GEDU501: Scientific Writing **POSLEC**

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Introduction Review Worksheet

Recalling and Comparing Moves in Your Reading

Instructions

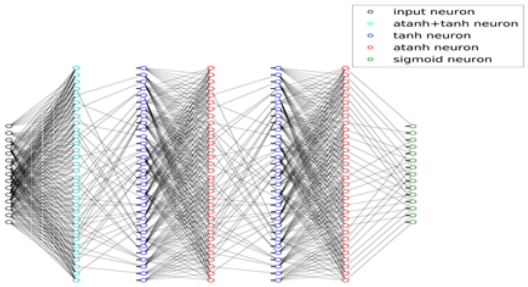
1. *Copy this google doc with group members in order for everyone in the group to type in the G-doc simultaneously.*
2. *Share with Prof. Powell : npowell@g.postech.edu*
3. ***Talking** in groups, choose order of who will explain. Then, briefly introduce the paper you chose (from the week 3 Intro reading assignment). Typing,place your papers basic information in the table on page one in your order (1, 2, or 3)..*
4. *Compare and find different ways to express certain moves, grammatical forms, and useful vocabulary*

	Article Information 1	*Article Info 2*	*Article Info 3*
Title	Analog circuit generator based on deep neural network enhanced combinatorial optimization	Learning to decode linear codes using deep learning	
Author (s)	Hakhamaneshi, Kourosh ;Werblun, Nick ;Abbeel, Pieter ;Stojanović, Vladimir	Eliya Nachmani; Yair Be'ery; David Burshtein	
Journal Title	Proceedings of the 56th Annual Design Automation Conference	2016 54th Annual Allerton Conference on Communication, Control, and Computing (Allerton)	
Year of Publishing	2019	13 February 2017	
Volume/Issue	228/2019		
Pages	1/2	6	

Keywords / Search Terms	Deep neural network, discriminator, evolutionary algorithm	weight, deep learning, belief propagation algorithm	

Introduction Comparison Table

Introduction (including background/related works)			
Moves	**Example from article 1**	**Example from article 2**	**Example from article 3**
Importance of this research area	Analog circuit design automation (ACDA) has always been a challenge, mostly because the analog design heavily depends on human expertise and intuition to guide the exploration of a complex multi-dimensional design space.	This paper is very important. It is first time, to apply deep learning to the field (channel coding). => We regard this work as a first step in the implementation of deep learning techniques for the design of improved decoders	
Reference in a sentence about prior research	Deep Reinforcement Learning (DRL) on the other hand, has been able to solve many human decision making problems [3] in an unsupervised manner, which creates new opportunities for ACDA as discussed in [4].	**Since this paper is the first to apply deep learning, there is no previous paper & research. => For high density parity check (HDPC) codes [11], [12], [13], [14], such as common powerful algebraic codes, the BP algorithm obtains poor results compared to the maximum likelihood decoder [15].**	
*Use of reporting verb and reference to prior research	Utilizing the example of a full optical receiver front-end designed in GF14nm process we demonstrate that this method is effective on a relatively-large design space and can handle state-of-the-art designs within the layout constraints of an advanced process node.	In recent years deep learning methods have demonstrated significant improvements in various tasks. The naive approach to the problem is to assume a neural network type decoder without restrictions, and train its weights using a dataset that contains a large amount of codewords.	

Showing a research knowledge gap • Lack of info • Incorrect prior research • Unclear knowledge	However, a lot of progress needs be made to make these DRL approaches scalable to real analog design problems. On the other hand, population-based circuit optimization approaches [2] have been demonstrated as flexible global optimization frameworks, but confined to small-size designs due to their sample inefficiency. They are not suitable for layout-level optimization, which requires long simulation time even for relatively small circuits.	The picture of the structure of the neural network is wrong. 	
Purpose or aim of this research	In this paper, we tackle the sample efficiency problem of population- based methods using DNNs.	implementation of deep learning techniques for the design of improved decoders (source sentence : We regard this work as a first step in the implementation of deep learning techniques for the design of improved decoders.) => In this work we applied deep learning techniques to improve the performance of the BP algorithm.	
Sentence that outlines paper's sections (e.g. methodology, results, discussion, conclusion)	We present a framework that is built on top of an evolutionary algorithm (EA) and leverages a DNN trained as a discriminator to prune out "bad" children to reduce the evaluation time spent in post-layout simulation. Utilizing the example of a full optical receiver front-end designed in GF14nm process we demonstrate that this method is effective on a relatively- large design space and can handle state-of-the-art designs within the layout constraints of an advanced process node.	A novel deep learning method for improving the belief propagation algorithm is proposed. : methodology.	
Grammatical Features	**Example from article 1**	**Example from article 2**	**Example from article 3**

