東北大學悉尼智能科技学院
Sydney Smart Technology College
NORTHEASTERN UNIVERSITY

Information System Development Methodologies

Project 2

Faculty	SSTC
Group	Group 5
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Date	2024.6.1

Project 2 – 40 Marks

Group 5:

Student ID	Name	Surname
202219094	Zhuohang	Li
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202219028	Zhengjie	Zhao
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The input for Project 2 is:

- ***Project topic:*** *same as Project 1*
- ***Value Propositions:*** *report your value propositions from Project 1; you may modify them if you want or if you received negative comments/marks in Project 1.*

Topic:

- *Bike Sharing*

Value Propositions (VPs)

- **VP1:**

VP statement:

An AI-based maintenance system aimed at coordinating fixers to conduct repairs, maintenance, and feedback for shared bicycles.

VP analysis:

Issue(s) addressed / Stakeholder(s) affected	*Issue(s) addressed: Efficient and timely repair of shared bicycles based on user feedback.* *Stakeholder(s) affected:* *Customers* *Fixers* *Coordinator.*
Describe the value to stakeholder(s) / innovation	*Customers: Enhance user experience, increase bicycle availability, and provide a safer cycling environment.* *Fixers: Optimize repair processes, allocate tasks reasonably, and improve work efficiency.* *Coordinator: Reduce maintenance costs, increase repair efficiency, better understand user needs, and provide feedback for product improvement.*
Technology adopted	*AI (Artificial Intelligence): Utilized for image recognition to analyse and assess the severity of bike damages from user feedback.* *Big Data Analytics: Employed to process and analyse large datasets, combining user feedback, bike usage patterns, and maintenance history for informed decision-making.* *Real-time Monitoring Systems: Implemented to track the status of shared bicycles in real-time, enabling quick response to urgent repair needs.* *Smart Scheduling Algorithms: Utilized to optimize repair task assignments, ensuring efficient use of maintenance resources.*
Challenges / Constraints	*Data Privacy and Security: Ensuring that user feedback and bike usage data are handled securely and comply with privacy regulations.*

	Integration Complexity: Integrating the AI, big data analytics, and real-time monitoring systems into the existing bike-sharing platform may pose technical challenges. *User Engagement: Encouraging users to provide accurate and timely feedback on bike damages.* *The maintenance team may not be able to obtain accurate location information of damaged bicycles in a timely manner.* Fixers will see regular maintenance and calibration of it sensors and self-diagnosis systems as a new technical challenge.
Success measure(s)	*Reduction in Repair Time: Measure the average time taken to address reported bike damages before and after implementing the AI-based repair system.* *Cost Savings: Assess the reduction in maintenance costs through optimized repair processes and resource allocation.* *User Satisfaction: Conduct surveys or analyse user reviews to gauge the improvement in user satisfaction with the bike-sharing service.* *System Reliability: Monitor the overall system reliability by tracking the frequency of reported bike damages and their resolution.*

- **VP2:**

VP statement:

A dynamic management system that can allocate bicycles through scheduling to provide more available bikes for users during peak usage periods, alleviating traffic congestion and promoting sustainable transportation choices.

VP analysis:

Issue(s) addressed / Stakeholder(s) affected	*Issue: During peak usage periods, bike-sharing systems experience uneven geographical distribution of bikes.* *Stakeholder: Coordinator, Customer, Government.*
Describe the value to stakeholder(s) / innovation	*1. For coordinators: Ensuring better availability and distribution of bikes during peak hours enhances customer satisfaction, loyalty, and ultimately, profitability.* *2. For customers: Improved access to bikes during peak times increases convenience and promotes the use of sustainable transportation options.* *3. For local governments: Encouraging the use of bike-sharing systems aligns with sustainability goals and can help alleviate congestion and reduce pollution.*
Technology adopted	*1. GPS tracking and monitoring systems to accurately track the location of bikes in real-time.* *2. Data analytics tools to analyse usage patterns and predict demand during peak hours.* *3. Mobile applications for users to locate nearby available bikes and for service providers to manage bike distribution.* *4. Automated transport equipment: Redistribute bikes from low-demand areas to high-demand areas through automated transportation facilities between bike stations.*
Challenges / Constraints	*1. Limited resources for redistributing bikes manually to balance geographical distribution.* *2. Technical challenges in accurately predicting demand and optimizing bike distribution in real-time.* *3. Potential resistance or restrictions from local authorities regarding bike redistribution policies.* *4. Budget constraints for investing in technology and operational improvements.*
Success measure(s)	*1. Reduction in the average distance between users and available bikes during peak hours.* *2. Increase in the number of bike rides taken during peak periods.* *3. Higher customer satisfaction ratings regarding bike availability and accessibility.* *4. Decrease in complaints or negative feedback related to bike shortages during peak times.* *5. Improvement in overall system efficiency and utilization rates.*

