BOOT CAMP COMPLETION REPORT

1. Introduction

The Department of Information Technology and Telecom under the Ministry of Information and Communications conducted two events: Cybersecurity and Data Science boot camps with the grant support offered by the Asia Pacific Telecommunity under APT Young Professionals and Students program. These events were targeted to the college students with an objective to upscale their knowledge and skills on cybersecurity and data science fields, and further to guide the young minds as they start to embark toward their journey of building a career in the ICT sector. This event completion report covers the following two programs in detail.

Program 1: Cybersecurity BootCamp, held in DITT Conference hall, Thimphu from 6th to 7th December, 2022.

Program 2: DataScience BootCamp, held in Sherubtse College,Trashigang from 11th to 13th December, 2022.

2. Event Detail

a. Cybersecurity BootCamp

The Cybersecurity Bootcamp took place from 6th to 7th of December, 2022, as a part of the National Cybersecurity Week 2022. The Bootcamp consisted of a hands-on workshop on information security on Day 1 and Capture the Flag competition among the students on Day 2. The objective of the event was to create general awareness in cybersecurity and also start building capacity in cybersecurity skills among the college students.

The opening session was graced by Mr. Liu Ziping, the Deputy Secretary General of APT, Mr. Jigme Tenzing, Director of Department of IT and Telecom and Mr. Adli Wahid, Senior Security Specialist from Asia Pacific Network Information Center (APNIC), as the instructor for the cybersecurity bootcamp.

The participants for the cybersecurity bootcamp were students from College of Science and Technology (CST), Jigme Namgyel Engineering College (JNEC) and Royal Institute of Management (RIM). There were 17 students nominated from CST, of which 3 were 3rd year students undergoing Bachelors of Engineering in Electronics and Communications and rest of them were final year students pursuing Bachelors of Engineering in Information Technology.

The rest were diploma students, 12 each from JNEC and RIM studying Diploma in Computer System and Network and Diploma in Information Technology, respectively.

Figure A.3: Students/Participants during the Opening session of the Cybersecurity Bootcamp

Figure A.4: Group photo of cybersecurity bootcamp participants.

Day 1: Introduction to Information Security & Labs.

Before the commencement of the bootcamp, the coordinator from BtCIRT had conducted a virtual meeting with all the students and had instructed them to create an account in MyAPNIC (https://my.apnic.net/) to explore various self paced online courses and labs in APNIC Academy. The students were asked to complete the basic Cybersecurity course. The BtCIRT team, Few Officers from the Department along with other five officers who had recently undergone Advance PenTest training supported the instructor during the lab exercises.

Mr. Adli started the session with a quick introduction of himself right after the morning tea break to break the ice among the youth. With his years of experience in cybersecurity, it was an excellent opportunity for the participants to engage in an interactive mode of learning. He provided definitions of cybersecurity concepts in more practical terminology and demonstrated various real incidents and examples which made it easy for the students to grasp the concepts quickly. He customized the Packet Analysis lab in APNIC Academy to conduct all the lab exercises and also to solve the capture the flag challenge which was conducted on the second day.

Figure A.5: Mr. Adli introducing cybersecurity concepts

Figure A.6: Students concentrating during the lecture

Day 2: Capture the Flag

On day 2, until morning tea break students were allowed to complete the lab exercises and revise on the day 1 activities. During the tea break students were asked to form a team of 5 members, and 8 teams were formed in total. As there were 41 students , one of the team had six members. All teams were asked to register in the CTF platform. The platform contained the registrations page, Challenges (Problems to solve) and the Live leaderboard to trace the progress of each team.

Every team was very competitive and four of the teams solved all the challenges except one where it had some issue with the platform. CSTTrojan was the first team to solve the problems and reach the highest score the fastest. GoGirls were the 2nd place holder, followed by Group 6 boys. After the CTF challenge, the instructor also conducted a kahoot quiz on cybersecurity as the students showed enthusiasm to solve more problems.

Figure A.10: CTF challenge in the motion

Figure A.11: DITT Director providing closing remarks

Prizes were provided to top three positions and also to the quiz winner. Certificates were distributed beforehand to each participant prior to the closing ceremony to efficiently manage the time.

Certificate of Participation

Awarded To

For completion of the
Cybersecurity Bootcamp as a part of **National Cybersecurity Week 2022**

On

December 7th, 2022

Adli Wahid
Sr. Internet Security Specialist
(APNIC)

Jigme Tenzing
DIRECTOR
(Department of IT & Telecom)

Figure A.12: Sample certificate designed by BtCIRT

1st Prize Winner: CSTTrojan

2 nd Prize Winner: GoGirls

3rd Prize Winner: Group 6 Boys

Figure A.13: Photograph with the winners

The cybersecurity bootcamp was officially closed with prizes distribution and remarks from Mr. Jigme Tenzing Director, DITT where he shared the expectations from youths for their contribution as the possible future workforce of the country. Students also raised questions to the department seeking clarifications on securing government Jobs, and internships. They also raised questions on how to report vulnerabilities found in the government applications. The event ended with warm memories and aspirations to work more in future.

b. Data Science BootCamp

The three day Data Science Boot camp was held at Sherubtse college campus from 11th to 13th of December, 2022 with 60 participants attending the program including 6 faculty members from the college. The event targeted college students pursuing Bachelor of Science in Data Science with an objective to upscale their knowledge and skills on Data science tools and technologies and further guide them as they start to embark on their journey of building their career in the tech sector. Mr.Tshering, Deputy Chief ICT Officer from the Data Science project(RGoB) was the resource person for the event.