Present Simple Tense	*Generating the relevant post-layout data is also expensive in terms of simulation time.*	A well-known family of linear error correcting codes are the low-density parity-check (LDPC) codes [10].	
Reason for use	*General truth*	Because it explains the definition about LDPC.	
Present Perfect (+ continuous) Tense	*Analog circuit design automation (ACDA) has always been a challenge, mostly because the analog design heavily depends on human expertise and intuition to guide the exploration of a complex multi-dimensional design space.*	In recent years deep learning methods have demonstrated significant improvements in various tasks.	
Reason for use	*What happened in the past will affect the present*	because deep learning is still being used in communication research's field.	
Past tense	*On the other hand, population-based circuit optimization approaches [2] have been demonstrated as flexible global optimization frameworks, but confined to small-size designs due to their sample inefficiency.*	Additionally, deep learning combined with reinforcement learning techniques was able to beat human champions in challenging games such as Go [4].	
Reason for use	*Facts from a period in the past*	Reason for verb tense use Because beating AlphaGo was a long time ago. (alpha go vs human's game(match) was a few years ago.)	
Use of I/my or we/our	In this paper, we tackle the sample efficiency problem of population- based methods using DNNs.	**Hence we are required to train the decoder using a huge collection of codewords from the code, and due to the exponential nature of the problem, this is infeasible, e.g., for a BCH(63,45) code we need a dataset of codewords.**	
Additional features	**Example from article 1**	**Example from article 2**	**Example from article 3**
Citation and reference of	Deep Reinforcement Learning (DRL) on the other hand, has been able to solve many human decision making problems [3] in an unsupervised	Recall that this is a fundamental property of message	

prior research 1 (method/claim/ theory?)	manner, which creates new opportunities for ACDA as discussed in [4].	passing algorithms [16].	
Citation and reference of prior research 2	On the other hand, population-based circuit optimization approaches [2] have been demonstrated as flexible global optimization frameworks, but confined to small-size designs due to their sample inefficiency.	**Note that Hinton [20] recommends to initialize the weights with normal distribution. In Figures 8 and 9 we plot the weights of the last hidden layer.**	
Vocabulary	**Example from article 1**	**Example from article 2**	**Example from article 3**
Verb	Word - Defintion:**tackle [to try to deal with something or someone]** Source sentence (with vocab word bolded and underlined) : **In this paper, we tackle the sample efficiency problem of population- based methods using DNNs.**	Word - Defintion: Emphasize [to show that something is very important or worth giving attention to] Source sentence (with vocab word bolded and underlined) : It should be emphasized that the parity check matrices that we worked with were obtained from [19].	Word - Defintion: Source sentence (with vocab word bolded and underlined) :
Adjective or adverb	Word - Defintion:**unsupervised (manner) [without anyone watching to make sure that nothing dangerous or wrong is done or happening]** Source sentence (with vocab word bolded and underlined) : **Deep Reinforcement Learning (DRL) on the other hand, has been able to solve many human decision making problems [3] in an unsupervised manner, which creates new opportunities for ACDA as discussed in [4].**	Word - Defintion: renowned **[famous, widely used]** Source sentence (with vocab word bolded and underlined) : The renowned BP decoder [10], [16]can be constructed from the Tanner graph, which is a graphical representation of some parity check matrix that describes the code.	Word - Defintion: Source sentence (with vocab word bolded and underlined) :