- **VP3:**

VP statement:

Our goal is to introduce a bike damage notification system, which uses different colored lights to distinguish damaged bicycles, so that users can know if the bike is damaged before they use it. To provide a more convenient and reliable experience for shared bike users.

VP analysis:

Issue(s) addressed / Stakeholder(s) affected	*Issue:Bike-sharing damage notification system to enhance user awareness of bicycle conditions.* *Stakeholders:Customer,Coordinator,Bicycle Manufactures*
Describe the value to stakeholder(s) / innovation	*1. For bike-sharing users: Enabling users to assess bike conditions before usage, enhancing trust in the bike-sharing service.* *2. For coordinator: Reduced complaints and maintenance costs due to bike damages, increased user retention.* *3. For bicycle manufatures:Get a better reputation and earn more profits*
Technology adopted	*1. Self-diagnosis system: The integrated self-diagnosis system enables shared bicycles to automatically detect and report their own problems, reducing the reliance on user feedback.* *2. IoT (Internet of Things) Technology: Installation of various sensors, such as accelerometers and gyroscopes, for real-time monitoring of bike conditions, providing comprehensive data on bike health.* *3. Big data technology: Use historical feedback from users to assist 7* *4. Visualization Technology: Integration of visual cues, such as lights, to intuitively convey bike conditions to users, enhancing their awareness.* *5. Low-power technology: Use low-power sensors and devices to reduce system energy consumption and extend battery life.* *6. Machine learning algorithms: Analyze user feedback and historical data to build predictive models and improve the ability to accurately predict vehicle damage.*
Challenges / Constraints	*1. How can coordinators encourage users to trust and use the new bike-sharing damage notification system that may be a challenge.* *2. Bicycle manufacturers will worry about whether they can integrate so many technologies and whether they are compatible.*
Success measure(s)	*1. User Satisfaction: Use a prize questionnaire to survey user feedback on this new technology.* *2. System Reliability: The vehicles are randomly selected for manual inspection, and the results are compared with the self-diagnosis system to analyze whether the notification system is reliable.*

1. Self-organizing Teams

1.1 Individual Skills

Please complete the following table for each team member.

Member #1 Zhuohang Li		
Skill	***Level** (1-5; 1=basic, 5=expert)*	***Describe your experience so far** (student, professional, etc)*
Basic network security (familiar with basic CVE vulnerabilities, able to respond to security problems and trace the source)	5	Served as a core member of the NEUQ-RO CTF team
Coding(HTML,CSS,JavaScript,PHP,Java,Python,C++,C)	4	Build the station independently, complete the front and back end interface development.
Communication	4	Serve as the study commissar in the class
Leadership experience	4	Serve as a core leadership member in an innovation project.

Member #2 Wenqi Li		
Skill	***Level** (1-5; 1=basic, 5=expert)*	***Describe your experience so far** (student, professional, etc)*

Coding(HTML,CSS,JavaScript,TypeScript,php,React,Vue)	5	Develop in the core department of Little Red Book,which has billions of daily active users.
Software development	5	Independently creating mobile game assistance software,gaining tens of thousands of usage.
Experience in collaborative environments	4	Complete the development of risk control business with backend development to dealing with e-commerce business during the Double Eleven period.
Algorithm	4	Vice President of NEUQ-ACM Club.Received Robocom Algorithm Contest National Second Prize.

