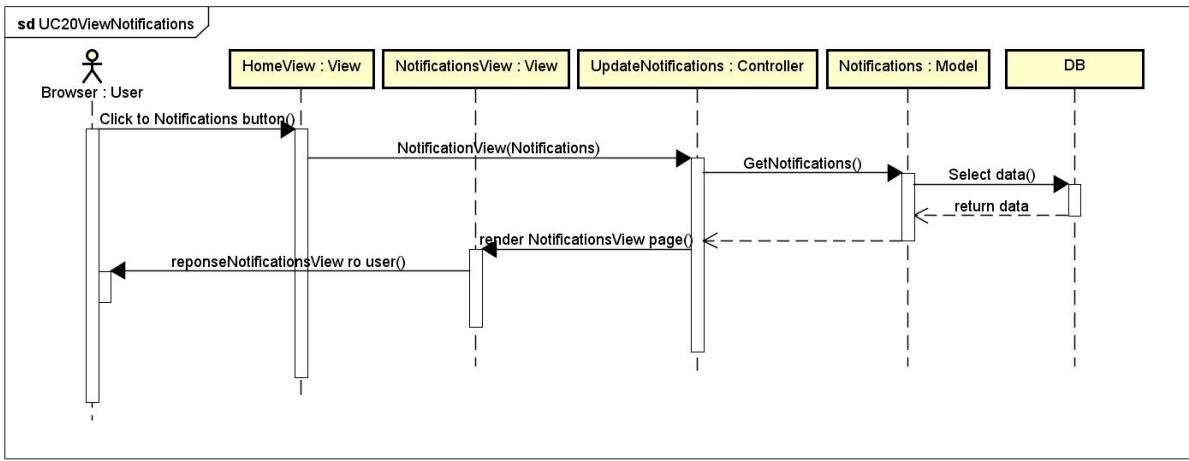


Figure 3.21.2: View Notifications

3.22 UC21 - Search User

3.22.1 Sequence Diagram

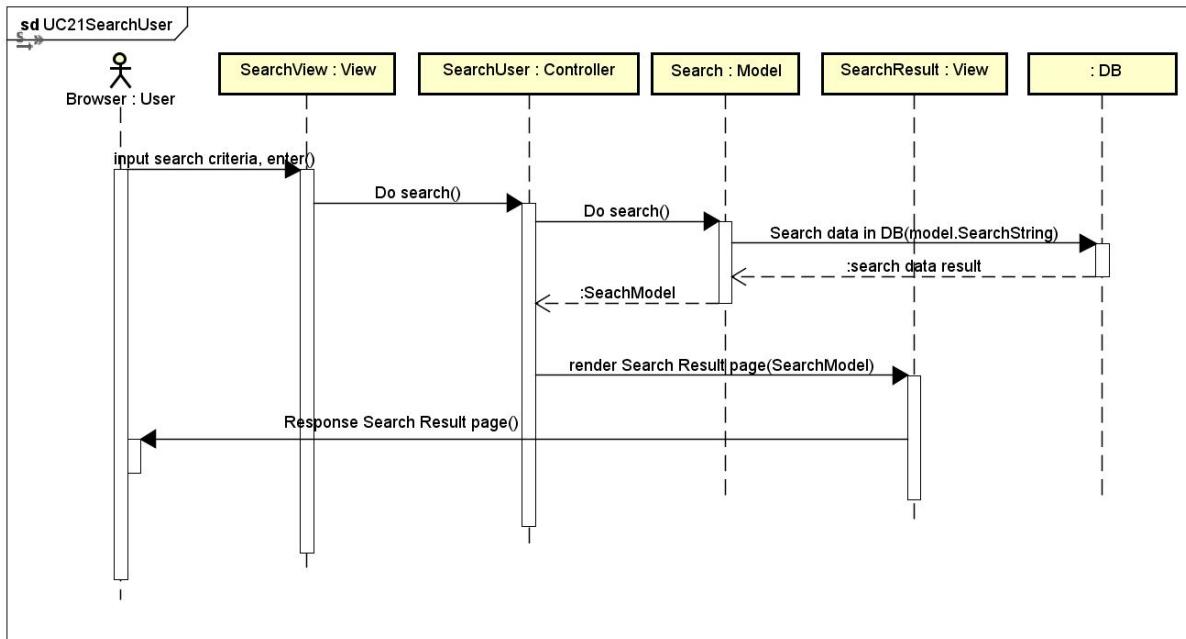


Figure 3.22.1: Search User

3.23 UC22 - View Mail

3.23.1 Screen Design

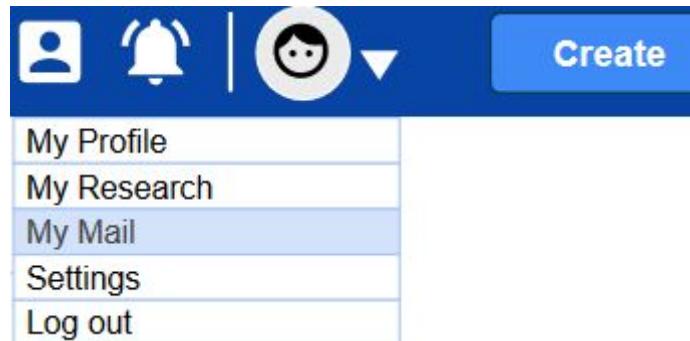


Figure 3.22.1.1: UC22 - View Mail

Table 3.23.1.1: UC22 - View Mail

No	Object/Control Name	Type	Required	Length	Description
1	My Mail button	UIButton	Yes	N/A	Click to redirect to My Mail View

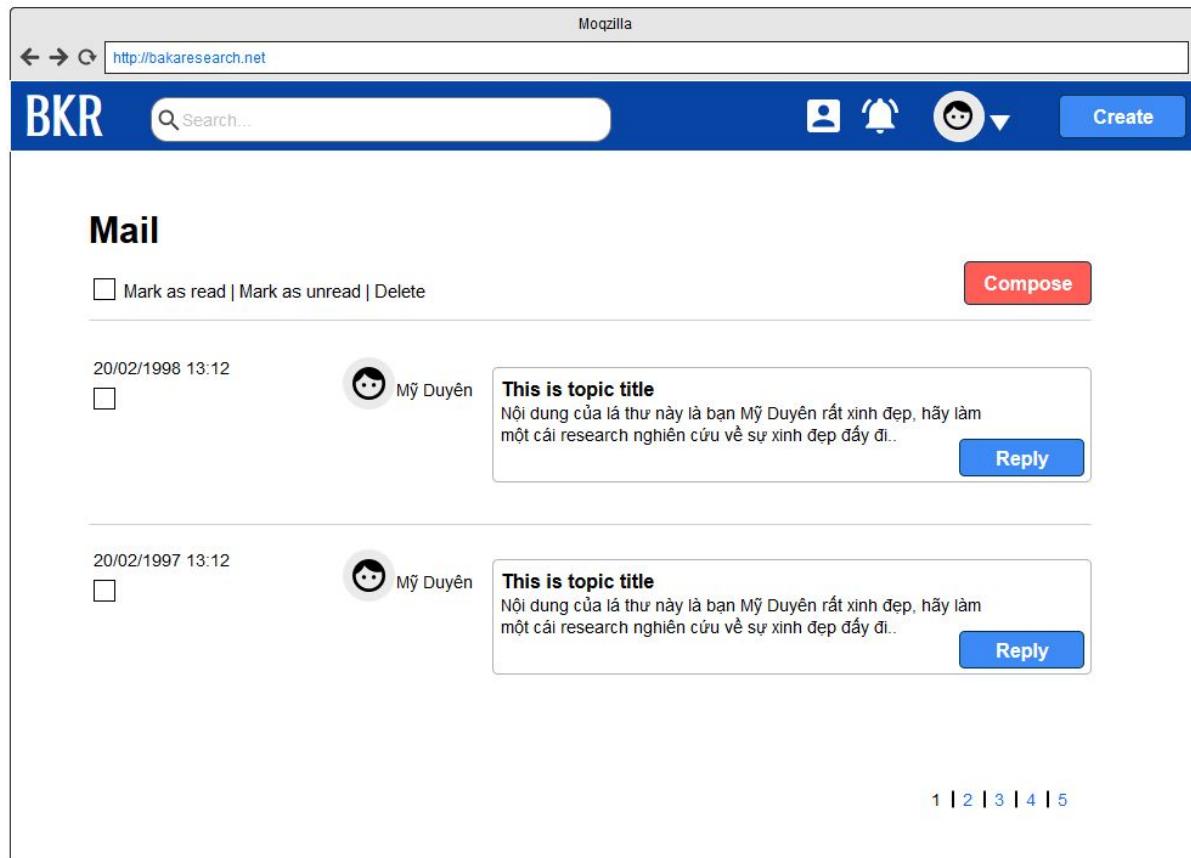


Figure 3.23.1.2: UC22 - View Mail, mailbox

Table 3.23.1.2: UC22 - View Mail

No	Object/Control Name	Type	Required	Length	Description
1	Compose button	UIButton	Yes	N/A	Click to write a new mail
2	20/02/1998 13:12	UILabel	Yes	N/A	Show the time that the mail arrived
3	My Duyen	UIHyperlink	Yes	N/A	Click to redirect to user's page
4	This is topic title	UILabel	Yes	N/A	N/A
5	Noi dung cua...	UIText	Yes	N/A	N/A
6	Blank check box	UICheckbox	Yes	N/A	Check if user want to Mark as read/ Mark as unread or Delete in the same time with other box which are checked too.
7	Reply button	UIButton	Yes	N/A	Click to reply the mail
8	Pager	UIPager	No	N/A	N/A

3.23.2 Sequence Diagram

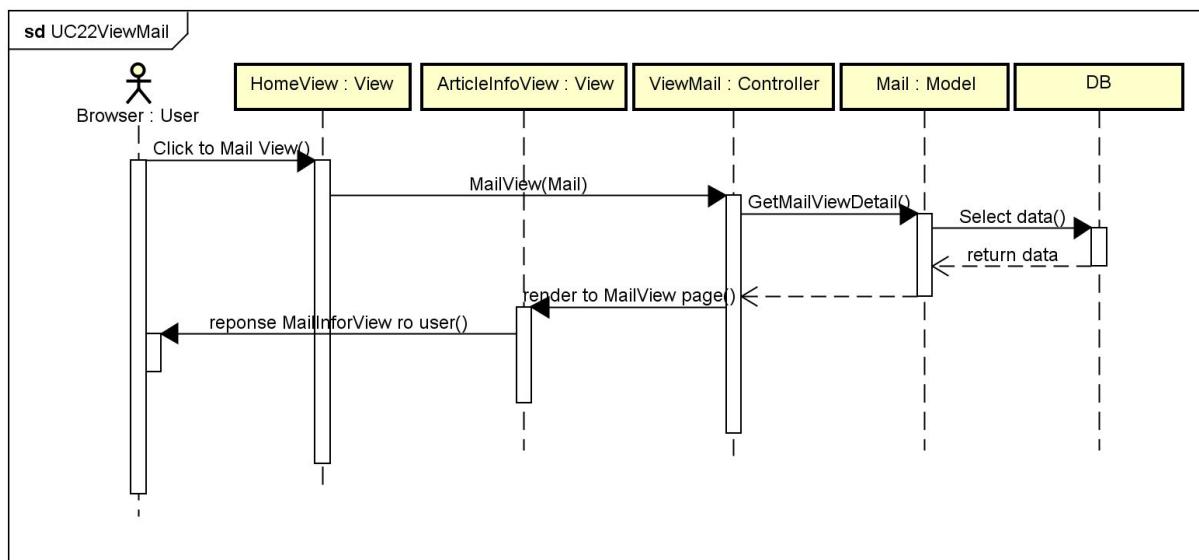


Figure 3.23.2: UC22 - View Mail

3.24 UC23 - Send Mail

3.24.1 Screen Design

The screenshot shows the BKR web application interface. The top navigation bar includes a search bar, user profile icons, and a 'Create' button. The main content area is titled 'Send Mail' and contains fields for 'To' (with an 'Enter a name' placeholder), 'Title' (with an 'Enter a subject' placeholder), and 'Message' (with an 'Enter a message' placeholder). Below these is a 'Upload file here' section with a blue plus button and the file 'Baka.rar' listed. At the bottom is a large green 'Send message' button.

Figure 3.24.1: UC23 - Send Mail

No	Object/Control Name	Type	Required	Length	Description
1	Send mail	UILabel	No	N/A	N/A

2	To	UILabel	No	N/A	N/A
3	To input text	UITextField	Yes	N/A	Input other user account to send mail.
4	Title	UILabel	No	N/A	N/A
5	Title input text	UITextField	Yes	200	Input title
6	Message	UILabel	No	N/A	N/A
7	Message input text	UITextField	Yes	500	Input message
8	Upload file here	UILabel	No	N/A	N/A
9	Upload file	UIAttachedFile	N/A	N/A	N/A
10	Send message button	UIButton	Yes	N/A	Click this button to complete the process and send the message to people you want to send.

