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Solving Maximum Weighted Matching problem using Graph Neural Networks

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Abstract

In this work we tried to train a Graph Neural Network (GNN) to solve a popular problem of Maximum Weighted Matching.

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Nikita Zaicev

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Chapter 1

Introduction

Machine Learning (ML) has become a powerful tool for solving a wide variety of problems. One such field that has been particularly challenging is Combinatorial Optimization (CO).

1.1 Background

This chapter is dedicated to all the knowledge and background research that was required for this project.

1.1.1 Listings

You can do listings, like in Listing 5.1

Listing 1.1: Look at this cool listing. Find the rest in Appendix A.1

```
1 $ java -jar myAwesomeCode.jar
```

You can also do language highlighting for instance with Golang: And in line 6 of Listing 5.2 you can see that we can ref to lines in listings.

Listing 1.2: Hello world in Golang

```
1 package main
2
3 import "fmt"
4
5 func main() {
6     fmt.Println("hello world")
7 }
```

1.1.2 Figures

Example of a centred figure

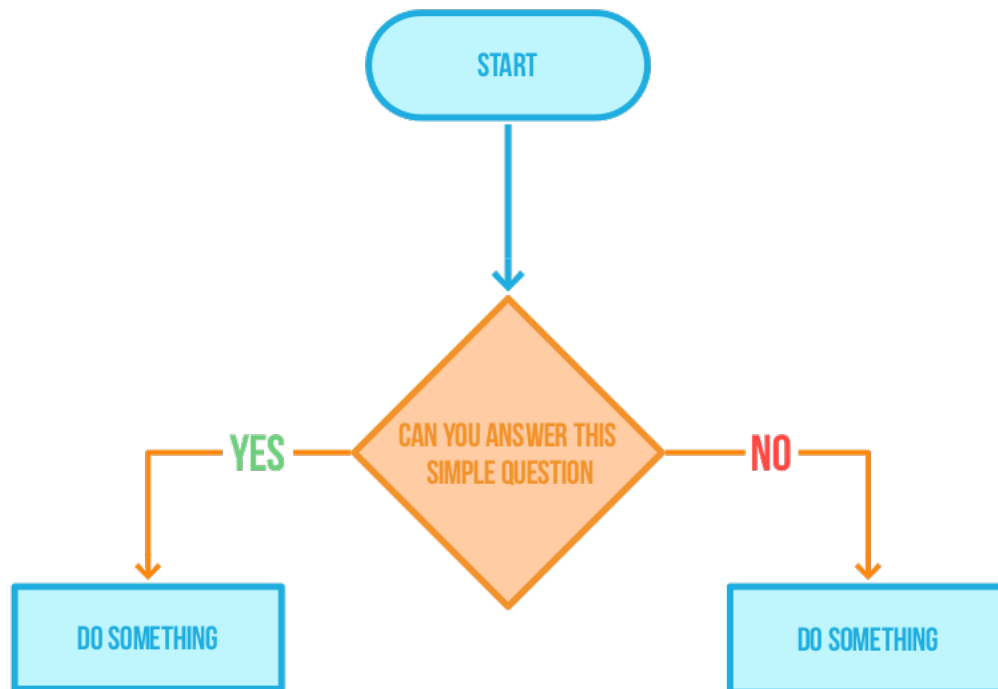


Figure 1.1: Caption for flowchart

Credit: Acme company makes everything <https://acme.com/>

1.1.3 Tables

We can also do tables. Protip: use <https://www.tablesgenerator.com/> for generating tables.

Table 1.1: Caption of table

Title1	Title2	Title3
data1	data2	data3

1.1.4 Git

Git is fun, use it!

Chapter 2

Approach

ML has become a powerfull tool for solving a wide variety of problems. One such field that has been particulary challenging is CO.

2.1 Result Validation

How the performance was measured

Chapter 3

Graph Neural Network

ML has become a powerfull tool for solving a wide variety of problems. One such field that has been particulary challenging is CO.

3.1 Difference from normal neural network

Why it works better for graphs

Chapter 4

Training

ML has become a powerfull tool for solving a wide variety of problems. One such field that has been particulary challenging is CO.

4.1 Data

What data was used for training

Chapter 5

Results

ML has become a powerfull tool for solving a wide variety of problems. One such field that has been particulary challenging is CO.

5.1 Performance on unseen data

How well the final model solves the matching problem

Chapter 6

Conclusion

ML has become a powerfull tool for solving a wide variety of problems. One such field that has been particulary challenging is CO.

6.1 Future work

Results show that this approach

Glossary

Git Git is a Version Control System (VCS) for tracking changes in computer files and coordinating work on those files among multiple people.

List of Acronyms and Abbreviations

CO Combinatorial Optimization.

GNN Graph Neural Network.

ML Machine Learning.

VCS Version Control System.

Appendix A

Generated code from Protocol buffers

Listing A.1: Source code of something

```
1 System.out.println("Hello Mars");
```