Member #Xioayuanying Kuang		
Skill	***Level*** *(1-5; 1=basic, 5=expert)*	***Describe your experience so far*** *(student, professional, etc)*
Time Management and Organizational Skills	5	Able to complete all tasks in a very busy time.
Creativity	4	Often the facilitator of new ideas in team work
Decision-making ability	5	Able to make informed decisions and take responsibility in the face of complex situations
Communication ability	5	Able to easily understand the ideas of teammates and communicate effectively

Member #Zhengjie Zhao		
Skill	***Level*** *(1-5; 1=basic, 5=expert)*	***Describe your experience so far*** *(student, professional, etc)*
Leadership experience	5	Manage the class as monitor
Communication	5	Always make a lot of friends, outgoing personality
Experience in collaborative environments	5	Often act as the team leader in team cooperation
imagination	3	Often have some wild ideas

1. Member #Haojiang Shi		
Skill	***Level*** *(1-5; 1=basic, 5=expert)*	***Describe your experience so far*** *(student, professional, etc)*
Project Management	5	Read some examples of agile project management competitions and learn to use Trello.
Coding(C++, Java, HTML)	5	Produced some beautiful and responsive web pages.
Database design and management	4	In school projects and internships, I have certain experience in database design and management.
3D modeling	4	I used 3ds Max to model some missions in anime.

1.2 Unique Skills

Please list below unique skills – i.e. skills that ONLY one single member has.

Unique skill

Internship experience in the security development department of Litte Red Book
network security (Address information security issues)
Mobile Software Develop
Communication ability

1.3 Strengths and Weaknesses

Based on previous analysis, please identify main strengths and weaknesses of the **TEAM**.

Strengths
Strong technical background (HTML,CSS,JavaScript,TypeScript,php,React,Vue)
Harmonious team environment, efficient work efficiency
Strong learning atmosphere, mutual supervision learning

Weaknesses
The lack of a unified technology stack can lead to difficulties in communication and collaboration.
Lack of experience in Agile methodologies.
Technical capacity is uneven.

1.4 Please answer the following questions individually:

- Would you like to work in a self-organising team? Yes!
- Why?

1. Autonomy and Empowerment: In a self-organizing team, members have the autonomy to make decisions and manage their work. This can lead to a greater sense of ownership and motivation, as individuals feel empowered to contribute their ideas and solutions.

2. Flexibility and Adaptability: Self-organizing teams are often more flexible and adaptable, able to respond quickly to changes and challenges. This can create a dynamic and innovative work environment where creativity and problem-solving are highly valued.

3. Collaboration and Teamwork: Such teams typically emphasize collaboration and collective responsibility. This fosters a strong sense of community and mutual support, which can enhance teamwork and lead to more effective and cohesive outcomes.

4. Skill Development: Working in a self-organizing team often requires members to take on various roles and responsibilities, which can lead to continuous learning and skill development. This can be personally and professionally rewarding, offering opportunities for growth and advancement.

5. Efficiency and Productivity: Without the need for constant oversight and hierarchical approval, self-organizing teams can operate more efficiently. This can result in higher productivity and the ability to deliver high-quality results in a timely manner.

1.5 Based on the previous answer, provide a summary on the opinion of the team.

Our team exhibits a robust technical foundation with expertise in a wide array of technologies, including many programming languages. They operate in a harmonious and efficient environment, fostering strong collaboration and a positive working atmosphere. There is a notable emphasis on learning and mutual supervision, which contributes to continuous skill development.

However, our team faces some challenges. Our respective areas of expertise being different can cause communication and collaboration difficulties. Additionally, their limited experience with Agile methodologies could impede efficient project management and adaptability. The disparity in technical skills among members and different personal styles pose a potential challenge for balanced contribution to projects.

Unique strengths within our team include real-world security development experience from an internship at Little Red Book, expertise in addressing network security issues, proficiency in mobile software development, and strong communication abilities.

Overall, our team's technical prowess and collaborative spirit are significant assets, but more extensive collaboration and improved communication efficiency are necessary steps for faster progress and higher project completion rates.