3.24.2 Sequence Diagram

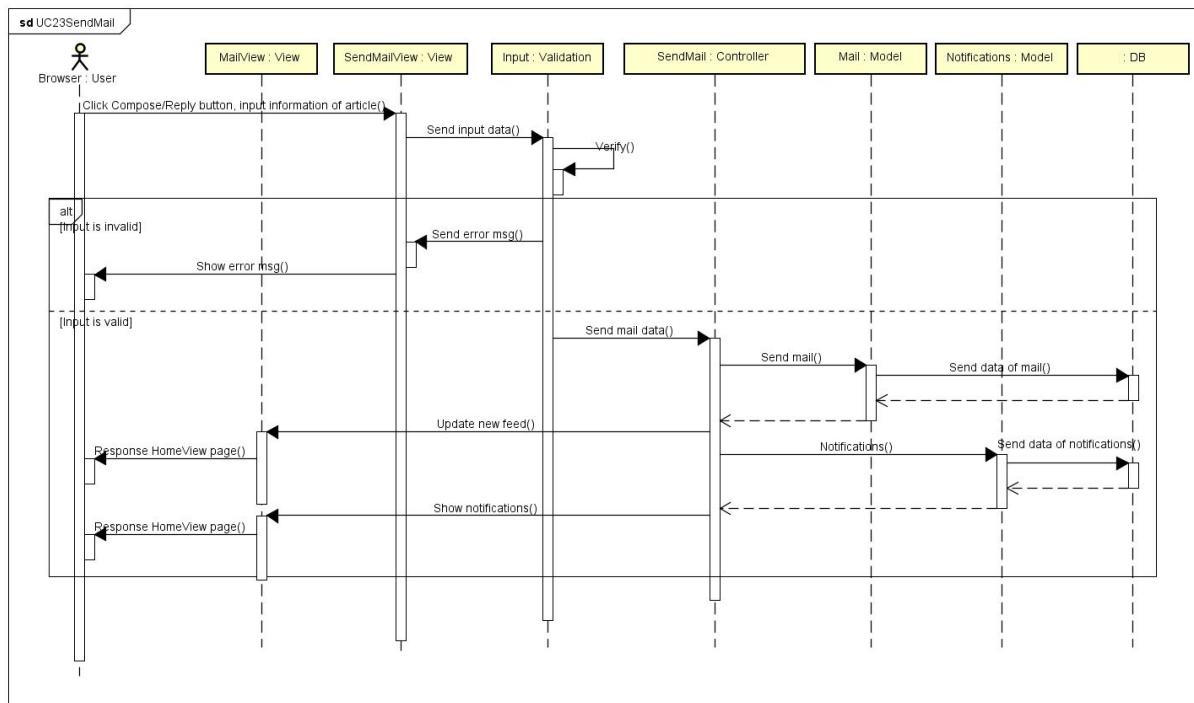


Figure 3.24.2: UC23 - Send Mail

3.25 UC24 - Manage Friend Relationship

3.25.1 Screen Design

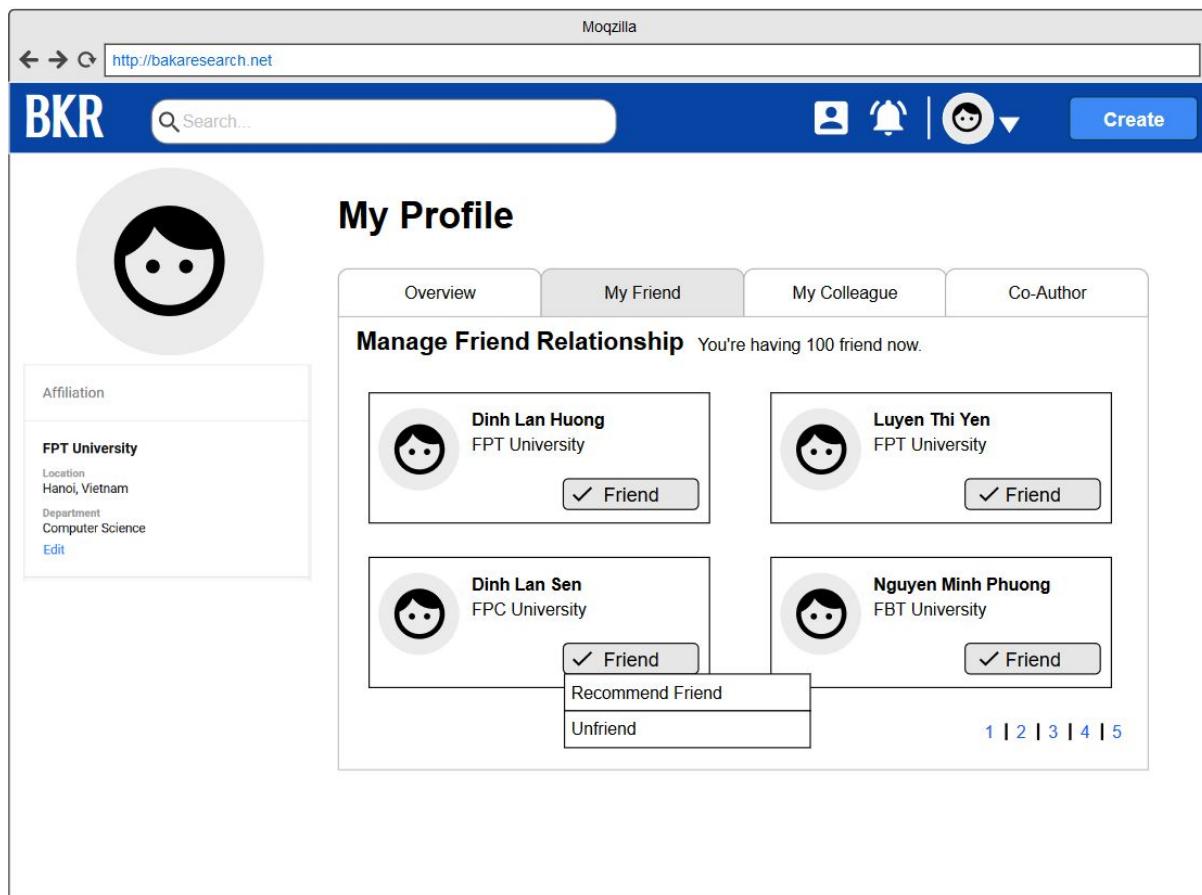
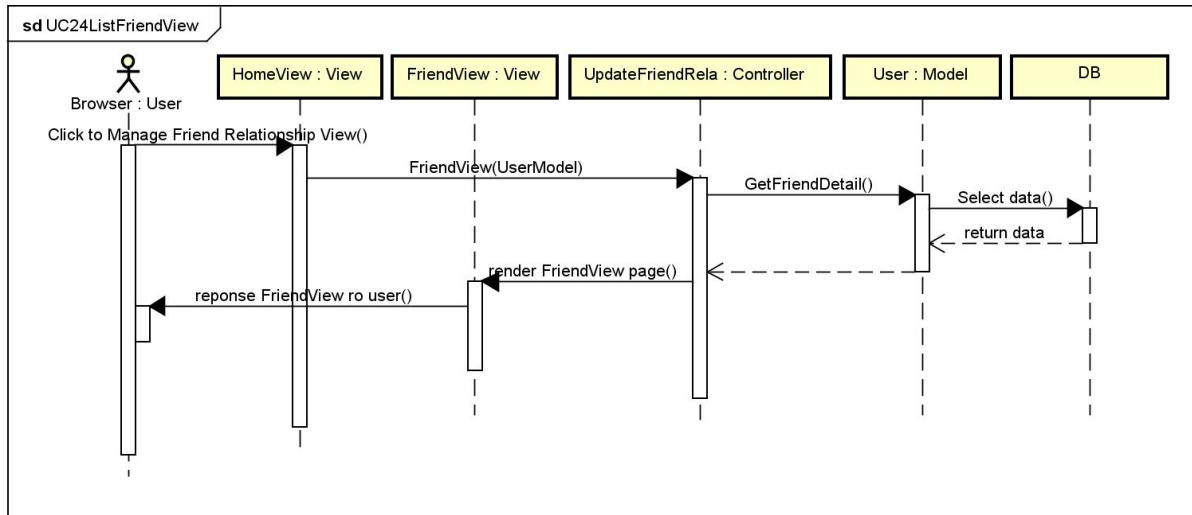


Figure 3.25.1: UC24 - Manage Friend Relationship

No	Object/Control Name	Type	Required	Length	Description
1	Manage Friend Relationship	UILabel	No	N/A	N/A
2	You're having 100 friend now	UILabel	No	N/A	Show numbers of friends user are having
3	Avatar	UIImage	No	N/A	Click this to redirect to user's page.
4	Dinh Lan Huong	UIHyperlink	No	N/A	Click this to redirect to user's page.
5	FPT University	UIHyperlink	No	N/A	Click this to redirect to user's institution page
6	Friend Button	UIButton	No	N/A	Click this to change status of

					relationship of friend.
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3.25.2 Sequence Diagram



3.26 UC25 - Friend requests

3.26.1 Screen Design

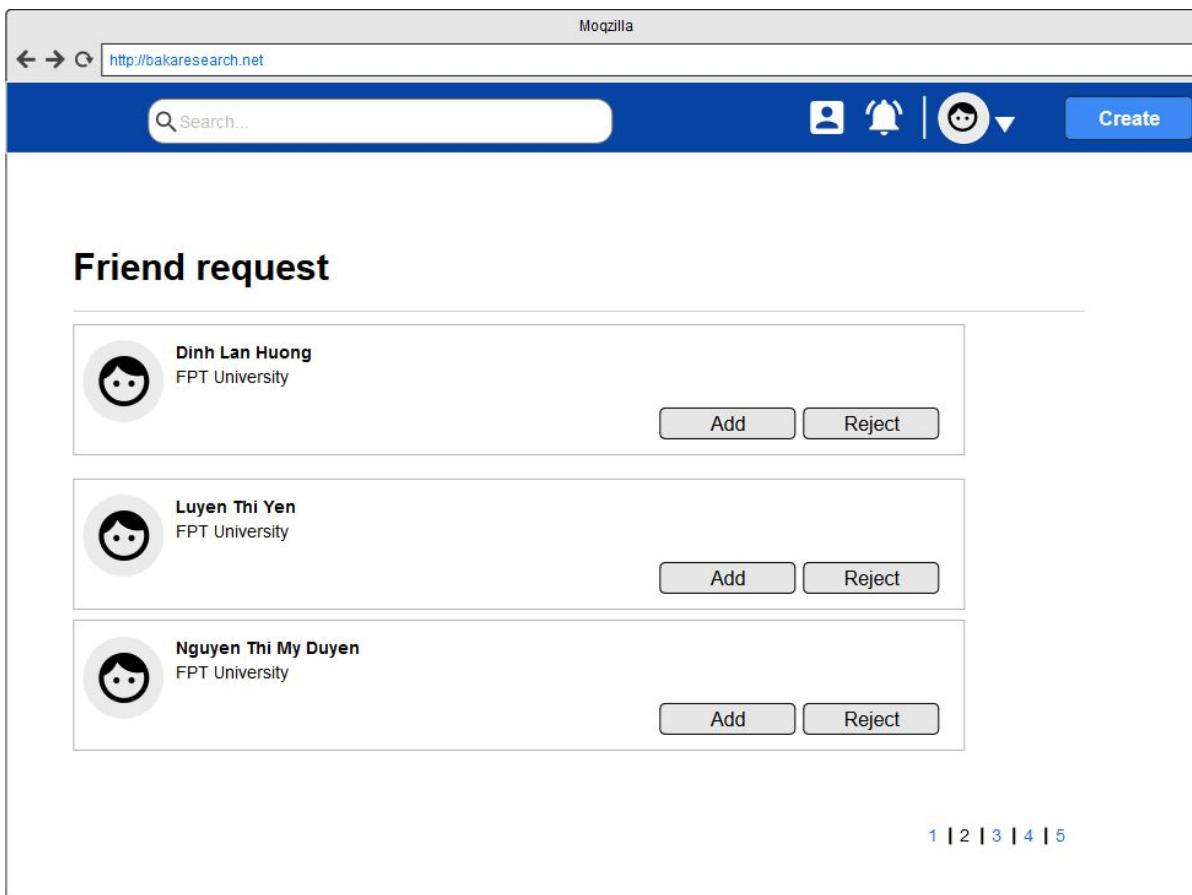


Figure 3.26.1: UC25 - Friend request

No	Object/Control Name	Type	Required	Length	Description
1	Avatar	UIImageView	No	N/A	Click this to redirect to user's page.
2	Dinh Lan Huong	UIHyperlink	No	N/A	Click this to redirect to user's page.
3	FPT University	UIHyperlink	No	N/A	Click this to redirect to user's institution page
4	Add Button	UIButton	No	N/A	Click this to add friend.
5	Reject Button	UIButton	No	N/A	Click this to reject to become friend.

