ADDIS ABABA UNIVERSITY
ADDIS ABABA INSTITUTE OF TECHNOLOGY
SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING

Computer Stream

Final internship report

Name:Adane Eshete Gerem(UGR/3760/12)

Hosting company: Ministry of Innovation and Technology(MinT)

Duration: 4 months (October 01 ,2023-January 30,2024)

Submission date: February 1,2024

Declaration of Internship Completion and Approval

I,Adane Eshete Gerem, a fifth-year student in Electrical and Computer Engineering, hereby declare the successful completion of my internship at the Ministry of Innovation and Technology in Addis Ababa, Ethiopia. This internship spanned from October to January and was a significant part of my academic journey, providing practical insights into the fields of system development and networking.

Mentor's Approval

I, Feven Tadesse, hereby confirm that I have mentored Adane Eshete during their internship at the Ministry of Innovation and Technology. I have reviewed and approved this declaration.

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Feven Tadesse

Supervisor's Approval

I, Ayanna Mural, as the supervisor in the IT department during Adane's internship, confirm the successful completion of their internship. I have reviewed and approved this declaration.

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Ayanna Murad

Acknowledgment

I express my sincere gratitude to the Ministry of Innovation and Technology for providing me with this invaluable opportunity to apply theoretical knowledge in a real-world setting. The hands-on experience gained during this internship has not only enhanced my technical skills but also deepened my understanding of the practical applications of the concepts learned throughout my academic studies.

I extend my appreciation to my mentor,Feven Tadesse, for the guidance, support, and encouragement provided throughout the internship. Their expertise and insights were instrumental in shaping my learning experience and contributing to the successful execution of various projects.

I also acknowledge and appreciate the supervision and support provided by Ayanna Murad in the IT department. Their leadership and mentorship significantly contributed to my professional development, allowing me to actively contribute to the development of the research portal and networking tasks.

I am confident that the skills and knowledge acquired during this internship will be invaluable as I transition into the next phase of my academic and professional journey. I look forward to applying these experiences in future endeavors.

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Adane Eshete Gerem

February 01,2024

Executive Summary

Internship at the Ministry of Innovation and Technology, Addis Ababa

My internship at the Ministry of Innovation and Technology in Ethiopia was a transformative experience in system development and networking. Contributing to the research portal and engaging in networking tasks provided practical insights and theoretical knowledge.

Skills Enhancement: Active involvement in coding, system design, and testing enhanced my practical skills in software development. Networking tasks, including monitoring and security implementation, provided hands-on experience crucial for real-world application.

Knowledge Upgrade: The internship bridged theoretical concepts with practical application. Exposure to live projects and innovative technologies deepened my understanding of software architecture, coding standards, and network protocols.

Interpersonal Communication Skills: Collaboration within cross-functional teams and engagement with professionals improved my interpersonal communication skills. From user training sessions to documentation and team discussions, I refined my ability to convey technical information clearly.

Adaptability and Collaboration: The internship fostered adaptability through exposure to changing project requirements and priorities. Engaging in agile methodologies and collaborative problem-solving sessions strengthened my ability to navigate dynamic work environments.

Conclusion

This internship equipped me with essential skills for system development and networking roles. The practical exposure, theoretical understanding, and improved interpersonal communication skills acquired have laid a solid foundation for my professional growth. Grateful for the opportunity, I look forward to applying these skills in future endeavors.

Adane Eshete

January 31,2024

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Chapter One

Ministry of Innovation (MinT)

1.1 Brief History

The Ministry of Innovation and Technology (formerly known as the Ministry of Science and Technology (MoST)) is an agency of the Government of Ethiopia. It was established as a commission in December 1975 by directive No.62/1975. The Ministry of Science and Technology (MoST) was a governmental institution that was established for the first time in December 1975 by proclamation No.62/1975 as a commission. Following the change in government in 1991 and with the issuance of the new economic policy, the Commission was re-established in March 1994 by Proclamation No.91/94. The commission went into its 3rd phase of re-institution on 24 August 1995 by Proclamation No.7/1995, as an agency following the establishment of the Federal Democratic Republic of Ethiopia. Finally, in 2008 it was promulgated at the level of the Ministry of Science and Technology (MoST) Proclamation No. 604/2008 and two more years later, it was established at the ministry level by Proclamation No. 691/2010. The ministry was merged with the Ministry of Information Communication and Technology and changed its title to the Ministry of Innovation and Technology in October 2018.

