

HoGent

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Professional Bachelor in Applied Computer Science
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Solving CAPTCHA using neural networks

Submitted on 10 june 2013

Student:
Pieter Van Eeckhout

Mentor:
Johan Van Schoor

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Abstract

Preamble

Chapter 1

Solving CAPTCHA using neural networks

The history of SPAM. Ever since the internet has found its way into the daily usage in our society there have been people out there who **don't** always have other **peoples** best interests in mind. In this particular case I am referring to people aiming to advertise their product, services, etc ...in an aggressive manner. The methods of advertising include but are not limited to:



- Sending bulk emails without the recipients permission (SPAM).
- Posting irrelevant links and **info** on fora and various social media.
- Flooding chat channels with their links and **info**.

These emails, posts and messages inconvenience the end-users, requiring time to filter out the junk. The economic costs of SPAM has led to a decrease in the Japanese GDP by 500 billion Yen (3.78 billion Euro) in 2004 and were projected to reach a decrease of 1% of the total GDP by 2010 unless adequate counter-measures were taken [Ukai and Takemura, 2007]. [Khong, 2004] researched the economic arguments for regulating junk mails, the efficiency of these regulations.

Birth of CAPTCHA. The two previously mentioned researches signify the importance and impact of SPAM on our daily lives. The users of the internet quickly tried to implement methods to prevent spammers from spreading their advertisements to the **masses**. Several prevention and detection methods and systems were developed successfully. These range from hidden text only visible to automated scripts, to invalid HTML tags. One of the methods developed for this purpose is a CAPTCHA test. CAPTCHA is an acronym based on the word "capture" and is spelled out completely as 'Completely Automated Public Turing

test to tell Computers and Humans Apart'. An attempt to trademark the term was made by Carnegie Mellon University on 15 October 2004, but the application was eventually dropped on 12 April 2008

Spammers fight back. All these prevention and detection methods did not stop the spammers from trying to reach an audience as large as possible. They rely on this vast audience because of the return rates being as low as 0.0023% [Cobb, 2003]. Trying to reach such a large audience the spammers start to device ways to circumvent or break the existing systems. One of these methods is solving CAPTCHA tests making use of the adaptive learning and pattern recognizing capabilities of neural networks. These networks can be used to recognize letters from images with adversarial clutter. This is the area I will focus on in this thesis. This thesis will list some of the difficulties regarding the extraction of relevant data from a CAPTCHA, and how to possibly overcome these difficulties. However the main focus will be on searching for the types and configuration of neural networks best used for pattern recognition.

Chapter 2

Premise and research questions

2.1 Premise

2.2 Research questions

What different types of CAPTCHA exist?

What are the difficulties for solving a CAPTCHA automatically

What are the types of neural networks suitable for OCR

Is this a feasible endeavour at this point of personal computing power

Chapter 3

Methodology

Chapter 4

Corpus

4.1 CAPTCHA

4.2 Neural Networks

4.3 Implementation

Chapter 5

Conclusion

Appendix A

Sourcecode

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