3.26.2 Sequence Diagram

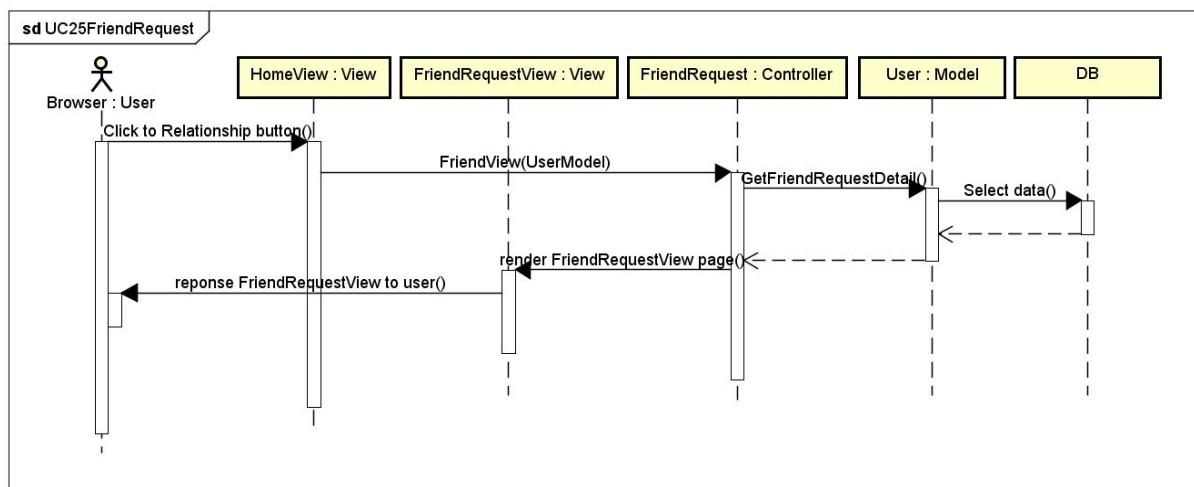


Figure 3.26.2: UC25 - Friend request

3.27 UC26 - Add/ Reject Friend

3.27.1 Screen Design

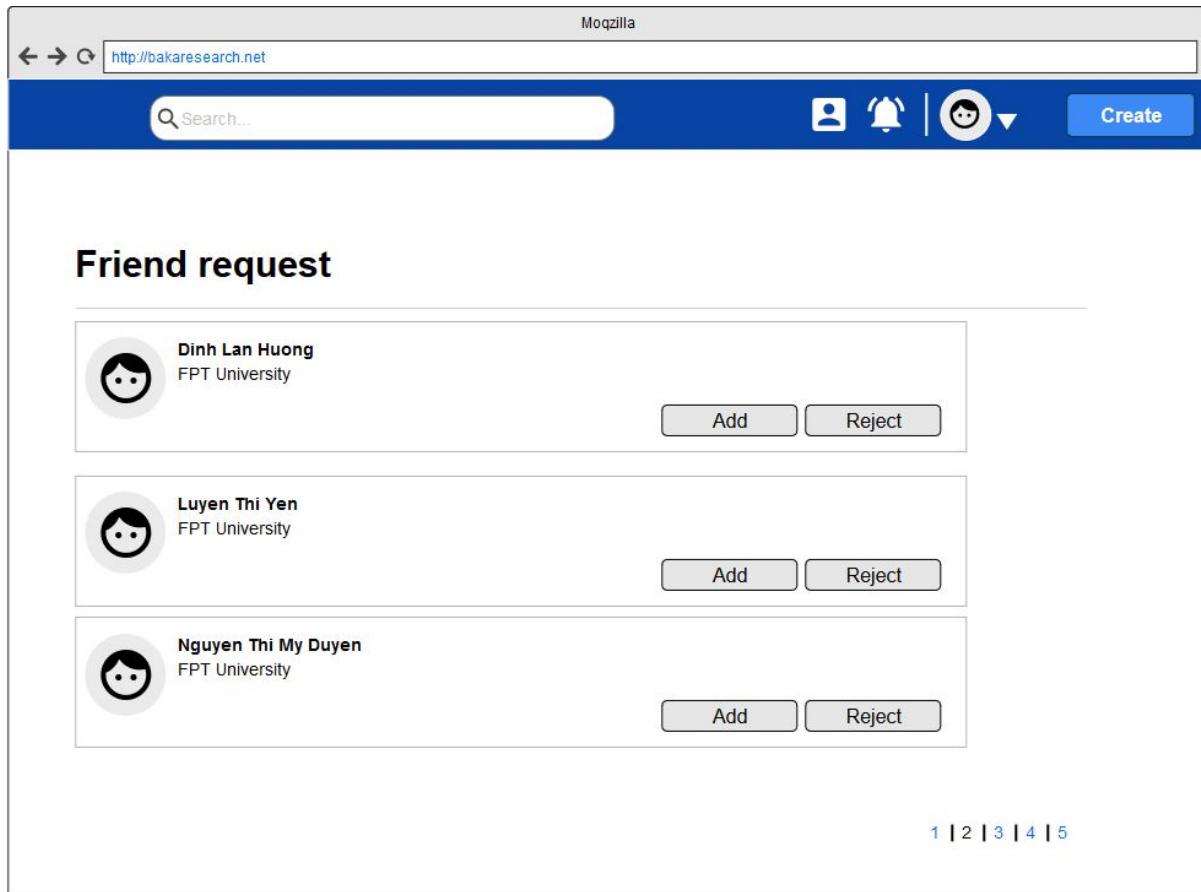


Figure 3.27.1: UC26 - Add/Reject Friend

No	Object/Control Name	Type	Required	Length	Description
1	Avatar	UIImageView	No	N/A	Click this to redirect to user's page.
2	Dinh Lan Huong	UIHyperlink	No	N/A	Click this to redirect to user's page.
3	FPT University	UIHyperlink	No	N/A	Click this to redirect to user's institution page
4	Add Button	UIButton	No	N/A	Click this to add friend.
5	Reject Button	UIButton	No	N/A	Click this to reject to become friend.

3.27.2 Sequence Diagram

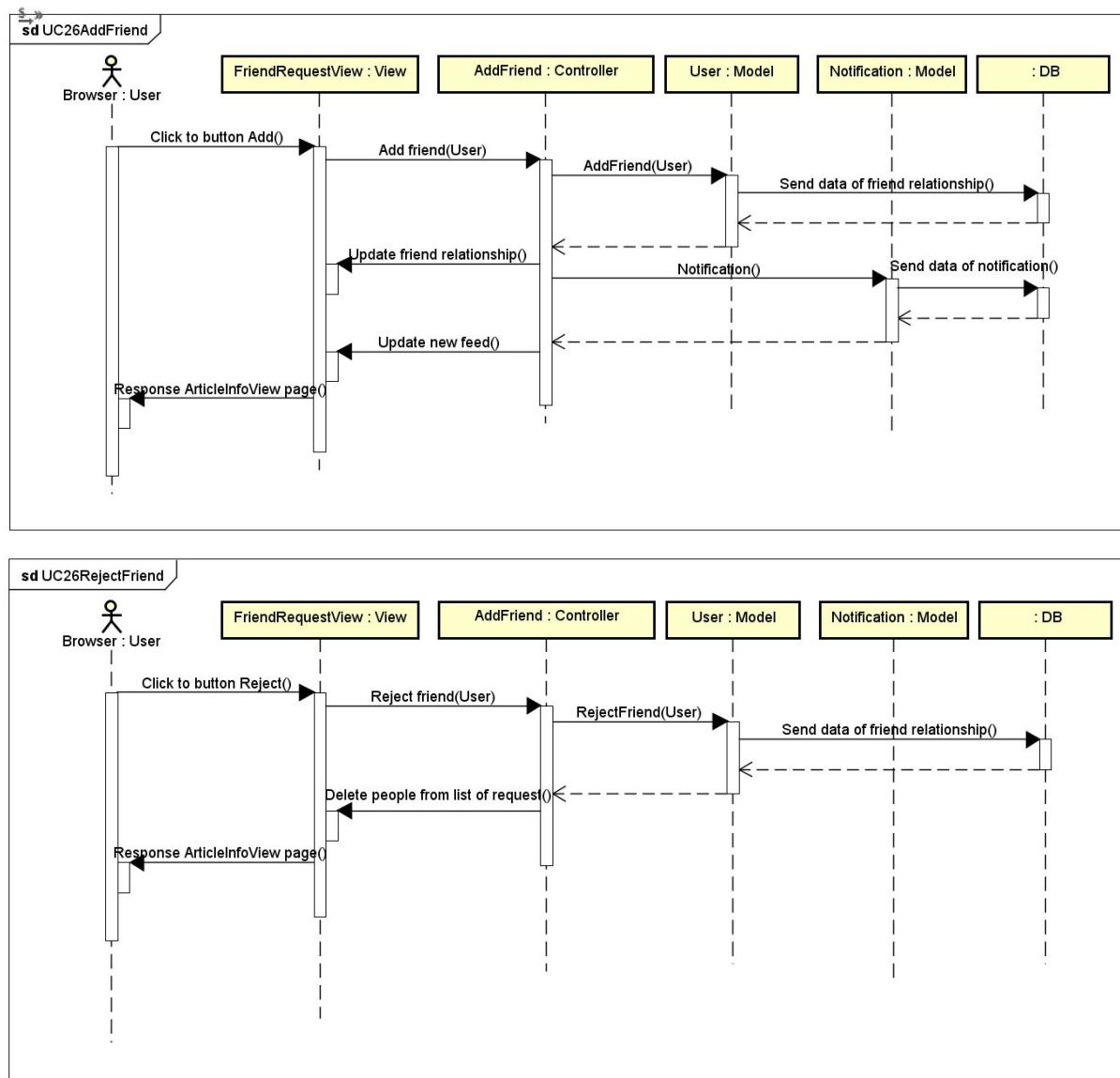


Figure 3.27.2: UC26 - Add/Reject Friend

3.28 UC27 - List Friend

3.28.1 Screen Design

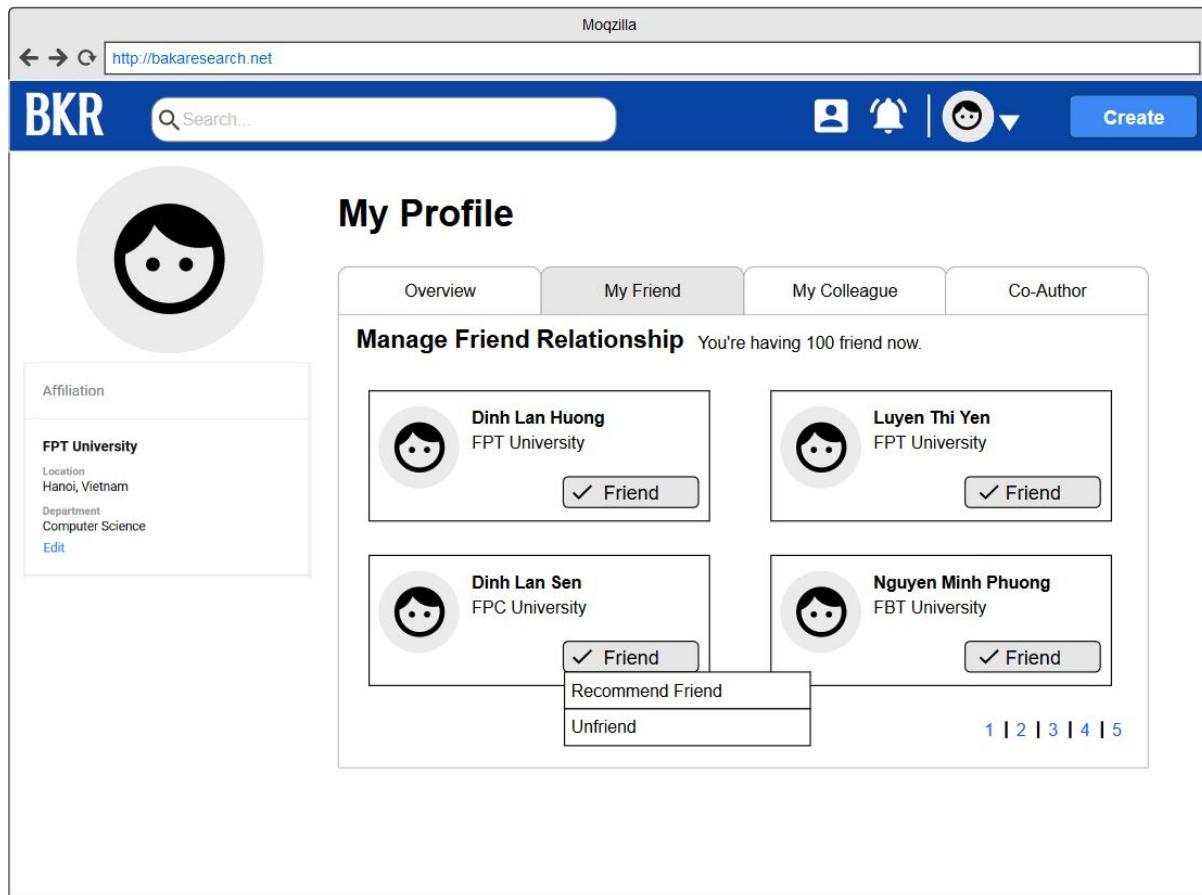


Figure 3.28.1: UC27 - List Friend

No	Object/Control Name	Type	Required	Length	Description
1	Manage Friend Relationship	UILabel	No	N/A	N/A
2	You're having 100 friend now	UILabel	No	N/A	Show numbers of friends user are having
3	Avatar	UIImageView	No	N/A	Click this to redirect to user's page.
4	Dinh Lan Huong	UIHyperlink	No	N/A	Click this to redirect to user's page.
5	FPT University	UIHyperlink	No	N/A	Click this to redirect to user's institution page
6	Friend Button	UIButton	No	N/A	Click this to change status of

					relationship of friend.
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3.28.2 Sequence Diagram

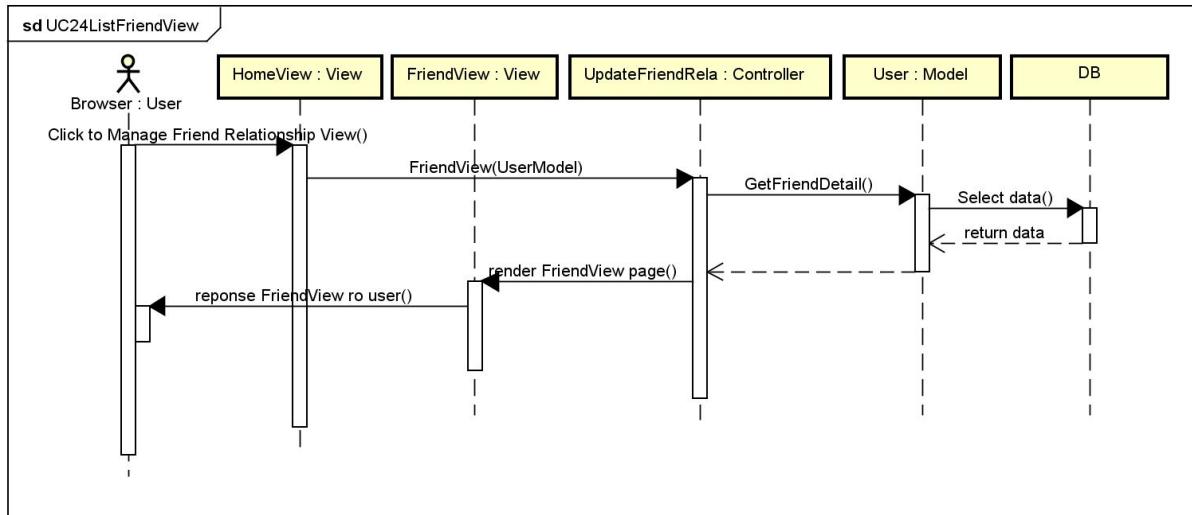


Figure 3.28.2: UC27 - List Friend

3.29 UC28 - Recommend Friend

3.29.1 Screen Design



Figure 3.29.1: UC28 - Recommend Friend

No	Object/Control Name	Type	Required	Length	Description
1	Recommend Friend	UIButton	No	N/A	Click to recommend friend
2	Unfriend	UIButton	No	N/A	Click to unfriend

