Reading memo for GRL

* Book: GRL (Graph Representation Learning) by W.L. Hamilton (2020)

General points for **thorough** reading (not extensive reading)

- Read **every** words and mark/memorize important words.
- Try to understand **every piece** the authors want to tell us - if needed, read other reference(s).
- However, if you cannot understand something after you have tried more than 30 minutes, discuss it with others.
- Try to use low-entropy description in explaining.

#01, liangz

range: from the title page to p8 (end of Chapter 1)

i: title page

- official book
- author William L. Hamilton was an Assistant Professor at that time at McGill Univ.
- McGill Univ., a famous university in Canada, 12 Nobel laureates, and graduate Yoshua Bengio (2018 ACM Turing Award, one of the three Godfathers of deep learning)

ii: Abstract page

- no-free-lunch theorem
- ⇒ inductive bias is important before optimization (and before machine learning). Ex. Consider to use a linear regression to analyze a dataset. The assumption that a linear regression is approporiate is an inductive bias.
- What is induction?
- Lin & Tegmark'16 Why does deep and cheap learning work so well? ⇒ Assumptions: (1) Low polynomial order in the real world (2) Locality of data (3) Symmetry phenomenon.
- 3 graph learning topics: (1) embedding (2) CNN → Graph (3) Message-passing approach

iii-v: Contents

- not important now

vi: Preface

- “past seven years” ⇒ graph learning started from 2013
- at 2020, fastest growing sub-areas of deep learning
- audience: shall have some background in machine learning and deep learning (e.g., Goodfellow et al, 2016)

vii-viii: Acknowledgements

- connections of the author (e.g., Jure Leskovec is a famous researcher in network science)

p1: Chapter 1 Introduction

- node, edge, relations, graph ⇒ ask the audience to illustrate some graphs
- Zachary Karate Club Network (1977) and on its importance

p2:

- It mentioned “a dramatic increase in the quantity and quality of graph data in the last 25 years.” ⇒ Why 25 years?
- ML is not the only way but may be interesting.
- adjacency matrix, adjacency list, simple graph and {0,1}
- (optional) graph processing from adjacency list to adjacency matrix seems an evidence showing human consumes matter and energy to increase

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