2. Functional Requirements

For each VP, please provide an exhaustive list of requirements structured in Epics/User Stories:

- The focus is on MOST RELEVANT requirements – i.e. those requirements that characterise your value proposition.
- All users must be addressed.
- Estimate the priority of each requirement assuming MoSCoW

VP1:

An AI-based maintenance system aimed at coordinating fixers to conduct repairs, maintenance, and feedback for shared bicycles.

Epic 1	As a customer, I want to have a good user experience, high bicycle availability, and enjoy a safer cycling environment.	**Priority**
User Story 1	As a customer, I want to report bicycle damages through an AI-based maintenance system so that repairs can be conducted efficiently and timely, enhancing my cycling experience.	High
User Story 2	As a customer, I want the system to prioritize urgent repairs (e.g., safety-related issues) so that I can have access to safe bicycles promptly.	Medium
User Story 3	As a customer, I want the system to optimize bike availability by ensuring that repaired bicycles are quickly back in service.	Medium
User Story 4	As a customer, I want to receive updates on the repair status so that I can plan my trips accordingly.	Low

Epic 2	As a fixer, I hope to optimize the maintenance process, allocate tasks reasonably, and improve work efficiency.	**Priority**
User Story 1	As a fixer, I want the system to intelligently assign repair tasks based on location, severity, and workload so that I can optimize my repair processes and improve work efficiency.	High
User Story 2	As a fixer, I want the system to provide real-time updates on repair requests and bike availability so that I can allocate my resources effectively.	High
User Story 3	As a fixer, I want the system to provide feedback on my repair performance so that I can continuously improve.	Medium

User Story 4	As a fixer, I want the system to track the parts inventory in real-time so that I can ensure all necessary parts are in stock for repairs.	Medium
User Story 5	As a fixer, I want to schedule regular maintenance checks proactively to prevent frequent damages and ensure long-term bicycle usability.	Low

Epic 3	Reduce maintenance costs, increase repair efficiency, better understand user needs, and provide feedback for product improvement.	**Priority**
User Story 1	As a coordinator, I want the system to analyze maintenance data and identify cost-saving opportunities so that we can reduce overall maintenance expenses.	High
User Story 2	As a coordinator, I want the system to collect user feedback and analyze it to understand user needs and preferences.	Medium
User Story 3	As a coordinator, I want to implement a reward system for customers who report issues promptly, encouraging a culture of maintenance and care.	Medium
User Story 4	As a coordinator, I want to use customer feedback to identify common issues and focus on improving those areas in future bicycle designs.	Medium

VP2:

A dynamic management system that can allocate bicycles through scheduling to provide more available bikes for users during peak usage periods, alleviating traffic congestion and promoting sustainable transportation choices.

Epic 1	As a Coordinator, I want to efficiently manage bike distribution during peak hours, so that I can maximize customer satisfaction and profitability.	**Priority**
User Story 1	As a coordinator, I want the system to automatically redistribute bikes from low-demand areas to high-demand areas during peak hours so that we can ensure better availability and distribution of bikes and increase customer satisfaction.	High
User Story 2	As a coordinator, I want real-time data analytics tools to analyze usage patterns and predict demand during peak hours so that we can optimize bike distribution more effectively and efficiently.	High
User Story 3	As a coordinator, I want GPS tracking and monitoring systems to accurately track the location of bikes in real-time so that we can have precise information about bike availability and plan redistribution strategies accordingly.	High
User Story 4	As a coordinator, I want automated transport equipment to facilitate bike redistribution between stations so that we can overcome the resource constraints and efficiently balance geographical bike distribution.	Medium
User Story 5	As a coordinator, I want a mobile application for service providers to manage bike distribution so that we can have a user-friendly interface to monitor and control the allocation process seamlessly.	Medium

Epic 2	As a Customer, I want easy access to bikes during peak hours, so that I can conveniently use sustainable transportation options.	**Priority**
User Story 1	As a customer, I want to easily find nearby available bikes through a mobile application so that I can have convenient access to bikes during peak hours.	High