3.29.2 Sequence Diagram

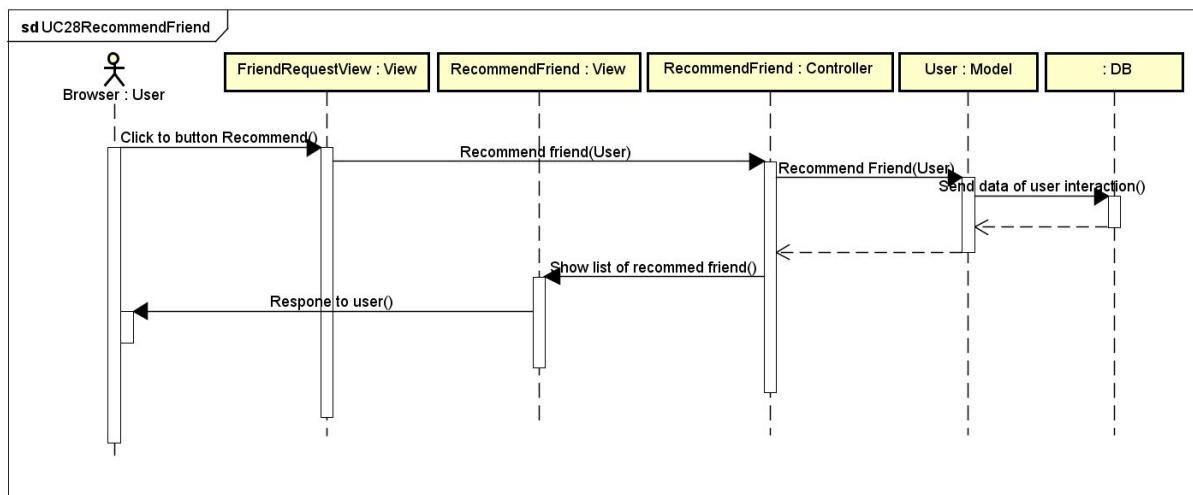


Figure 3.29.2: UC28 - Recommend Friend

3.30 UC29 - Unfriend

3.30.1 Screen Design



Figure 3.30.1: UC29 - Unfriend

No	Object/Control Name	Type	Required	Length	Description
1	Recommend Friend	UIButton	No	N/A	Click to recommend friend
2	Unfriend	UIButton	No	N/A	Click to unfriend

3.30.2 Sequence Diagram

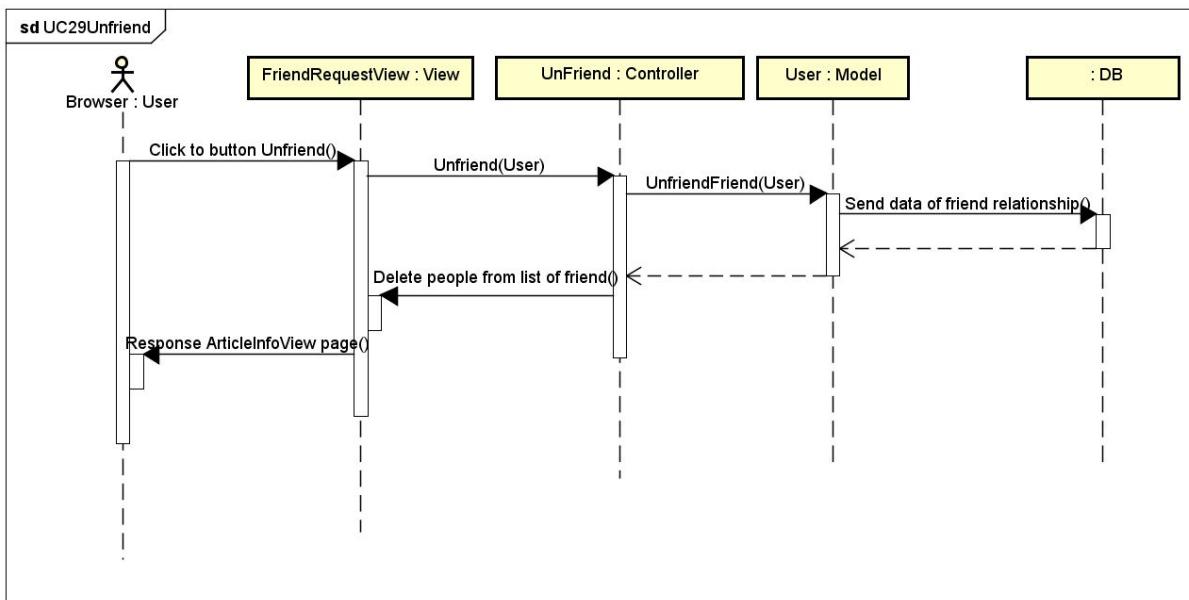


Figure 3.30.2: UC29 - Unfriend

3.31 UC30 - Manage Article Relationship

3.31.1 Screen Design

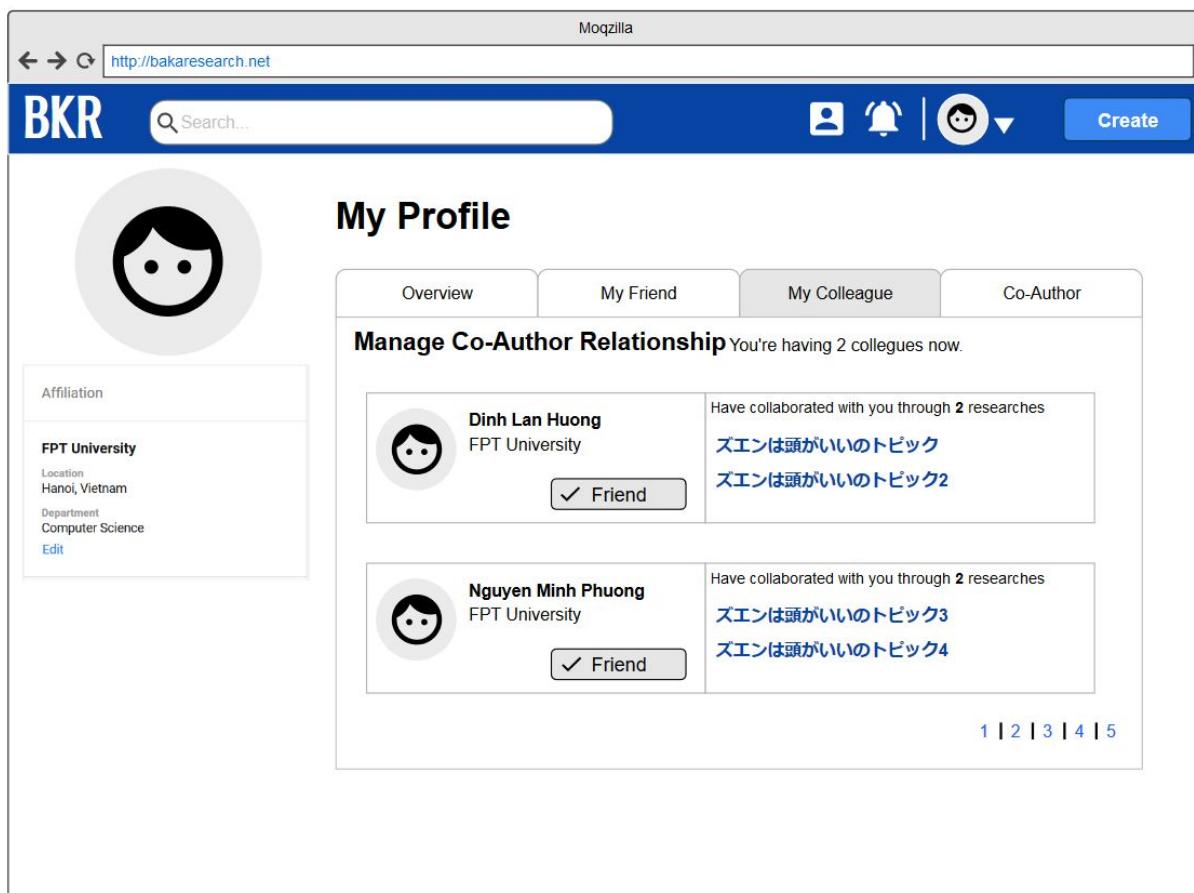


Figure 3.31.1: UC30 - Manage Article Relationship

No	Object/Control Name	Type	Required	Length	Description
1	Manage Article Relationship	UILabel	No	N/A	N/A
2	You're having 2 co-authors now	UILabel	No	N/A	Show numbers of co-author user are having
3	Avatar	UIImage	No	N/A	Click this to redirect to user's page.
4	Dinh Lan Huong	UIHyperlink	No	N/A	Click this to redirect to user's page.
5	FPT University	UIHyperlink	No	N/A	Click this to redirect to user's institution page
6	Friend Button	UIButton	No	N/A	Click this to change status of relationship of friend.
7	ズエンは頭がいいのトピック	UIHyperlink	No	N/A	Click to redirect to Article View Page
8	Pager	UIPager	No	N/A	N/A

3.31.2 Sequence Diagram

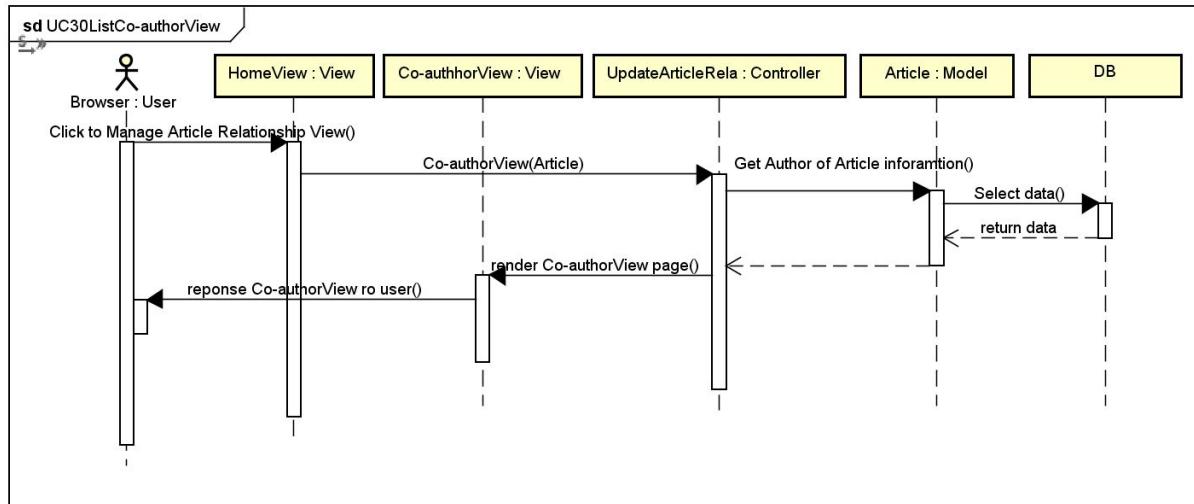


Figure 3.31.2: UC30 - Manage Article Relationship

3.33 UC32 - Add Co-author

3.33.1 Screen Design

The screenshot shows a web browser window with the URL <http://bakaresearch.net> in the address bar. The page has a blue header with the BKR logo, a search bar, and user icons. The main content area is titled 'Edit your research'. It contains fields for 'Title' (with placeholder 'ズエンさんはとても綺麗なトピック'), 'Author' (with placeholder 'ズエン'), 'Publication Type' (set to 'Software Engineering'), 'Upload file here' (with a 'Baka.rar' file listed), and 'Description' (with placeholder 'とてもつかれました。'). A large green 'Edit' button is at the bottom. The 'Author' input field is circled in red.

Figure 3.33.1: UC32 - Add co-author

No	Object/Control Name	Type	Required	Length	Description
1	Edit your research	UILabel	No	N/A	N/A
2	Title label	UILabel	No	N/A	N/A
3	Title input text	UITextField	Yes	200	Input title of research document
4	Author label	UILabel	No	N/A	N/A
5	Author input text	UITextField	Yes	N/A	Input the author or research document. Can be more than one authors own one research. If user want to add co-author, co-author must be in friend relationship with the creator.
6	Publication Type	UILabel	No	N/A	N/A
7	Publication Type	UIDropdownli	Yes	N/A	Click to choose the right

	Dropdownlist	st			publication type of research document.
8	Upload file here	UILabel	No	N/A	N/A
9	Upload file	UIUploadFile	Yes	N/A	User can choose number types of research documents.
10	Description	UILabel	No	N/A	N/A
11	Description input text	UITextField	Yes	N/A	Input description of the research document.
12	Edit button	UI Button	Yes	N/A	Click to complete the process.