1.2 Services provided by the Company

1.DATA CENTER HOSTING

The ministry helps companies who need physical data centers but don’t have the need to build their own proprietary physical locations. The Ministry can offer private data center rental; colocation, where a company rents a server within a shared data center space; or a mix of the two. Data center as a service (DCaaS) is the provision of offsite physical data center facilities and infrastructure to clients. Clients rent or lease access to

the MInT's data center, using the servers, networking, storage and other computing resources owned by the Ministry.

2.EMAIL SERVICES

Government offices request through letters to get Safe and secure email accounts. These are scalable , easy-to-use email servers that provide excellent support. The ministry will provide the email account as per their request for accessing their email anytime, anywhere, on any device—without any interruption.

3.SMS SERVICES

The ministry helps clients to deliver critical communications in uncertain times with SMS.

- Deploy Notifications and reliably reach users at scale with global phone numbers, redundancy, and intelligent routing.
- Create triggered Alerts and automatically handle responses with the SMS API.

Also the ministry of innovation is responsible for the following tasks:

1. Prepares, executes innovation and technology research and development programs based on the national development direction, prepares institutional capacity and human resource development in order to efficiently execute and also follows up its practical implementation.
2. Provides the necessary professional and technical support for regional innovation and technology institutions capacity building.
3. Collaborate with the concerned bodies for the purpose of determining standards enabling to keep the quality, safety and reliability of information technology service, and also follow up their practical implementation.

4. Supports institutions and professional capacity building, professional associations and academics that participate in innovation and technology.
5. Collaborates with the concerned bodies so as to ascertain that the curriculum of the nation is formulated in light of innovation and technology development.
6. Putting in place a system enabling to cover the technology demand, looking for appropriate technologies and practically utilizing it in collaborating is the concerned bodies, and also follow up its execution.
7. Identify emerging innovation and technology research and studies required for growth of the nation, and collaborate with national research programs.
8. Encourages researches, studies and mainstreaming works for upgrading, growing up and supply to the market endemic technologies, encourages, support, individuals, professional associations and academic that may contribute for the betterment and development of Innovation and technology
9. Put in place a system of awarding and motivating individuals and institutions that contribute for the development of Innovation and technology and the growth of inventive works and also practically implement the same.
10. Register the data of transformed technologies in the sector, collaborating the works of codification and containment thereby making them put for the disposal of consequence works.
11. A Certain arrangement of conditions that can support fundamental systems and services rendering to the public substantiated with technology and render better service to beneficiaries than at any time in the past.
12. Establish, collaborate, support councils supporting cooperation of research words.
13. Organize Innovation and technology database, compile information, issues levels of data keeping.

14. Collaboration with the concerned bodies in order to coordinate the information system of Federal and Regional Government Institutions, supports installation of safe and proper standard information technology.
15. Cooperate, follow up the concerned bodies for the purpose of creating a national administrative system in the name of the country's higher identification domain and properly utilize it. Appropriate domain name for the purpose of building up and cooperating data systems of governmental institutions, register address, supervise the same.
16. Follow up and monitor the proper implementation of the supervision system of use and disposal of radiation and materials related to it.
17. Issues national telecommunication plan, assign figures, administer and supervise the utilization.
18. Issues license and supervise those engaging in rendering telecommunication and postal service, confirm the technical capacity of telecommunication equipment.
19. Approve, supervise the radio frequency utilization allocated for Ethiopia, the powers and duties vested up on communication, information and technology ministry concerning information technology as per the prevailing other laws and provisions, the powers and duties vested up on Science and Technology Ministry concerning technology are hereby issued to Ministry of Innovation and Technology as per the present proclamation.

1.3 Organizational Set Up

The Ministry of Innovation and Technology (MINT) is a governmental organization which is located in Arada Sub city, Wereda 03. The organization was categorized under 3 state ministers.. Currently there are about 360 permanent employees in the ministry

1.4 End Users

The Ministry of Innovation and Technology in Ethiopia, like similar government bodies in other countries, typically serves a wide range of stakeholders and end-users. The primary end-users of the Ministry's initiatives and services are likely to include:

1.Government Agencies and Departments: The Ministry of Innovation and Technology may provide services and support to other government entities, helping them adopt and implement innovative technologies to improve efficiency and service delivery.