Figure B.1:Group photo of Data Science bootcamp participants.

The opening session for Data Science Bootcamp was graced by the Deputy Secretary General of APT Mr, Liu Ziping, Head of Tech Industry Development Division(DITT) Mrs. Deepika Rai, the Program Leader of BSc. in Data Science from Sherubtse college Mr. Sangay Thinley, and the 1st and 2nd year student of Bsc. Data Science.

Figure B.2: Opening session graced by APT Deputy Secretary Mr, Liu Ziping

Figure B.3: Certificate Sample

Day 1: Introduction to Data Science

The day one started with the introduction to Data Science, the types of data, data preparation and visualization, data analysis, life cycle and tools available for Data Science.

The resource person, Mr.Tshering provided a detailed explanation on the concept of data science and its tool before getting into the practical session. He defined data science as a field of study that combines domain expertise, programming skills and knowledge of mathematics and statistics to extract meaningful insights from data.

Figure B.4: Day 1 Introduction to Data Science

Figure B.5: Mr.Tshering explaining the Data science concept

Day 2: Introduction to Machine Learning

The day two, 12th of December focused on the Machine Learning (ML) tools and techniques. The participants were explained the differences between machine learning and artificial intelligence. Real life examples were provided to explain the types of Machine Learning. Following are the list of ML types discussed:

1. Supervised learning
2. Unsupervised learning
3. Reinforcement learning

The session also covered the algorithms and the important steps involved in ML life cycle starting from collecting data, cleaning, feature engineering, model building, selection of ML algorithms. The resource person explained how, after the model selection, the model evaluation is being done and model deployment is carried out.

Day 3 : Introduction to Deep Learning

The final day (day 3) was on an introduction to Deep learning. The session started with the definition and evolution of deep learning where various types of Deep learning including ANNs (Artificial Neural Networks) which are helpful for solving complex problems. CNNs (Convolution Neural Networks) are best for solving Computer Vision-related problems and RNNs (Recurrent Neural Networks) are proficient in Natural Language Processing were discussed.

Mr. Tshering gave a detailed explanation on each of the above types, its application and how it is done practically on Jupiter notebook. The Application on face mask detection and eye movement detection using deep learning tools were presented to the participants.

Following Practical session on ANN, RNN and CNN were conducted

1. Perceptron,
2. Multi layer Perceptron
3. Vanilla Recurrent Neural Network
4. Gated Recurrent Unit
5. Long Short-Term Memory
6. Bidirectional LSTM
7. Convolutional Neural Network
8. Convolutional-LSTM

The closing session was joined by the head of the Tech Industry Development Division, Chief ICTO from the Ministry of Information and Communications. The Chief gave a short presentation on the Health Data Analytics Project with JICA which highlighted the job opportunities in the data science areas.

Figure B.6 Closing Session

Figure B.7 Awarding of certificates by Mr.Sonam Dendup, Dean of Academic Affairs

The certificates of participation were awarded to the participants by Mr. Sonam Dendup, Dean of Academic Affairs at Sherubtse College on the last day of the event. The event with cheerful faces of students and the staff.

3. Feedback from the participants

a. Cybersecurity Bootcamp

The students were asked to provide feedback on the cybersecurity Bootcamp program. In general, the majority of the students found the cybersecurity bootcamp very useful and the conduct of the bootcamp satisfactory. More than 80% of the participants are interested in attending a similar program in future.

b. Data Science Bootcamp

Similar to program 1, the students of Data Science bootcamp were also asked to provide feedback and share views regarding the event on the last day of the program. The majority of the participants found the event relevant and helpful.

We asked the participants regarding the day they enjoyed the most, where many participants indicated that they enjoyed all three sessions thoroughly. 56% of 50 responses rated the resource person as excellent.

5. Conclusion

The Department in collaboration with Asia-Pacific Telecommunity(APT) has successfully conducted two programs Cybersecurity Bootcamp and DataScience Bootcamp which were held on 6-7th December and 11-13th December, 2022 respectively.

The objective of the first program was to create general awareness in cybersecurity and also start building capacity in cybersecurity skills among students pursuing higher education. Though the two days of Cybersecurity bootcamp were slightly challenging to cover vast topics and conduct the competition, the department has successfully achieved the desired outcome to train 41 students from three colleges and also conduct Capture the Flag competition among the students with great enthusiasm. The event also contributed to the department observing the National Cybersecurity week 2022, where the boot camp for the students was the highlight of the week. Press release for cybersecurity week 2022 including the cybersecurity bootcamp was also released.

The objective of the second program was to provide hands-on learning and industry relevant skills in Data science tools and technologies. It is important that students begin today to consider how to best prepare for and keep pace with this data-driven era of tomorrow and be informed on emerging tools and technologies and their usage. As data science continues to be one of the promising and in-demand careers in today's world, the students learned the importance of DS, ML, and DL tools and techniques and the job opportunities in these areas from this 3 day bootcamp. They also learned that to start a successful career in data science, one just needs to have hard skill sets like analysis, machine learning, statistics, neural networks, etc. and must be a problem solver, critical thinker, and a good storyteller to excel in data science.

The feedback received from the students for both the boot camps were positive and the department foresees many more such activities in future. The department is grateful for the support and collaboration in developing the ICT workforce of the country and look forward to many more such collaborations.