3.33.2 Sequence Diagram

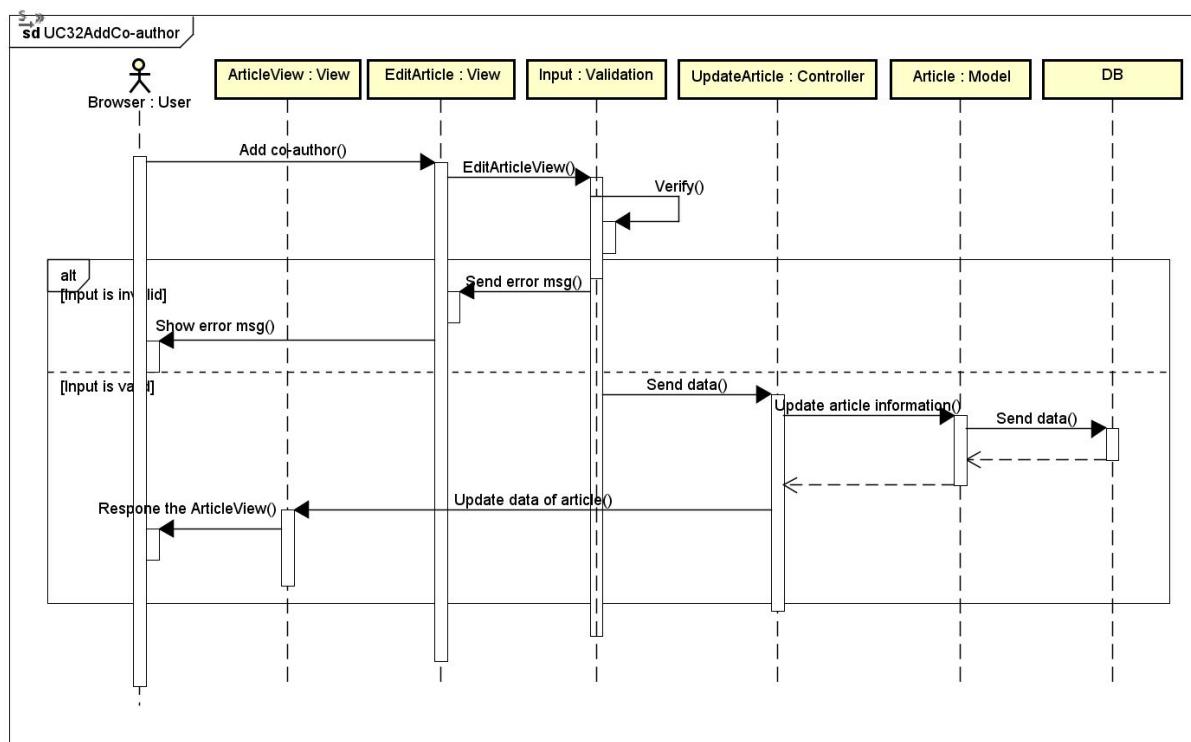
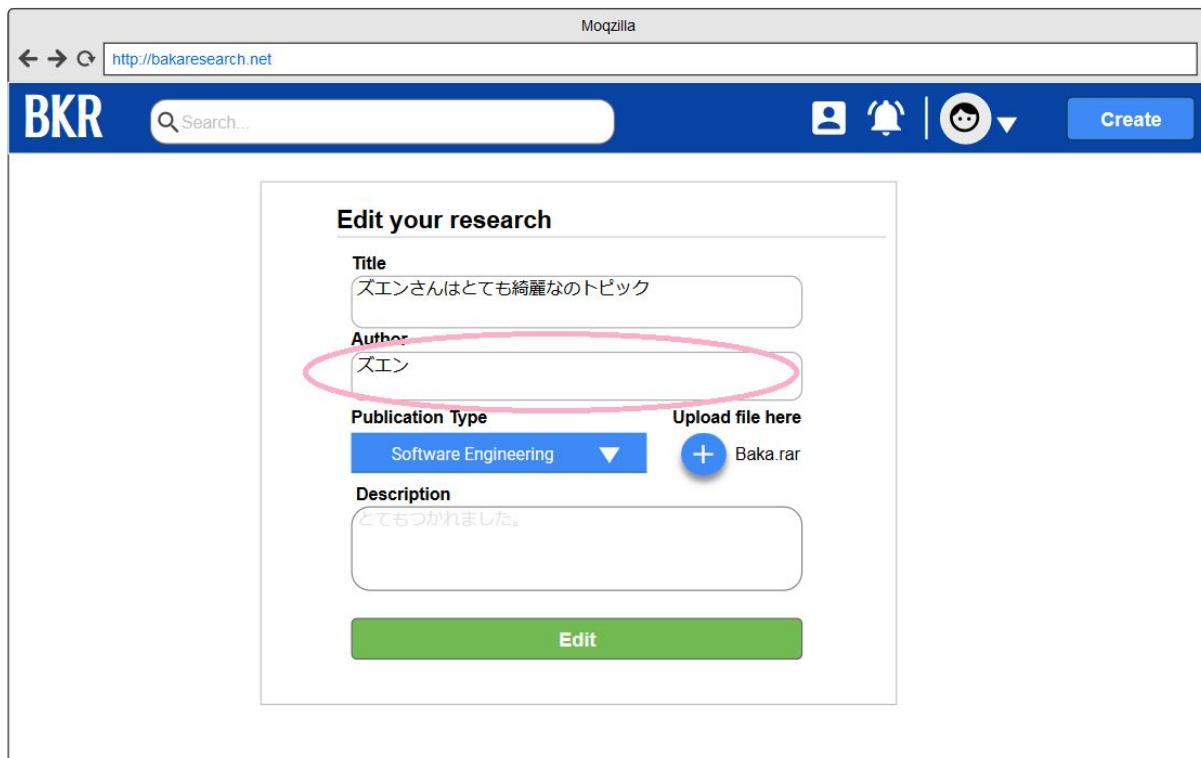


Figure 3.33.2: UC32 - Add Co-author

3.35 UC34 - Delete Co-author

3.35.1 Screen Design



The screenshot shows a web browser window with the URL <http://bakaresearch.net>. The page is titled 'Edit your research'. It contains fields for 'Title' (ズエンさんはとても綺麗なトピック), 'Author' (ズエン), 'Publication Type' (Software Engineering), 'Description' (とてもつかれました.), and an 'Edit' button. The 'Author' field is circled in red, indicating the target for the 'Delete co-author' action.

Figure 3.35.1: UC34 - Delete co-author

No	Object/Control Name	Type	Required	Length	Description
1	Edit your research	UILabel	No	N/A	N/A
2	Title label	UILabel	No	N/A	N/A
3	Title input text	UITextField	Yes	200	Input title of research document
4	Author label	UILabel	No	N/A	N/A
5	Author input text	UITextField	Yes	N/A	Input the author or research document. Can be more than one authors own one research. If user want to add co-author, co-author must be in friend relationship with the creator.
6	Publication Type	UILabel	No	N/A	N/A
7	Publication Type Dropdown list	UIDropdown list	Yes	N/A	Click to choose the right publication type of research document.

8	Upload file here	UILabel	No	N/A	N/A
9	Upload file	UIUploadFile	Yes	N/A	User can choose number types of research documents.
10	Description	UILabel	No	N/A	N/A
11	Description input text	UITextField	Yes	N/A	Input description of the research document.
12	Edit button	UI Button	Yes	N/A	Click to complete the process.

3.35.2 Sequence Diagram

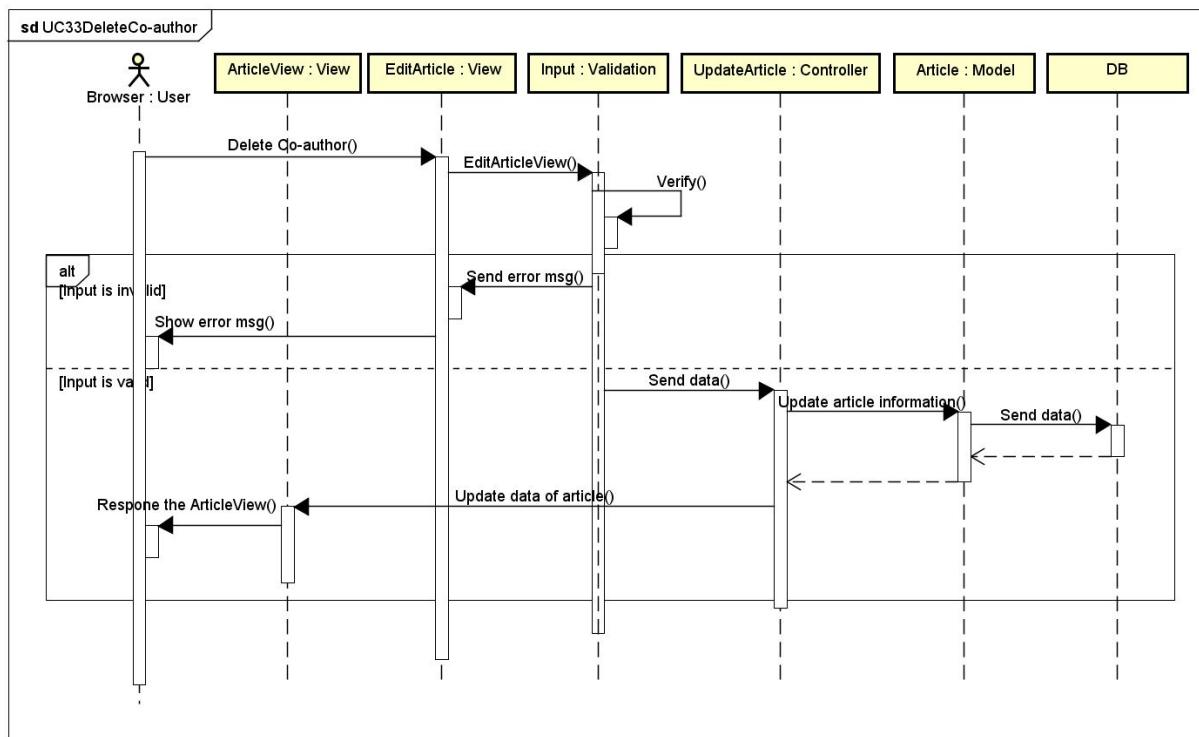


Figure 3.35.2: UC34 - Delete co-author

3.36 UC35 - View List Co-author

3.36.1 Screen Design

The screenshot shows the BKR application's user profile interface. At the top, there is a navigation bar with a search bar and user icons. The main content area is titled 'My Profile' and features a sidebar with user information: 'Affiliation' (FPT University, Hanoi, Vietnam, Computer Science), a 'Friend' button, and an 'Edit' link. The 'Co-Author' tab is selected, showing a list of 2 co-authors. Each co-author entry includes a profile picture, name, university, and a 'Friend' button. The first co-author is 'Dinh Lan Huong' from FPT University, and the second is 'Sen Sen Sen' from FPT University. Both entries mention 'Have collaborated with you through 2 researches' and show Japanese text: 'ズエンは頭がいいのトピック' and 'ズエンは頭がいいのトピック2' for the first, and 'ズエンは頭がいいのトピック3' and 'ズエンは頭がいいのトピック4' for the second. At the bottom, there is a pagination bar with links 1, 2, 3, 4, 5.

Figure 3.36.1: UC35 - View list co-author

No	Object/Control Name	Type	Required	Length	Description
1	Manage Article Relationship	UILabel	No	N/A	N/A
2	You're having 2 co-authors now	UILabel	No	N/A	Show numbers of co-author user are having
3	Avatar	UIImage	No	N/A	Click this to redirect to user's page.
4	Dinh Lan Huong	UIHyperlink	No	N/A	Click this to redirect to user's page.
5	FPT University	UIHyperlink	No	N/A	Click this to redirect to user's institution page
6	Friend Button	UIButton	No	N/A	Click this to change status of

					relationship of friend.
7	ズエンは頭がいいのトピック	UIHyperlink	No	N/A	Click to redirect to Article View Page
8	Pager	UIPager	No	N/A	N/A