User Story 2	As a customer, I want the system to ensure better availability of bikes during peak times so that I can rely on bike-sharing as a sustainable transportation option for my daily commute.	High
User Story 3	As a customer, I want to receive notifications about nearby available bikes during peak hours so that I can plan my journey effectively and avoid waiting times.	High
User Story 4	As a customer, I want to have a seamless experience while renting bikes during peak hours, without facing shortages or long wait times, so that I can have a positive biking experience.	Medium
User Story 5	As a customer, I want the system to provide incentives for using bikes during peak times, such as discounts or rewards, so that I am encouraged to choose sustainable transportation options more frequently.	Low

Epic 3	As a government official, I want to promote sustainable transportation options, so that I can reduce congestion and pollution in the city.	**Priority**
User Story 1	As a government official, I want to support the implementation of a dynamic bike allocation system to promote the use of sustainable transportation options and reduce congestion on city roads.	High
User Story 2	As a government official, I want the system to provide data on bike usage patterns and peak demand periods so that we can make informed decisions about infrastructure development and urban planning.	High
User Story 3	As a government official, I want to collaborate with bike-sharing service providers to overcome regulatory challenges and facilitate the implementation of bike redistribution policies.	High
User Story 4	As a government official, I want to see an increase in the number of bike rides taken during peak periods as a measure of the system's effectiveness in reducing reliance on cars and promoting environmentally friendly modes of transportation.	Medium
User Story 5	As a government official, I want to receive positive feedback from citizens regarding the availability and accessibility of bikes during peak hours, indicating the success of our efforts in promoting sustainable transportation options.	Low

VP3:

Our goal is to introduce a bike damage notification system, which uses different colored lights to distinguish damaged bicycles, so that users can know if the bike is damaged before they use it. To provide a more convenient and reliable experience for shared bike users.

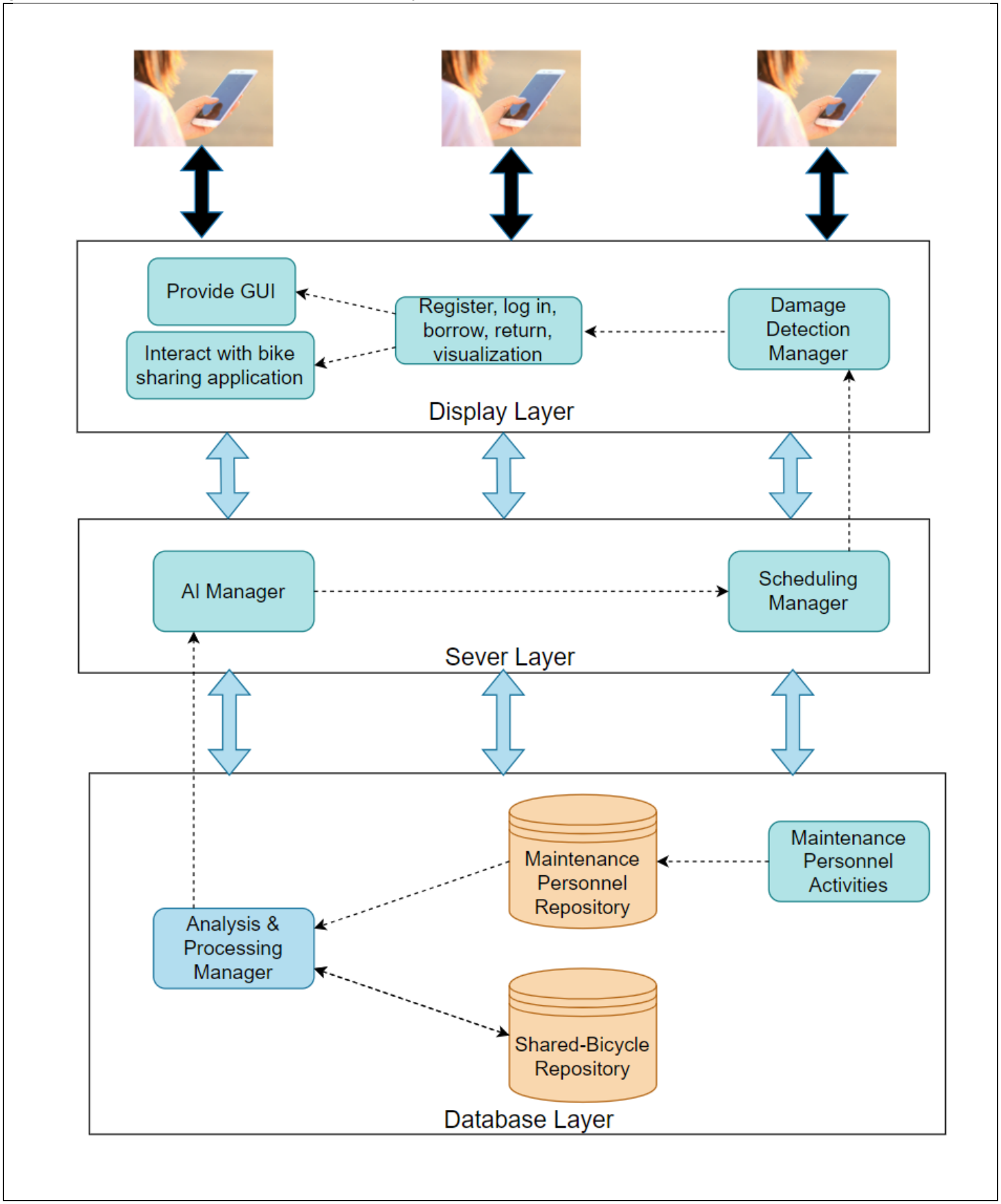
Epic 1	As a bike-sharing user, I want a system that uses color-coded lights to indicate bike damage, so that I can easily identify and avoid using damaged bikes, ensuring a more reliable and safe bike-sharing experience.	**Priority**
User Story 1	As a bike-sharing user, I want a system that uses color-coded lights to indicate bike damage, so that I can easily identify and avoid using damaged bikes, ensuring a more reliable and safe bike-sharing experience.	High
User Story 2	As a bike-sharing user, I want the damaged bikes to have a red light, so that I can instantly recognize them as unsafe to ride.	High
User Story 3	As a bike-sharing user, I want the system to be reliable, so that the color-coded lights accurately reflect the bike's condition.	High
User Story 4	As a bike-sharing user, I want the system to be intuitive, so that I can understand the color-coded lights without needing additional instructions.	Medium-High