2.Businesses and Industries: The ministry may collaborate with private enterprises and industries to foster innovation, promote technology adoption, and support the growth of the digital economy.

3.Academic and Research Institutions: Collaboration with universities, research institutions, and educational organizations is crucial for promoting research and development, technology education, and skill development in the country.

4.Startups and Entrepreneurs: The Ministry is likely to support and encourage innovation within the startup ecosystem, providing resources, funding, and regulatory frameworks to foster entrepreneurship.

5. Citizens: The general public can be considered end-users indirectly, benefiting from the Ministry's initiatives that aim to enhance public services, improve digital infrastructure, and create a more technologically advanced society.

6.International Organizations: Collaboration with international organizations, NGOs, and foreign governments may be part of the Ministry's responsibilities, especially in areas like technology transfer, capacity building, and international cooperation.

7.ICT (Information and Communication Technology) Industry: The technology sector itself, including ICT companies, may interact with the Ministry for policy guidance, regulatory compliance, and initiatives that promote industry growth.

8.Innovation Ecosystem Participants: This includes incubators, accelerators, and innovation hubs that play a role in nurturing and supporting innovative ideas and startups.

The end-users can vary depending on the specific programs, policies, and initiatives undertaken by the Ministry of Innovation and Technology at any given time. The overarching goal is usually to drive technological advancement, economic growth, and social development within the country.

1.5Partners and collaborations

About Research Development CEO

Desks

- National Research and Development
- National Research Infrastructure
- National Research Ethics

Priority Research Sectors

- ➢ Agriculture
- ➢ Industry
- ➢ Health
- ➢ Mines and Water
- ➢ Construction
- ➢ Information Communication
- ➢ Energy
- ➢ Environment Protection
- ➢ Other related Sectors.

Key Stakeholders and Partners

- UNDP(United Nations Development Programme)
- African Center for Technology Studies (ACTS)

Institutions

Affiliated institutions

- Bio and Emerging Technology Institute
- Geospatial and Space Science institute
- Ethiopian Radiation and Protection Authority.
- Ethiopian Intellectual property Authority
- Ethiopian Technology Authority

National Research institutions

· **Agricultural Research institutions**

- ❖ Ambo Research Center
- ❖ Assosa Research Center
- ❖ Bako maize Research Center
- ❖ Chiro Sorghum Research and Training Center
- ❖ Debre zeit Research Center
- ❖ Fisheries and Aquatic Life Research Center
- ❖ Fogera rice research and training center
- ❖ Holetta Research Center

- ❖ jimma Research Center
- ❖ kulumsa Research Center
- ❖ Mehoni Research Center
- ❖ Melkassa Research Center
- ❖ National Agricultural Biotechnology Research Center
- ❖ Pawe Research Center
- ❖ Tepi Spices Research Center
- ❖ Wendo genet Research Center
- ❖ Werer Research Center
- ❖ Ethiopian Agricultural Research Institute

Ethiopian Health Research Institute

- ➢ Ethiopian Public Health Institute (EPHI)
- ➢ Ethiopian Health and Nutrition Research Institute
- ➢ Armauer Hansen Research Institute (AHRI)

International Research institutions

- ➔ International Food Policy Research Institute (IFPRI)
- ➔ International Livestock Research Institute (IRLI)

Chapter two

Internship Experience at the Ministry of Innovation

2.1 Introduction

I worked in the company for four months starting from October31 to January 30. I work in the It department of the company.

The Ministry of Innovation is one of the leading well known ministerial companies in Ethiopia. The company accepts internship students in every semester of the year. I asked my senior students about how good the company is for the intern students. And the company accept me for that duration of time.

2.2 Department or working sector

I work in the It department of the company in system development and Networking.

Department Overview

The IT Department at the Ministry of Innovation and Technology plays a pivotal role in facilitating the organization's technological infrastructure, ensuring seamless system development, and managing networking solutions. This department is essential in leveraging technology to advance the ministry's objectives and initiatives.