3.36.2 Sequence Diagram

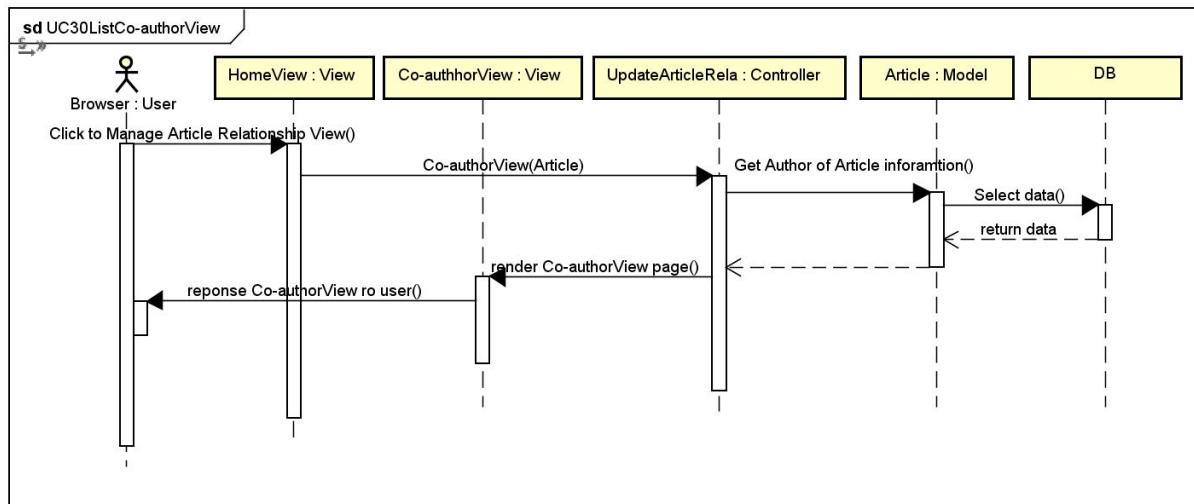


Figure 3.36.2: UC35 - View List Co-Author

3.38 UC37 - View List Colleague

3.38.1 Screen Design

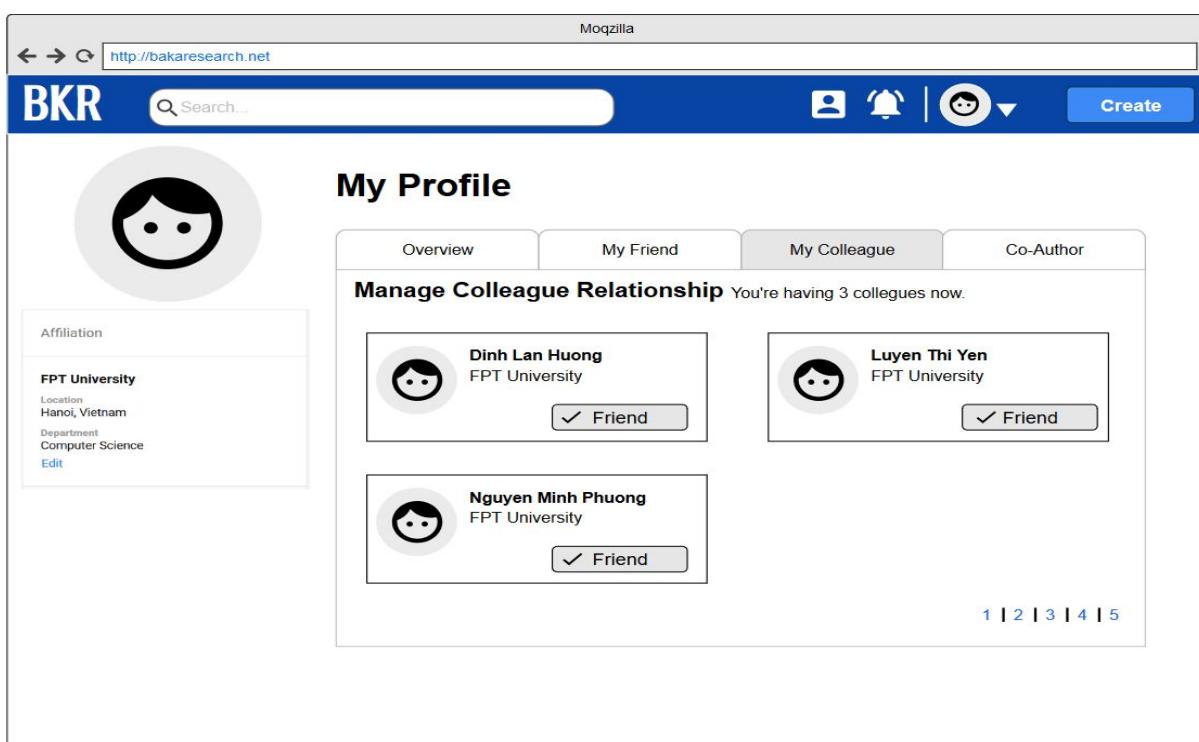
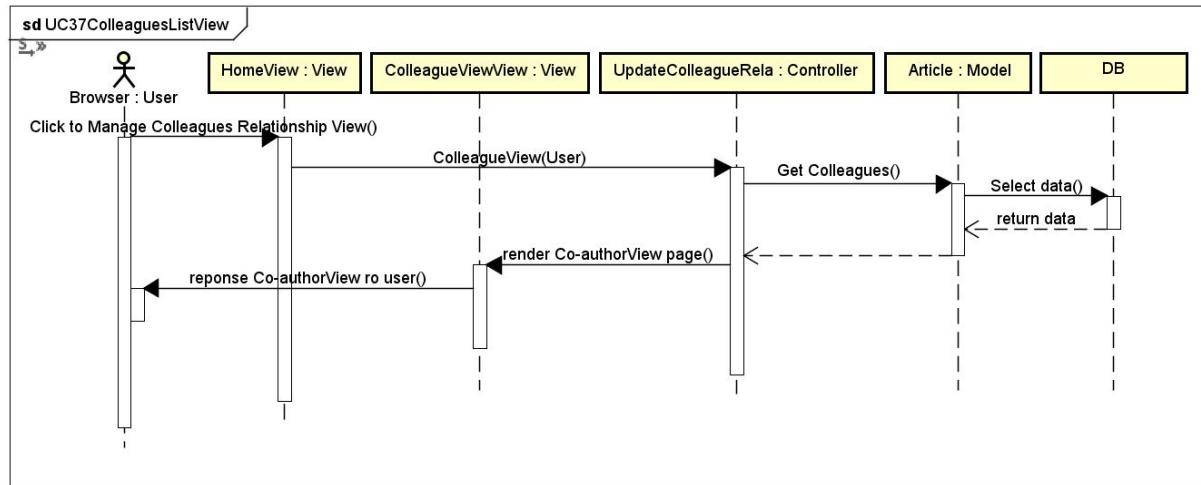


Figure 3.37.1: UC37 View List Colleague

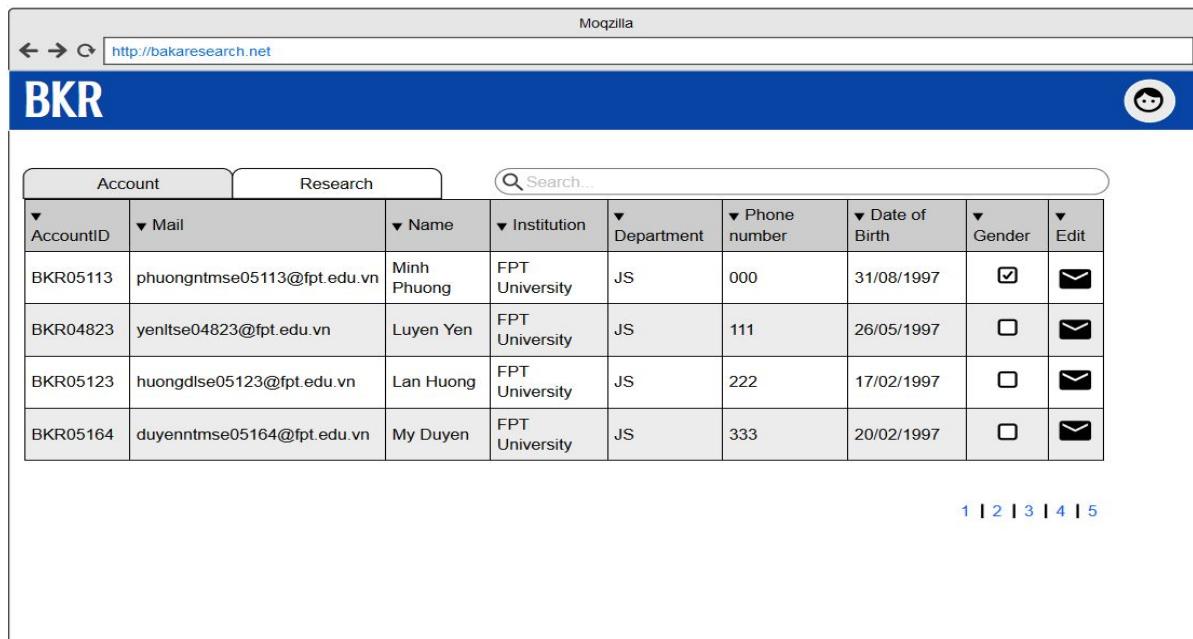
No	Object/Control Name	Type	Required	Length	Description
1	Manage Colleague Relationship	UILabel	No	N/A	N/A
2	You're having 3 Colleagues now	UILabel	No	N/A	Show numbers of colleagues user are having
3	Avatar	UIImage	No	N/A	Click this to redirect to user's page.
4	Dinh Lan Huong	UIHyperlink	No	N/A	Click this to redirect to user's page.
5	FPT University	UIHyperlink	No	N/A	Click this to redirect to user's institution page
6	Friend Button	UIButton	No	N/A	Click this to change status of relationship of friend.

3.38.2 Sequence Diagram

**Figure 3.38.1: UC37 - Colleagues List View**

3.42 UC41 - Admin View Account

3.42.1 Screen Design



The screenshot shows a web browser window with the URL <http://bakaresearch.net> in the address bar. The page is titled 'BKR' and features a navigation bar with tabs for 'Account' and 'Research'. A search bar with the placeholder 'Search...' is located at the top right. Below the search bar is a table with the following columns: AccountID, Mail, Name, Institution, Department, Phone number, Date of Birth, Gender, and Edit. The table contains four rows of data, each with a checkbox and an envelope icon in the last two columns. The data is as follows:

AccountID	Mail	Name	Institution	Department	Phone number	Date of Birth	Gender	Edit
BKR05113	phuongntmse05113@fpt.edu.vn	Minh Phuong	FPT University	JS	000	31/08/1997	<input checked="" type="checkbox"/>	
BKR04823	yenltse04823@fpt.edu.vn	Luyen Yen	FPT University	JS	111	26/05/1997	<input type="checkbox"/>	
BKR05123	huongdlse05123@fpt.edu.vn	Lan Huong	FPT University	JS	222	17/02/1997	<input type="checkbox"/>	
BKR05164	duyenntmse05164@fpt.edu.vn	My Duyen	FPT University	JS	333	20/02/1997	<input type="checkbox"/>	

At the bottom right of the table, there is a page navigation bar with links labeled 1, 2, 3, 4, and 5.

Figure 3.41.1: UC41 - Admin View Account

No	Object/Control Name	Type	Required	Length	Description
1	Tab Account/ Research	UITab	N/A	N/A	Show tab view
2	Account gridview	UIGridView	N/A	N/A	Show all of the information of accounts in BKR System
3	Search text input	UITextField	N/A	N/A	Input name of an account of research to search.
4	Pager	UIPager	N/A	N/A	N/A