User Story 5	As a bike-sharing user, I want the system to be updated in real-time, so that I always have the most current information about bike conditions.	Medium
User Story 6	As a bike-sharing user, I want to be able to report bike damage through the app, so that I can contribute to the system's accuracy and help maintain the fleet.	Medium
User Story 7	As a bike-sharing user, I want to receive notifications about nearby damaged bikes, so that I can avoid them and find an alternative quickly.	Medium

Epic 2	As a bike-sharing coordinator, I want an efficient system to identify and repair damaged bikes quickly to minimize user complaints and enhance service quality.	**Priority**
User Story 1	As a coordinator, I want to receive real-time notifications for damaged bikes so that I can promptly dispatch maintenance staff.	High
User Story 2	As a coordinator, I need an interface to track the status and progress of repairs to keep users updated.	High
User Story 3	As a coordinator, I want the system to automatically assign repair tasks based on the type and severity of damage to optimize resource allocation.	Medium
User Story 4	As a coordinator, I need a feature to log repair history and costs to analyze trends and improve maintenance strategies.	Medium
User Story 5	As a coordinator, I want to communicate with users through the system, providing updates on the repair status and estimated availability of damaged bikes.	Medium
User Story 6	As a coordinator, I need a system to evaluate the performance and efficiency of maintenance staff to improve service quality.	Low-Medium

Epic 3	As a bicycle manufacturer, I want to ensure that the design and materials of shared bikes can withstand daily wear and tear to reduce damage and repair costs.	**Priority**
User Story 1	As a bicycle manufacturer, I want to collect real-time data from shared bikes to analyze damage patterns and improve bike design.	High
User Story 2	As a bicycle manufacturer, I need to collaborate with bike-sharing companies to develop more durable and safe bike models.	High
User Story 3	As a bicycle manufacturer, I want to implement quality control measures to ensure that every bike meets safety standards before leaving the factory.	Medium-High
User Story 4	As a bicycle manufacturer, I need a feedback mechanism to collect user feedback on bike performance from bike-sharing companies.	Medium
User Story 5	As a bicycle manufacturer, I want to participate in the development and testing of new bike technologies, such as self-diagnosis systems and low-power sensors.	Medium
User Story 6	As a bicycle manufacturer, I need to ensure that our bike designs comply with the latest industry standards and regulatory requirements.	Low-Medium