Mission and Objectives

The primary mission of the IT Department is to provide robust technological support to enhance the overall efficiency, productivity, and innovation within the Ministry of Innovation and Technology. The department aligns its objectives with the broader goals of the organization,

contributing to advancements in various sectors through the strategic use of information technology.

Roles and Responsibilities

System Development

The IT Department is responsible for spearheading system development initiatives, creating and maintaining software applications that cater to the specific needs of the ministry. This involves collaborating with other departments to identify requirements, designing solutions, coding, testing, and implementing software systems.

Network Management

Networking is a critical aspect of the IT infrastructure, and the department oversees the design, implementation, and maintenance of the ministry's network. This includes local area networks (LANs), wide area networks (WANs), and other communication systems, ensuring connectivity and data transfer across the organization.

Security and Compliance

IT security is paramount, and the department is tasked with implementing measures to safeguard the ministry's digital assets. This involves establishing security protocols, conducting regular audits, and ensuring compliance with relevant regulations and standards.

Technical Support

The IT Department provides ongoing technical support to all ministry staff, addressing issues related to hardware, software, and network connectivity. This includes troubleshooting, maintenance, and timely resolution of IT-related challenges.

Innovation and Research

In alignment with the ministry's focus on innovation, the IT Department engages in continuous research to identify emerging technologies and trends. This proactive approach allows the organization to stay at the forefront of technological advancements.

Collaboration with Other Departments

The IT Department collaborates closely with other departments within the ministry, understanding their unique requirements and challenges. This collaborative approach ensures that the technology solutions implemented align with the overall goals and objectives of the organization.

2.3 Workflow in the IT Department

Requirements Gathering

The workflow typically begins with the IT department collaborating with other sections or departments within the Ministry of Innovation and Technology to gather requirements for new systems, applications, or network enhancements.

System Design and Planning

Based on the identified requirements, the IT team engages in the design and planning phase. This involves creating system architecture, outlining the features and functionalities, and establishing a timeline for development.

Development and Coding

Once the design is finalized, the development phase commences. Programmers and developers in the IT department write code, create software applications, and implement the necessary functionalities according to the specifications.

Testing and Quality Assurance

After the development phase, rigorous testing is conducted to ensure the reliability, security, and functionality of the developed systems. This phase may involve unit testing, integration testing, and user acceptance testing.

Deployment

Once the systems pass the testing phase, they are deployed into the production environment. This involves transitioning from development servers to live servers, making the new systems or updates available for use by the ministry's staff.

Maintenance and Support

Ongoing maintenance and support are crucial for the smooth functioning of IT systems. The IT department provides continuous assistance, addressing any issues, bugs, or technical challenges that may arise. Regular updates and patches are applied to enhance system performance and security.

Network Management

Simultaneously, the IT department manages the organization's network infrastructure. This includes monitoring network performance, ensuring connectivity, and implementing security measures to protect against cyber threats.

Security Audits and Compliance

Regular security audits are conducted to assess the resilience of the IT systems against potential threats. The IT department ensures compliance with relevant regulations and standards, implementing security protocols and measures to safeguard sensitive information.

User Training

As new systems are deployed or updates are implemented, the IT department may provide training sessions to ensure that users across the organization are familiar with the new technologies and can utilize them effectively.

Innovation and Research

The IT department engages in ongoing research to stay informed about emerging technologies. This involves exploring new tools, methodologies, and best practices that can be leveraged to enhance the ministry's technological capabilities.

Documentation

Throughout the workflow, the IT department maintains comprehensive documentation for all systems, applications, and network configurations. This documentation is critical for future reference, troubleshooting, and knowledge transfer within the department.

Collaboration and Communication

Collaboration with other departments is essential at every stage. Regular communication ensures that the IT department is aligned with the broader goals of the ministry and can tailor its efforts to support the organization's overall mission.

This workflow provides a structured approach to system development, network management, and IT support within the Ministry of Innovation and Technology. The efficiency of this workflow is crucial for the successful integration of technology into the organization's operations.

2.4 Work Implemented

2.4.1 Tasks in System Development: Research Portal

Requirements Analysis

Collaborated with stakeholders to gather requirements for the research portal, understanding the specific needs and functionalities desired by users.