3.42.2 Sequence Diagram

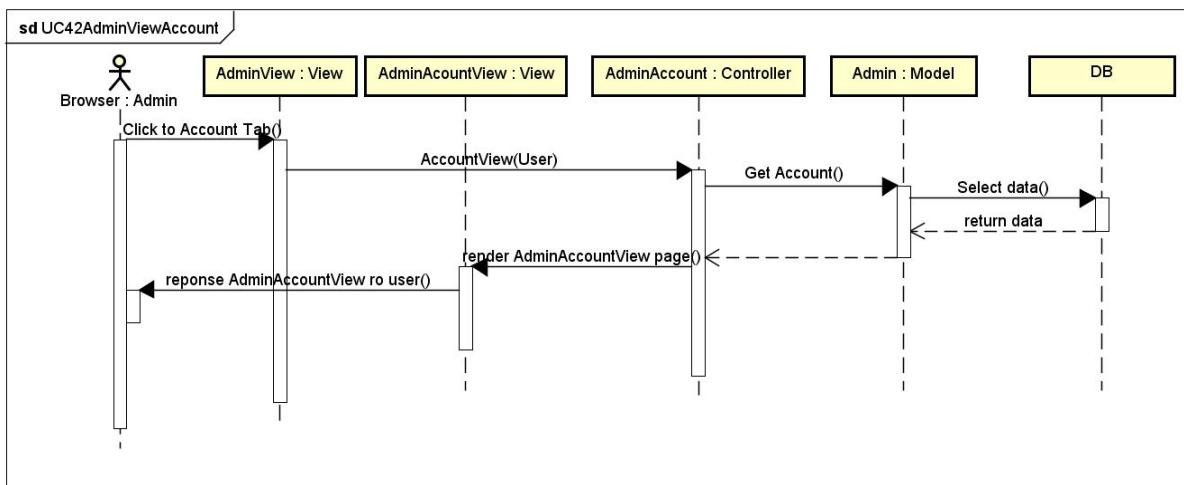


Figure 3.43.1: UC42 - Admin View Account

3.43 UC42 - Admin Send Notice

3.43.1 Sequence Diagram

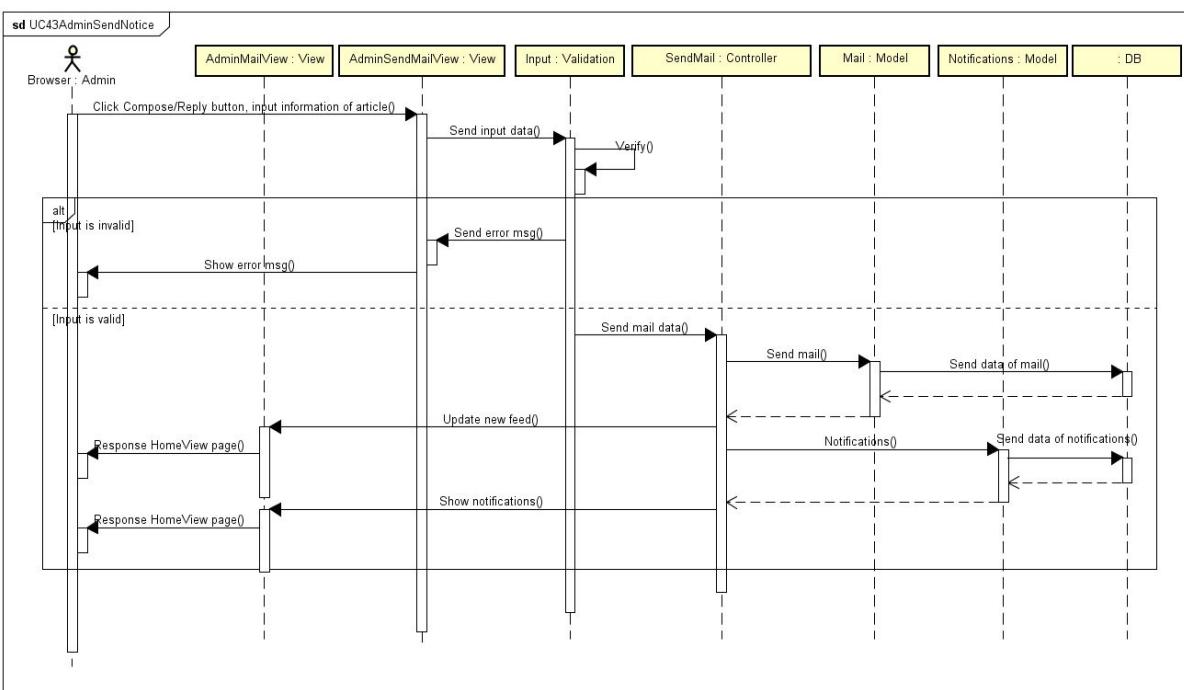


Figure 3.43.1: UC42 - Admin Send Notice

3.44 UC43 - Admin Search Account

3.44.1 Sequence Diagram

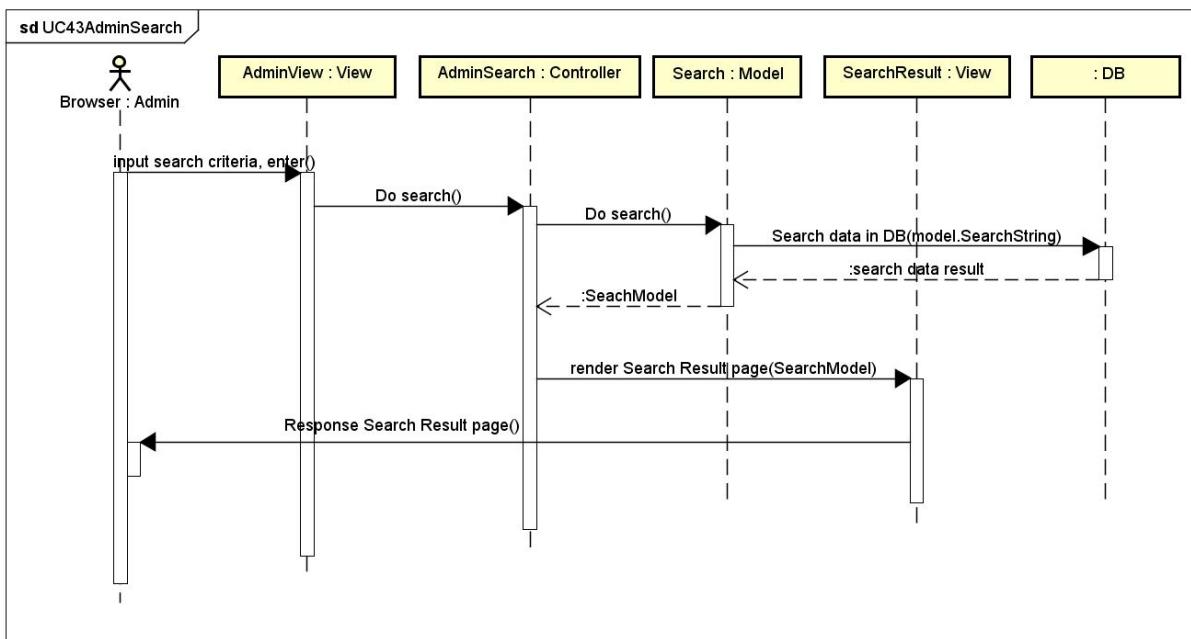
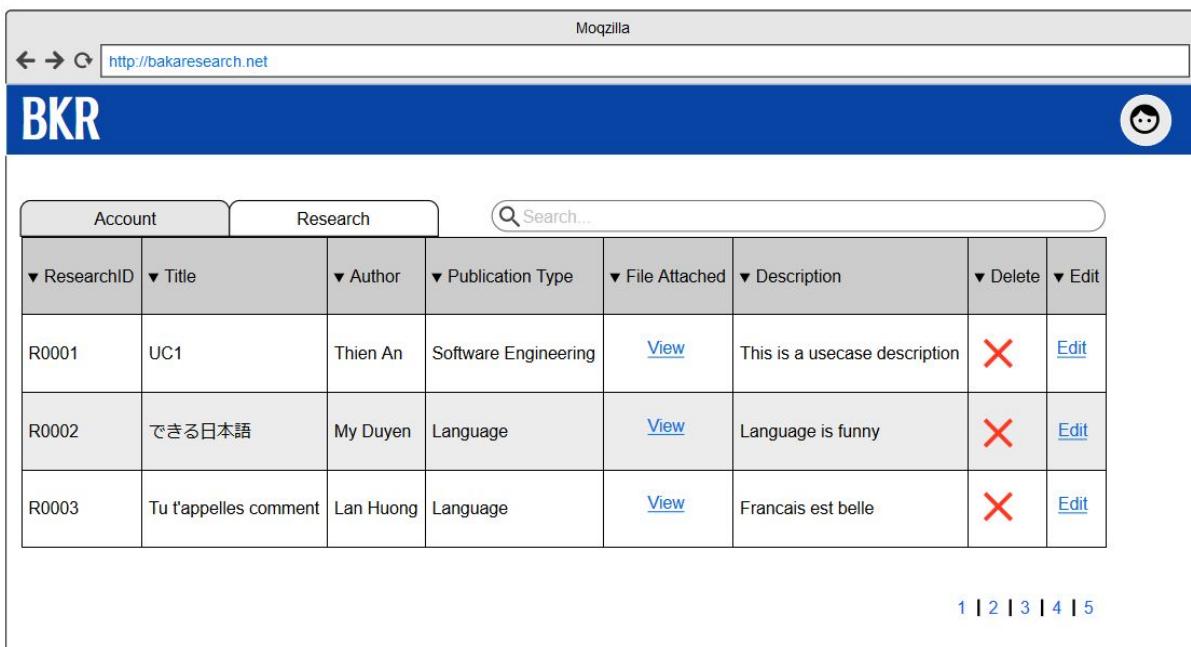


Figure 3.44.1: UC43 - Admin Search Account

3.45 UC44 - Admin View Article



No	Object/Control Name	Type	Required	Length	Description
1	Tab Account/Research	UITab	N/A	N/A	Show tab view

2	Article gridview	UIGridView	N/A	N/A	Show all of the information of article in BKR System
3	Search text input	UITextField	N/A	N/A	Input name of an account of research to search.
4	Pager	UIPager	N/A	N/A	N/A

3.45.1 Sequence Diagram

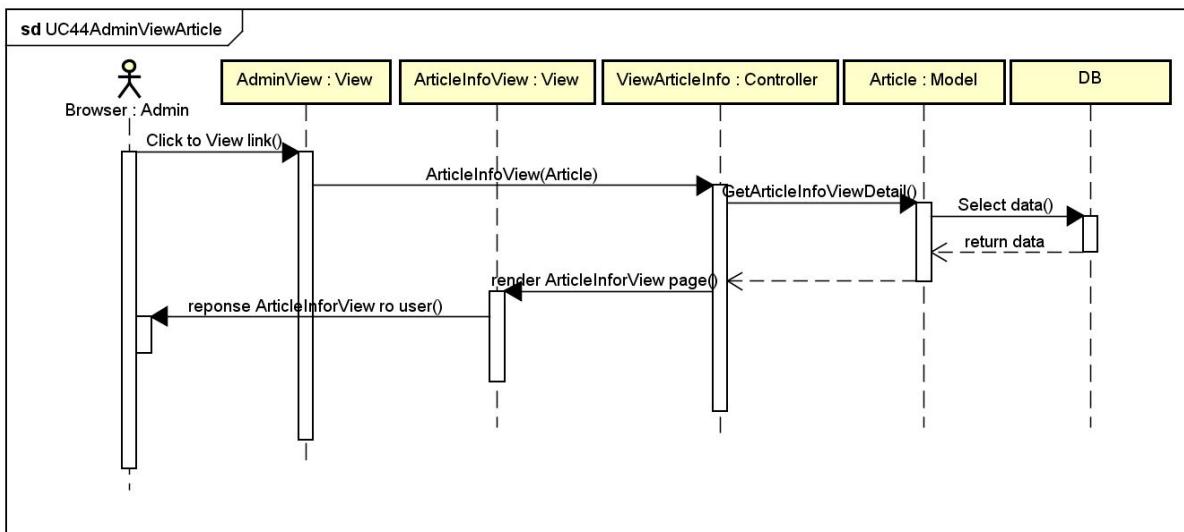


Figure 3.44.1: UC43 - Admin View Article

3.46 UC45 - Admin Search Article

3.46.1 Sequence Diagram

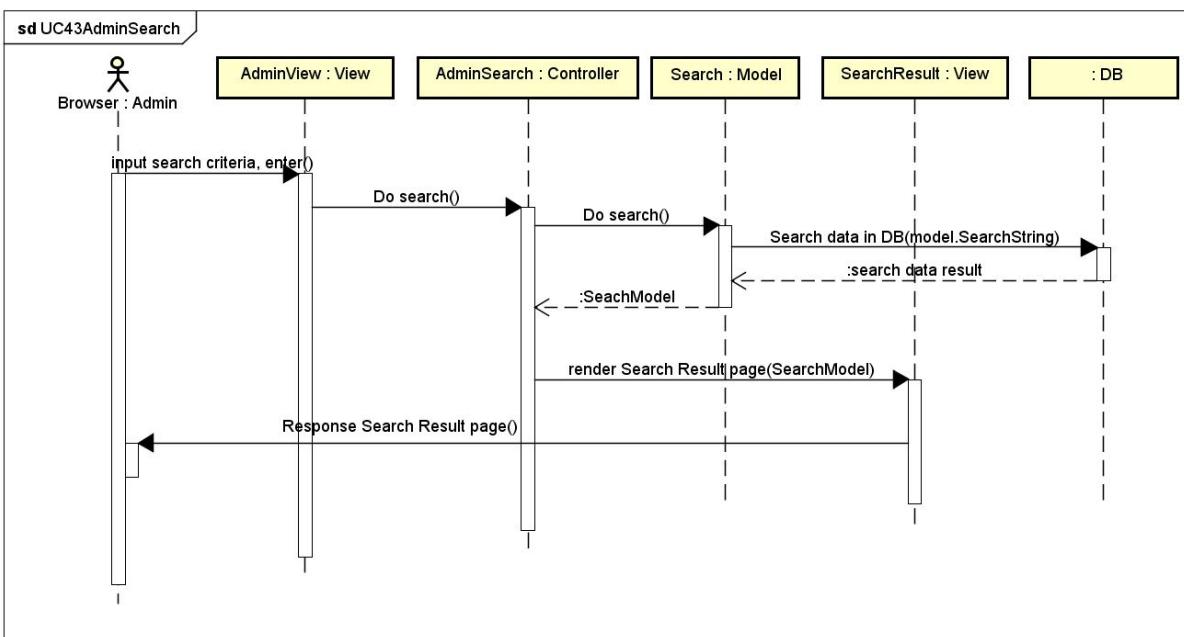


Figure 3.46.1: UC45 - Admin Search Article

3.47 UC46 - Admin Edit Article Information

3.47.1 Screen Design

Mozilla

← → ⌂ <http://bakaresearch.net>

BKR

Account Research

ResearchID: R0001
 Title: UC1
 Author: Thien An, My Duyen
 Publication Type: Software Engineering
 Description: This is a usecase description

Edit

Figure 3.46.1: UC46 - Admin Edit Article Information

No	Object/Control Name	Type	Required	Length	Description
1	Tab Account/Research	UITab	N/A	N/A	Show tab view
2	Search text input	UITextField	N/A	N/A	Input name of an account of research to search.
3	ResearhID	UILabel	N/A	N/A	N/A
4	ResearchID Text input	UITextField	N/A	N/A	Readonly
5	Title	UILabel	N/A	N/A	N/A
6	Title Textinput	UITextField	N/A	N/A	N/A
7	Author	UILabel	N/A	N/A	N/A
8	Author text input	UITextField	N/A	N/A	N/A
9	Publication Type	UILabel	N/A	N/A	N/A
10	Publication Type dropdown list	UIDropdown list	N/A	N/A	N/A

