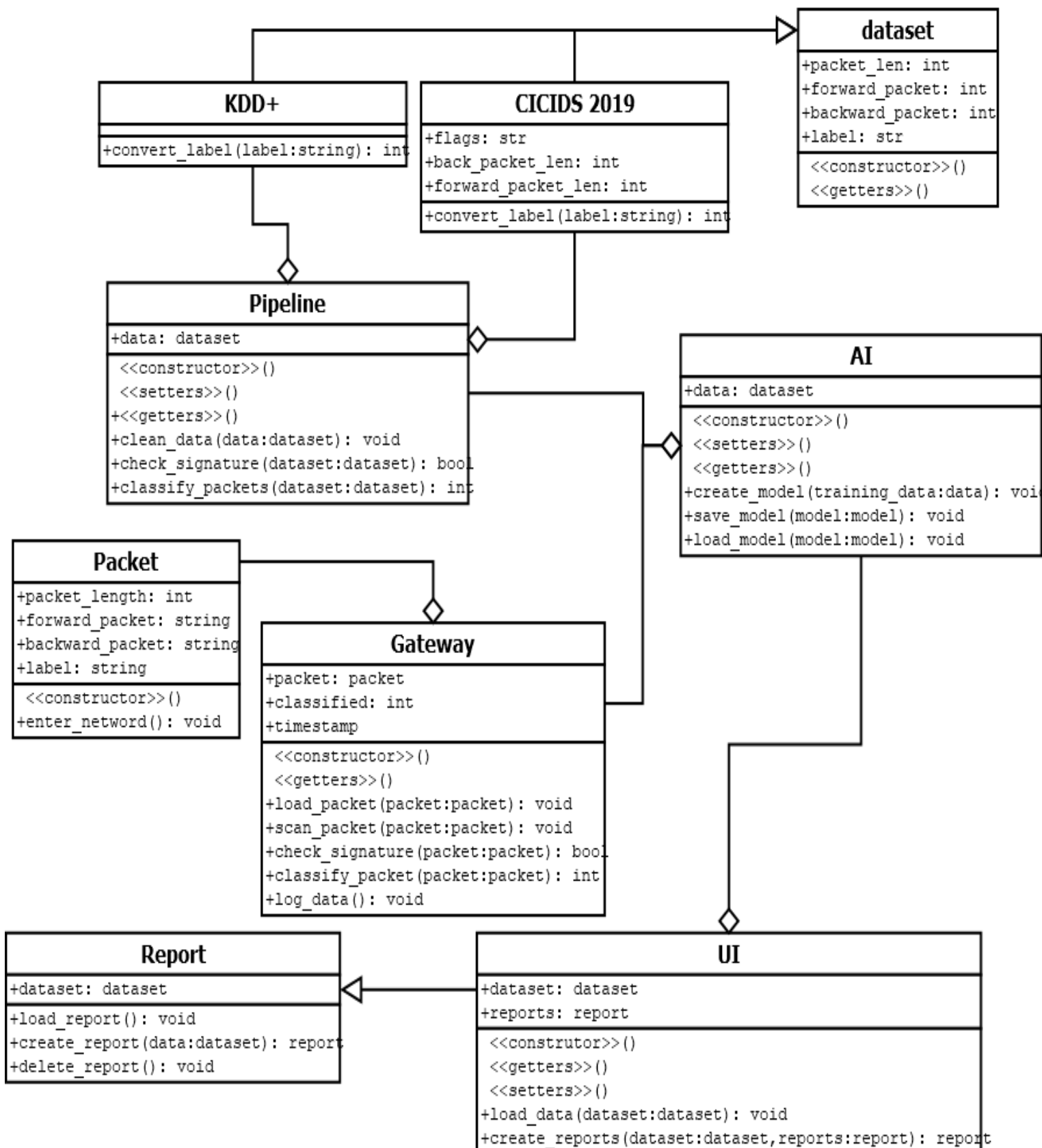


Network Intrusion detection system using Artificial Intelligence

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Test plan

Since planning has at least three testing techniques, we will be using those three here to test the system. Namely unit testing, integration testing, and system testing (Hamilton, 2022).

- **Unit testing**

Unit testing is the process of testing a certain portion of code in a system (TechTarget Contributor, 2022). This is usually done by programmers since they are working on the code directly, and it is usually at the functional level or class level if it is done in an object-oriented programming environment. Some of the functions that can be tested are the constructors and the destructors of the classes (TechTarget Contributor, 2022). These functions are tested to make sure that they are working as expected at their level of construction. Usually, functions have different portions within themselves, and hence unit tests can be done multiple times on one function to make sure that all the portions of the function are tested to make sure they are working fine (TechTarget Contributor, 2022). Unit testing is used to test that blocks of codes are working in software. It does not test for the functionality of the overall functionality of a system.

In the system, the first thing that will be done is to test the dataset to see if the dataset can be cleaned and presented in the right form before it is used by another system. Then the two pipelines will also be tested on their own with made-up data, a system-generated data to see if they are working on their own before they will be tested with the data from the test data. The gateway will also be tested on its own to see if it can process packets on its own and be able to classify the packets and forward them to the relevant department of the system.

- **Integration testing**

Integration testing is a type of testing in software that tries to make sure that different departments of software can communicate together (www.softwaretestinghelp.com, 2022). This type of testing can be accomplished in an interactive way which is a better way or a way that is usually preferred since it allows for easy management of interfaces. Then the other way of accomplishing integration testing is by combining everything together. Integration testing can be a bit difficult to maintain since it involves lots of codes from all different places. Hence they can be difficult to be traced to their exact locations whenever errors occur.

In the system, the integration testing is done by supplying the dataset on the pipelines to see how they behave and see if the two can be able to produce results that are expected.

Another integration testing is done on the Artificial Intelligence (AI) machine. The AI makes use of the dataset from the pipeline to create a learning model and save it. Then the model can be used to create a piece of useful information that can be used by users to see reports. The gateway also makes use of the integration testing technique to test for the packets that get through the gateway, and the packets use the trained model since it already knows the types of networks to expect and how to classify them. This is because it takes time to create a learned model, and that will slow down the network if every time a packet is loaded creates its own model. Hence it used the already created model, and it just loads it from where it is saved.

- **System testing**

System testing is a process whereby different components of a system are combined and tested all together as one, and the aim is to see how everything interacts together as one (Black, 2022). This kind of testing involves taking the utmost input and processing it through the internal structures of the system and then looking at the output and seeing if it produces the results that are supposed to be produced. The aim is to satisfy the functional or system requirements specifications.

System testing in this system will be the testing of the whole system and seeing how everything comes together. This includes taking all the integration testing components and combining them all to see how they interact with each other. Because the AI and gateway have been tested in integrating testing, then they get combined with being called by the User Interface (UI), which will also integrate the reports class to create reports of the tests that are being done. The reports can be created from the datasets or from the gateway when a new network is experienced, and it gets treated by the AI as it is supposed to. The system testing should be able to create reports from the AI, be able to present them in a graphical form for people to interpret, and also be able to delete the reports to create another one when there is a need to.

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