2.System Design

Contributed to the design phase by creating system architecture, outlining the portal's features, and mapping out the user interface for an optimal user experience.

3.Coding and Development

Actively participated in coding and development tasks, writing code to implement the functionalities outlined in the design phase.

4.Database Integration

Worked on integrating a database system to store and manage research data effectively, ensuring data integrity and security.

5.Testing and Debugging

Conducted rigorous testing to identify and resolve bugs and issues in the portal's functionality. Collaborated with the quality assurance team to ensure a robust and error-free system.

6.User Feedback Incorporation

Collected feedback from potential users and stakeholders, incorporating necessary changes and improvements to align the portal with user expectations.

7.Documentation

Maintained detailed documentation for the research portal, including coding standards, system architecture, and user guides to facilitate future maintenance and updates.

8.User Training

Assisted in the preparation and delivery of training sessions to familiarize users with the features and functionalities of the research portal.

2.4.2 **Work Tasks in Networking**

1.Network Monitoring

Participated in monitoring the ministry's network infrastructure, using network monitoring tools to ensure optimal performance and identify potential issues.

2.Security Implementation

Contributed to the implementation of security measures to protect the network against cyber threats, including firewalls, intrusion detection systems, and encryption protocols.

3.Troubleshooting

Assisted in troubleshooting network-related issues, providing timely support to resolve connectivity problems and ensure uninterrupted access to resources.

4. Network Configuration

Worked on configuring network devices such as routers, switches, and firewalls to optimize network traffic and ensure efficient data transfer.

5.Collaboration with IT Security

Collaborated with the IT security team to implement and maintain security policies and protocols across the network infrastructure.

6. Documentation

Maintained comprehensive documentation for network configurations, protocols, and security measures implemented, ensuring that the information is easily accessible for future reference.

7.Collaboration with Other IT Departments

Engaged in cross-departmental collaboration, particularly with the system development team, to ensure seamless integration between the developed systems and the network infrastructure.

By working on both the system development for the research portal and networking tasks, I have gained a diverse set of skills and experiences in both software development and IT infrastructure management. This dual exposure is valuable for understanding the holistic aspects of technology within an organization.

2.5 Procedures used in system development

I implement the following procedures in the development of the system.I use Agile software development model for the system development.

1.Requirement Elicitation

Conducted interviews and meetings with stakeholders to gather and understand the specific requirements for the research portal.

2.Documentation

Created detailed documentation outlining the project requirements, design specifications, and development plan. This documentation serves as a reference throughout the project lifecycle.

3. Agile/Scrum Methodology

Followed an agile or Scrum methodology for iterative development, allowing for flexibility in responding to changes and incorporating feedback at various stages of the project.

4.Version Control

Utilized version control systems (Git) to manage and track changes in the source code, enabling collaboration and maintaining a history of code modifications.

5. Coding Standards

Adhered to coding standards and best practices to ensure consistency and maintainability of the codebase.

6.Code Reviews

Participated in code reviews to receive feedback from peers and ensure the quality of the code, identifying and addressing potential issues early in the development process.

7.Testing Procedures

Followed a systematic approach to testing, including unit testing, integration testing, and user acceptance testing, to identify and rectify any defects or issues in the software.

8.Incremental Development

Implemented features incrementally, regularly delivering functional components to stakeholders for feedback and validation.

2.6 Performance in the tasks

In that duration of time there were groups that got interns in that company and each group with six members. We all work in the system development and networking part of the company. My

team received the highest admiration and reward from our advisor. They promised us ,it will be deployed and used by the company. Even if our intern is finished,they give us additional requirements to be included to be fully functional for the company.

2.7 Challenges faced during the intern Period

I faced the following challenges during my intern period.

1.Technical Challenges

Dealing with complex technical issues, bugs, or unexpected errors during system development or network management.

2.Resource Constraints

Limited availability of resources, including time, personnel, or technology, which can impact the progress of projects.

3. Changing Requirements

Coping with changes in project requirements, which may require adjustments to the initial design or development plan.

4. Security Concerns

Addressing cybersecurity threats and implementing robust security measures to protect systems and networks from potential breaches.

5. User Training and Adoption

Ensuring that end-users are adequately trained and comfortable adopting new systems or technologies.