11	Description	UILabel	N/A	N/A	N/A
12	Description input text	UITextField	N/A	N/A	N/A

3.47.2 Sequence Diagram

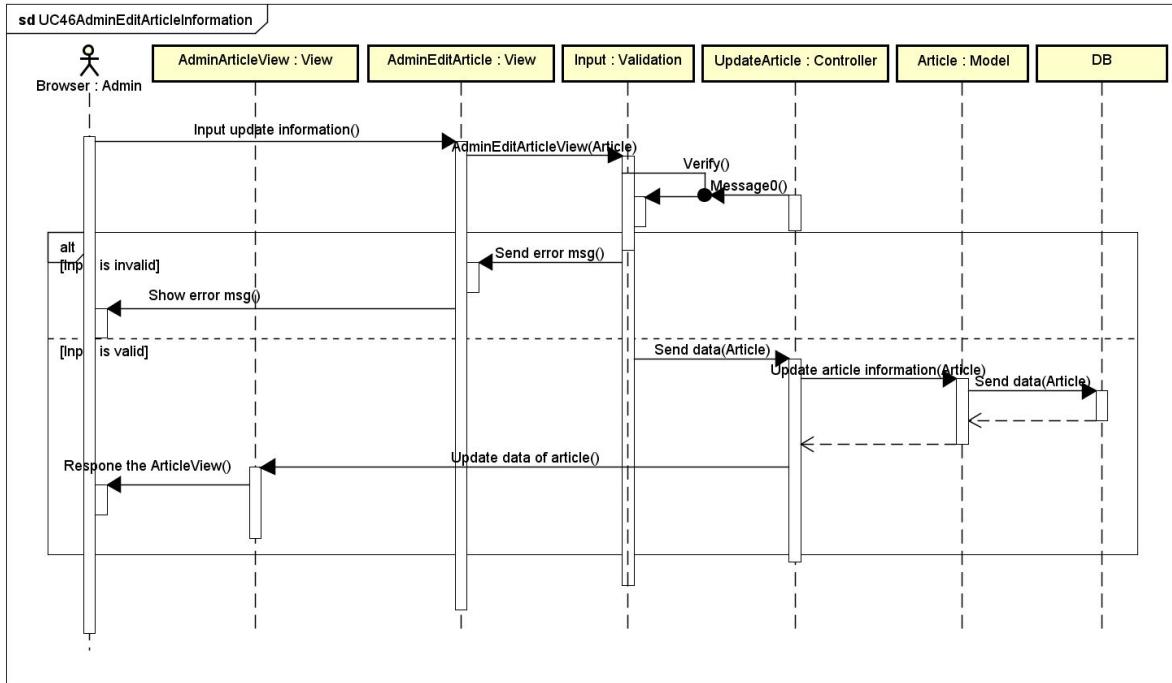


Figure 3.47.1: UC46 - Admin Edit Article Information

3.48 UC47 - Admin Delete Article

3.48.1 Sequence Diagram

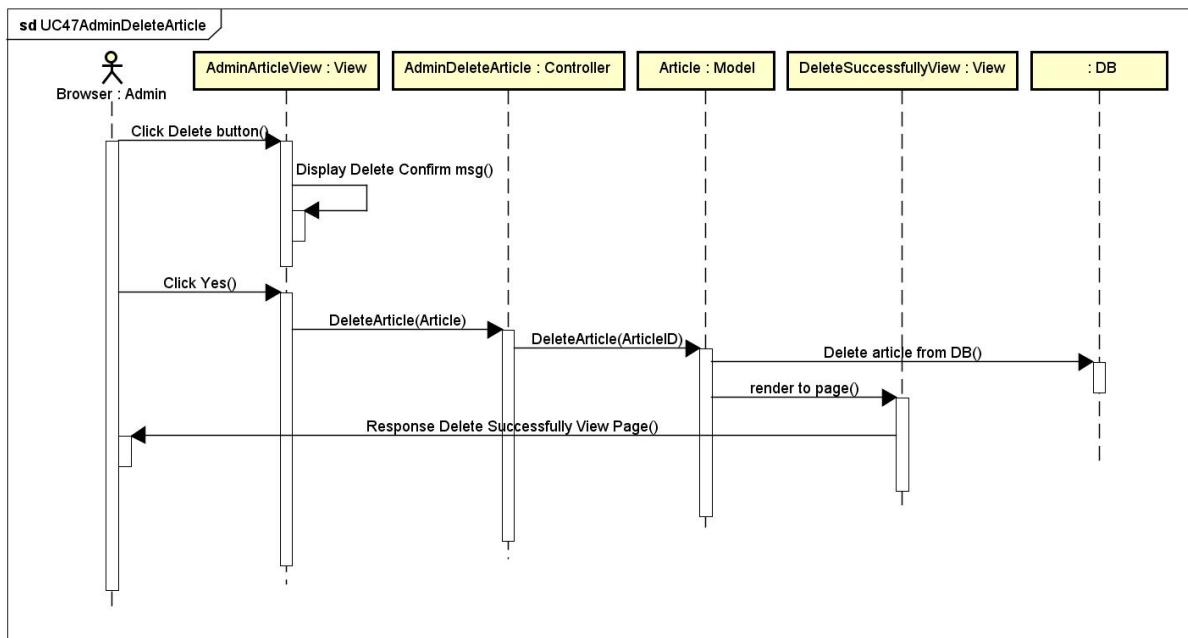


Figure 3.48.1: UC47 - Admin Delete Article

3.49 UC48 - Admin Comment

3.49.1 Sequence Diagram

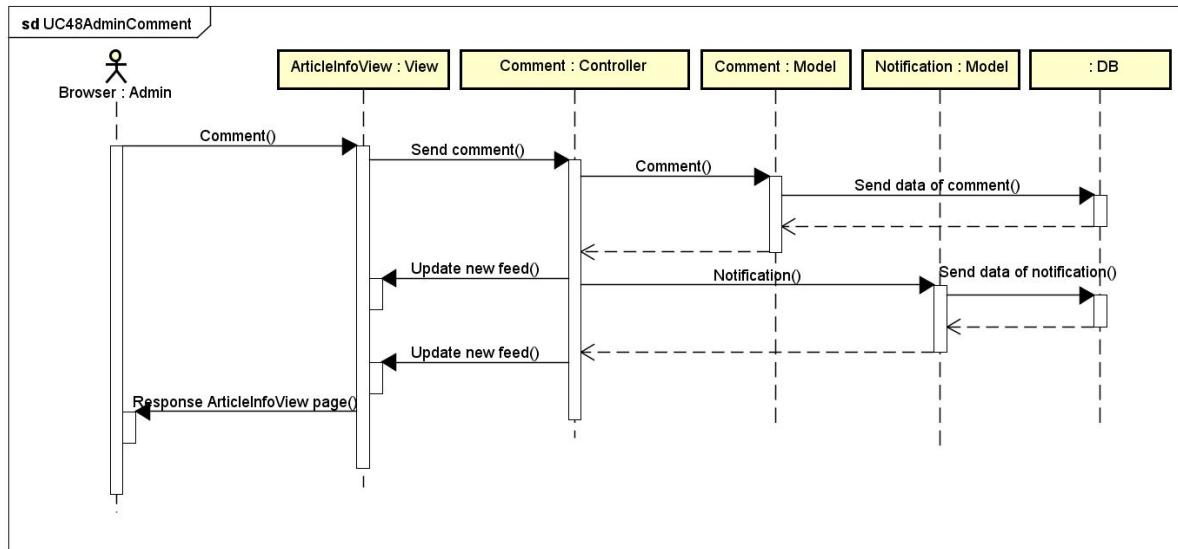


Figure 3.49.1: UC48 - Admin Comment

3.50 UC49 - Admin Delete Comment

3.50.1 Sequence Diagram

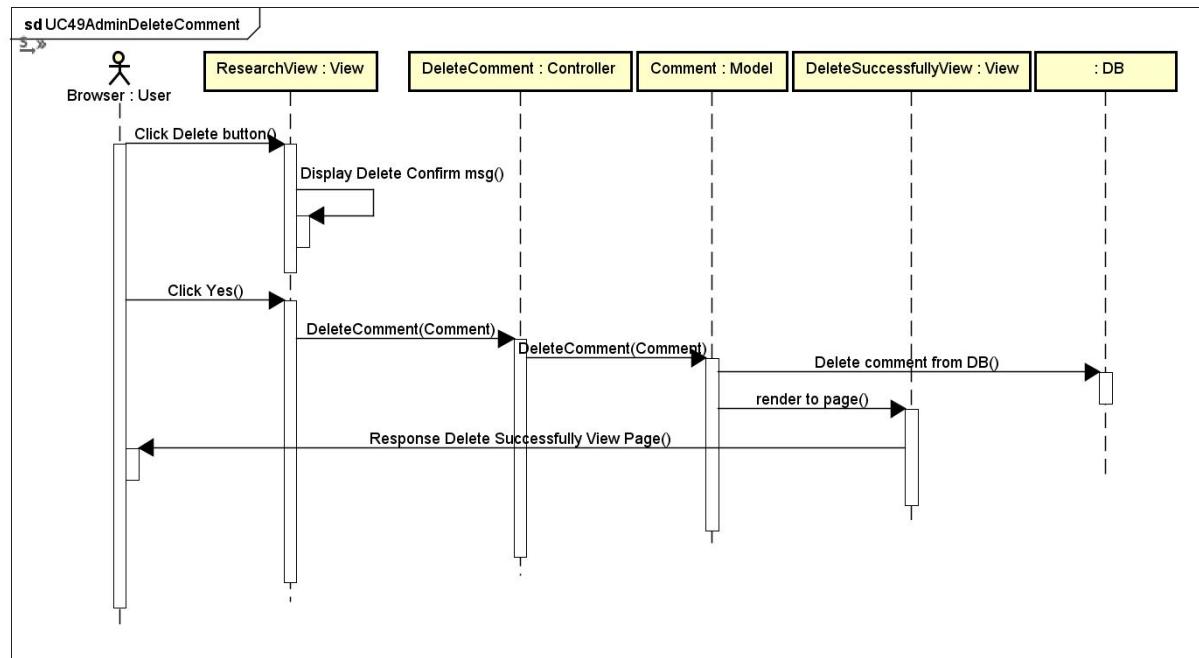


Figure 3.50.1: UC49 - Admin Comment

3.51 UC50 - Home View

3.51.1 Screen Design

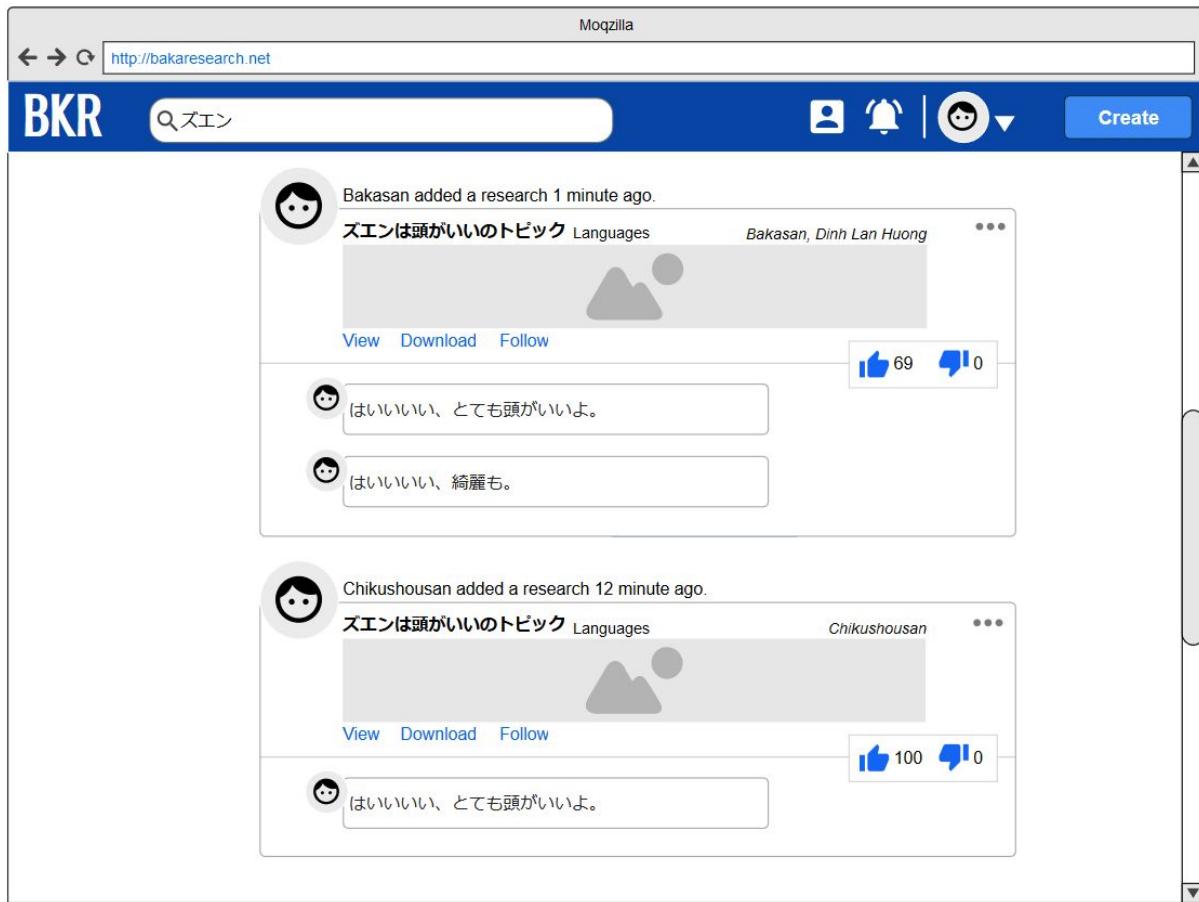


Figure 3.51.1: UC50 - Home View

No	Object/Control Name	Type	Require d	Length	Description
1	BKR	UIImageView	No	N/A	This is the logo of BKR. Click it everytime it will return homepage.
2	Search input text	UITextField	Yes	N/A	N/A
3	Friend request button	UIButton	No	N/A	It shows how many users want to be in friend relationship.
4	Notifications button	UIButton	No	N/A	It shows how many news that user has not read yet.
5	Avatar	UIImageView	No	N/A	Redirect to user research page
6	Create Button	UIButton	No	N/A	Click to upload new document

7	[Bakasan] in “Bakasan added a research 1 min ago.”	UIHyperlink	Yes	N/A	Describe the owner of the article. Click this link to redirect to user's page.
8	Bakasan added a research 1 min ago.	UILabel	Yes	N/A	Show the time user publish the article.
9	ズエンは頭がいいのトピック	UILabel	Yes	N/A	Show the name of the article
10	Bakasan, Dinh lan Huong	UIHyperlink	Yes	N/A	Show the authors of the article. Click this link to redirect to user's page.
11	Image	UIImage	Yes	N/A	Show the summary of the article
12	View button	UIButton	Yes	N/A	Click to view the detail of article.
13	Download button	UIButton	Yes	N/A	Click to download the article attached file.
14	Follow button	UIButton	Yes	N/A	Click to follow the topic of this article. If user did follow this topic before, the Unfollow will be appeared instead.
15	Like button	UIButton	Yes	N/A	Click to increase the Like numbers of the article.
16	Unlike button	UIButton	Yes	N/A	Click to decrease the Like numbers of the article.
17	Avatar	UIImage	Yes	N/A	Click to redirect to user's page
18	Comment box	UITextbox	Yes	N/A	Show the comment of user
19	Setting button (right corner of the article object)	UIButton	Yes	N/A	Show the choice of editing or deleting the article.

3.51.2 Sequence Diagram

3.52 UC51 - Friend's page View

3.52.1 Sequence Diagram

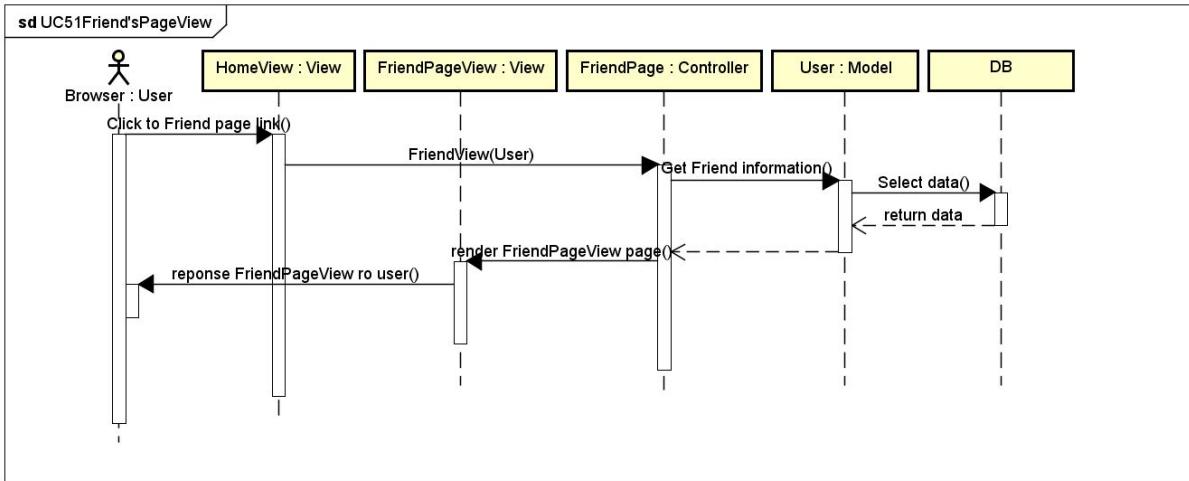


Figure 3.52.1: UC51 - Friend's page View

4. Appendices