3. System Architecture (high-level specification)


Provide GUI
Interact with bike sharing application
Register, log in, borrow, return, visualization
Damage Detection Manager
Display Layer
AI Manager
Scheduling Manager
Sever Layer
Maintenance Personnel Repository
Maintenance Personnel Activities
Analysis & Processing Manager
Shared-Bicycle Repository
Database Layer

4. Non-functional Requirements

Discuss each value proposition in terms of:

- Availability
- Performance
- Usability
- Security
- Scalability

VP1: ***An AI-based maintenance system aimed at coordinating fixers to conduct repairs, maintenance, and feedback for shared bicycles.***

Availability:

NFR1: The system should ensure at least **99.9% uptime**, allowing users to report bicycle damages at any time.

NFR2: Repair task assignment and status updates should occur in real-time to minimize bike unavailability.

Performance:

NFR3: The system must respond to user damage reports within seconds and allocate urgent repair tasks within **24 hours**.

NFR4: Big data analytics and predictive maintenance tasks should meet scheduled deadlines without compromising real-time performance.

Usability:

NFR5: The user interface (UI) should be intuitive, catering to both technical and non-technical users.

NFR6: Multilingual support should be provided to accommodate users from different regions.

Security:

NFR7: The system must comply with international data protection regulations (e.g., GDPR) to safeguard user data from unauthorized access.

NFR8: All data transmissions should be encrypted to ensure security during transit.

Scalability:

NFR9: The system design should allow seamless scalability as the user base and data volume increase.

NFR10: Easy integration of new technologies and modules should be possible to meet future development needs.

VP2: ***A dynamic management system that can allocate bicycles through scheduling to provide more available bikes for users during peak usage periods, alleviating traffic congestion and promoting sustainable transportation choices.***

Availability:

NFR1 The system ensures better availability and distribution of bikes during peak hours, enhancing the overall availability of the service to users.
NFR2 Improved access to bikes during peak times increases the availability of the service to customers, enhancing their overall experience.
NFR3 Encouraging the use of bike-sharing systems aligns with sustainability goals, making transportation options more widely available to residents.

Performance:

NFR4 By dynamically managing bike allocation through scheduling, the system optimizes performance during peak periods, meeting user demand effectively.
NFR5 Customers can quickly locate and access bikes through the mobile application, contributing to the system's performance by reducing wait times and enhancing user satisfaction.
NFR6 Alleviating congestion and reducing pollution contribute to improved transportation performance and environmental sustainability, benefiting the community as a whole.

Usability:

NFR7 Coordinators, customers, and local governments can easily access and utilize the system's features, such as real-time tracking, analytics tools, and mobile applications, to manage bike distribution effectively, locate nearby available bikes, and monitor the impact of bike-sharing initiatives.
NFR8 The system provides user-friendly interfaces and dashboards for users and stakeholders to navigate and perform tasks efficiently, enhancing overall usability.

Security:

NFR9 Secure access controls are implemented to ensure that only authorized personnel and users can access the system and its data, maintaining data integrity and confidentiality.
NFR10 Measures are in place to protect sensitive information, such as user data, payment details, and operational details, from unauthorized access or breaches, ensuring the security and privacy of users and stakeholders.

Scalability:

NFR11 The system should be designed to scale seamlessly to accommodate an increasing number of bikes, users, and demand fluctuations without compromising performance or availability.
NFR12 Scalability features enable the system to handle increasing demand, expand operations to serve new areas or markets effectively, and adapt to evolving requirements and changes over time.

VP3: ***Our goal is to introduce a bike damage notification system, which uses different colored lights to distinguish damaged bicycles, so that users can know if the bike is damaged before they use it. To provide a more convenient and reliable experience for shared bike users.***

Availability:

NFR1: The bike damage notification system should ensure at least 99.9% uptime, allowing users to report bicycle damages at any time, ensuring continuous availability for user interaction.
NFR2: The system should provide real-time status updates on bike conditions and repair tasks to minimize downtime and bike unavailability.