6. Interdepartmental Collaboration

Coordinating with other departments and teams to ensure alignment of technology initiatives with broader organizational goals.

7.Technology Obsolescence

Managing and upgrading legacy systems to prevent technology obsolescence and maintain compatibility with evolving standards.

8.System Integration Issues

Overcoming challenges related to integrating new systems with existing ones, ensuring seamless communication and functionality.

9.Data Management and Privacy

Addressing issues related to data management, storage, and privacy, especially in systems dealing with sensitive information.

10.Communication Challenges

Ensuring effective communication within the team and with stakeholders to prevent misunderstandings and keep everyone informed.

11.Compliance and Regulation

Navigating and adhering to regulatory requirements and compliance standards relevant to the organization's operations.

1**2.Scaling Infrastructure**

Planning for and implementing infrastructure scaling to accommodate growth and increased demand on systems and networks.

2.8 How to handle problems

1.Technical Challenges

- ★ establish a robust testing and debugging process to identify and resolve technical issues early in the development or implementation phase.
- ★ Foster a collaborative environment where team members can share expertise and collectively tackle complex technical challenges.

2.Resource Constraints

- ★ Prioritize tasks based on their impact on project goals and allocate resources efficiently.
- ★ Communicate resource constraints early and transparently to stakeholders, seeking support or adjustments as needed.

3.Changing Requirements

- ★ Implement agile methodologies that allow for flexibility in responding to changing requirements.
- ★ Establish clear communication channels with stakeholders to ensure everyone is informed about changes and their implications.

4. Security Concerns

- ★ Stay updated on cybersecurity best practices and implement robust security measures.
- ★ Conduct regular security audits to identify and address potential vulnerabilities proactively.

5.User Training and Adoption

- ★ Develop comprehensive training programs and documentation to facilitate a smooth user transition to new systems.
- ★ Collect feedback from users and iterate on training materials to address any challenges or misunderstandings.

6. Interdepartmental Collaboration

- ★ Foster open communication channels between different departments.
- ★ Establish cross-functional teams or committees to ensure alignment of technology initiatives with organizational goals.

7.Technology Obsolescence

- ★ Develop a technology roadmap for planned upgrades and replacements of legacy systems.

- ★ Stay informed about emerging technologies and trends to make informed decisions about system upgrades.

8.System Integration Issues

- ★ Conduct thorough testing during the integration phase to identify and address compatibility issues.
- ★ Maintain clear documentation on system interfaces and dependencies.

9.Data Management and Privacy

- ★ Implement robust data governance policies and protocols.
- ★ Ensure compliance with data protection regulations and prioritize user privacy in system design and operation.

10.Communication Challenges

- ★ Foster a culture of open communication within the team and with stakeholders.
- ★ Utilize project management tools and regular meetings to keep all team members informed about project progress and changes.

11.Compliance and Regulation

- ★ Appoint a compliance officer or team to monitor and ensure adherence to relevant regulations.
- ★ Stay informed about changes in regulations and adjust systems and processes accordingly.

12.Scaling Infrastructure

- ★ Implement scalable architecture from the outset to accommodate future growth.
- ★ Monitor system performance and plan for infrastructure upgrades in anticipation of increased demand.

Chapter Three

Benefits gained during Intern period

3.1 Skill Improvements

During my internship at the Ministry of Innovation and Technology in Ethiopia, I had the opportunity to enhance my practical skills significantly. The hands-on experience in the IT department allowed me to develop and refine various skills, contributing to my professional growth. Some of the key skills I gained include

1. System Development

Hands-on Coding: Engaged in coding and programming tasks, contributing to the development of the research portal and gaining proficiency in languages such as .

Mern stack

Agile Methodology: Applied agile principles in system development, participating in iterative processes and adapting to changing requirements.

2. Networking

Network Monitoring: Utilized network monitoring tools to observe and optimize network performance, gaining insights into real-time network operations.

Security Implementation: Acquired practical experience in implementing security protocols, including firewalls and encryption, to enhance the resilience of the ministry's network.

3. Collaboration and Communication

Interdepartmental Collaboration: Worked closely with other departments, fostering effective communication channels and ensuring technology initiatives aligned with organizational goals.

User Training: Assisted in the preparation and delivery of user training sessions, honing skills in conveying technical information to non-technical stakeholders.

4. Troubleshooting and Problem-Solving

System Integration: Faced challenges in system integration and successfully troubleshooted issues to ensure seamless communication between different systems.

Technical Support: Provided hands-on technical support, addressing hardware, software, and network-related issues promptly and efficiently.

5. Documentation

Comprehensive Documentation: Maintained detailed documentation for system development projects, including coding standards, system architecture, and user guides, facilitating future reference and knowledge transfer.

6. Adaptability and Time Management

Adapting to Changes: Navigated changing project requirements by adapting to agile methodologies, demonstrating flexibility in response to evolving needs.

Time Management: Successfully managed time and resources, prioritizing tasks effectively to meet project deadlines and objectives.

7. Innovation and Research

Continuous Learning: Engaged in ongoing research to stay abreast of emerging technologies, contributing to the ministry's focus on innovation and technological advancement.

3.2 Theoretical knowledge improvement

In summary, my internship experience has been instrumental in honing practical skills crucial for roles in system development and networking. The combination of technical proficiency, effective collaboration, and problem-solving capabilities has equipped me with a strong foundation for continued professional development in the field.

During my internship at the Ministry of Innovation and Technology in Ethiopia, I not only enhanced my practical skills but also significantly upgraded my theoretical knowledge in the realms of system development and networking. The hands-on experiences provided valuable insights into the application of theoretical concepts learned during my academic pursuits. Working on the development of the research portal allowed me to put into practice theoretical knowledge related to software architecture, coding standards, and the agile methodology. Similarly, engagement in networking tasks provided a deeper understanding of theoretical concepts such as network protocols, security measures, and best practices in infrastructure management. Collaborating with seasoned professionals and participating in real-world projects expanded my comprehension of theoretical frameworks and their practical implications. Moreover, exposure to innovative technologies and continuous research activities during the internship enriched my theoretical knowledge base, ensuring a more holistic understanding of the subject matter. Overall, the internship experience served as a bridge between theoretical concepts acquired in the classroom and their real-world applications, contributing to a more comprehensive and nuanced understanding of system development and networking principles.

3.3 Interpersonal skills

During my internship at the Ministry of Innovation and Technology in Ethiopia, I experienced significant improvement in my interpersonal communication skills. Engaging in a collaborative environment, particularly within the IT department, provided ample opportunities to communicate effectively with diverse stakeholders. Here are key aspects in which my interpersonal communication skills were enhanced:

Cross-Departmental Collaboration

Collaborated with professionals from various departments, fostering effective communication channels to ensure that technology initiatives were aligned with the broader organizational goals. This experience enhanced my ability to convey technical information to non-technical stakeholders in a clear and accessible manner.

User Training and Support

Participated in the preparation and delivery of user training sessions, honing my ability to communicate complex technical concepts to end-users. Providing technical support further improved my communication skills by tailoring explanations to the audience's level of understanding.

Team Collaboration

Worked within cross-functional teams, where effective communication was crucial for project success. Regular team meetings, discussions, and collaborative problem-solving sessions strengthened my ability to articulate ideas, listen actively, and respond constructively to colleagues' input.

Documentation

Contributed to comprehensive documentation for system development projects, which required clear and concise communication. Documenting coding standards, system architectures, and user guides improved my written communication skills and ensured that information was easily understood by others.

Adaptability and Flexibility

Navigated changes in project requirements and priorities, requiring effective communication to keep all stakeholders informed. Adapting to evolving circumstances further refined my ability to convey information in a dynamic and responsive manner.

Networking and Security Collaboration

Collaborated with the IT security team and other networking professionals, fostering communication on security measures and infrastructure management. Engaging in discussions about network protocols and security practices deepened my ability to communicate technical details within a specialized domain.

Feedback Incorporation

Actively sought and incorporated feedback from team members and stakeholders. This iterative feedback process contributed to an open and constructive communication environment, where ideas were shared, discussed, and refined collaboratively.

In summary, my internship experience significantly enhanced my interpersonal communication skills by exposing me to diverse communication scenarios, ranging from user training to cross-functional teamwork and collaborative problem-solving. These skills are vital not only for

conveying technical information effectively but also for building positive and productive working relationships in a professional setting.