Performance:

NFR3: The system must process user damage reports and display the color-coded lights indicating bike damage within seconds to provide immediate feedback.
NFR4: The self-diagnosis and IoT technologies should perform real-time monitoring and data processing without latency, ensuring the system's responsiveness.

Usability:

NFR5: The bike damage notification system's interface, including the color-coded lights and app, should be designed to be intuitive and easy to understand for all users, regardless of technical expertise.
NFR6: The system should offer multilingual support to cater to a diverse user base, enhancing accessibility and inclusivity.

Security:

NFR7: The system must adhere to international data protection standards such as GDPR to protect user data and privacy, building trust with users.
NFR8: All communications between the system components, including sensors, IoT devices, and the central server, should be encrypted to prevent unauthorized access and data breaches.

Scalability:

NFR9: The system architecture should be designed to scale seamlessly as the number of shared bikes, users, and data volume grows, maintaining performance and reliability.
NFR10: The system should be modular and open to facilitate the easy integration of new technologies, such as advanced machine learning algorithms or additional IoT sensors, to adapt to future advancements and requirements.

5. Reflection

Reflection is important in Agile / Self-organising Team. At this stage you have been working together as a part of a Team for several weeks.

Each team member should provide a reflection on the experience structured as follows:

Member #1 Zhuohang Li	
What worked well	Overall division of labor and coordination. Write related content about VP1.
What didn’t work that well	None.
Major difficulties I faced	Have no clear thinking when writing System Architecture.
My suggestions to improve team performance	Everyone actively put forward their own opinions and opinions, and complete their own division of labor on time.

Member #2 Xiaoyuanying Kuang	
What worked well	Works well with other members to give full play to their strengths, mainly responsible for the VP1 part.
What didn’t work that well	Occasionally there is a lack of communication, leading to misunderstanding or duplication of work.
Major difficulties I faced	It takes more time to get used to an understanding of agile methodology.
My suggestions to improve team performance	I think we can pay more attention to team communication and try to solve the problem of poor communication through more face-to-face meetings.

Member #3 Haojiang Shi	
What worked well	The clear division of labor among team members. Actively completed VP3
What didn't work that well	Our execution process has been relatively smooth.
Major difficulties I faced	While drafting the system architecture documentation, I encountered difficulties in conceptualizing and detailing the specifics.
My suggestions to improve team performance	I suggest that we hold regular brainstorming sessions to encourage team members to come up with innovative ideas, and ensure that individual tasks are completed on time and to a high standard.

Member #4 Zhengjie Zhao	
What worked well	Cooperate well with other team members, mainly responsible for the System Architecture.
What didn't work that well	None.
Major difficulties I faced	Understand and draw the system structure diagram.
My suggestions to improve team performance	I suggest that we can focus more on team communication, and try to solve these problems through more face-to-face meetings.

Member #5 Wenqi Li	
What worked well	With rich practical experience and clear thinking logic, he can provide effective suggestions on related designs.
What didn't work that well	For the absence of some discussions and designs
Major difficulties I faced	Rushing to class at 8 a.m.
My suggestions to improve team performance	More effective communication and clear division of labor

The Team discusses the different experiences/opinions and provide a summary as follows:

Team	
What worked well (overall)	Division of Labor: Clear roles and responsibilities enhanced efficiency. Collaboration: Strong teamwork and effective use of individual strengths. Active Participation: Members contributed ideas and completed tasks effectively.
What didn't work that well (overall)	Communication Issues: Occasional misunderstandings and duplicated work due to lack of consistent communication. Meeting Absences: Some tasks were delayed due to member absences.
Major difficulties	System Architecture: Challenges in understanding and detailing the system structure. Adapting to Agile: Some members took time to get used to the agile methodology. Scheduling Conflicts: Early morning classes affected participation in discussions.
Aspects to improve	Communication: More regular face-to-face meetings and better communication strategies. Brainstorming: Regular sessions to encourage innovative ideas. Timeliness: Ensure tasks are completed on time and to a high standard. Active Feedback: Encourage members to contribute opinions and feedback actively.