

Slovenská technická univerzita v Bratislave
Fakulta informatiky a informačných technológií

FIIT-0000-00000

Michal Fašánek

Pokročilé spracovanie sekvenčných dát pomocou umelých neurónových sietí

Diplomová práca

Vedúci práce: Ing. Michal Barla, PhD

Január, 2016

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Diplomová práca

Študijný program:	Informačné systémy
Študijný odbor:	Informačné systémy
Miesto vypracovania:	Ústav Aplikovanej Informatiky
Vedúci práce:	Ing. Michal Barla, PhD
Január, 2016	

>>>> ASSIGNMENT <<<<
>>>> ZADANIE <<<<

Anotácia

Slovenská technická univerzita v Bratislave

FAKULTA INFORMATIKY A INFORMAČNÝCH TECHNOLOGIÍ

Študijný program: Informačné systémy

Diplomová práca: Pokročilé spracovanie sekvenčných dát pomocou ume-
lých neurónových sietí

Autor: Michal Fašánek

Vedúci práce: Ing. Michal Barla, PhD

Január, 2016

Analýza dát z používateľského správania k zdrojom na webe je v súčasnosti populárna téma, vzhľadom na svoj potenciál zlepšovať služby poskytované návštevníkom webu. Najnovšie prístupy skúmajú aj možnosti aplikácie metód strojového učenia. Medzi týmito prístupmi si získavajú popularitu hlboké mnohovrstvové samoučiace sa neurónové siete a rôzne architektúry rekurentných neurónových sietí. Využívajú princípy učenia bez učiteľa, pomocou ktorých dokážeme v jednotlivých vzorkách dát identifikovať podstatné črty. V tejto práci sa zameriavam na možnosti využitia rekurentných neurónových sietí s dlhou krátkodobou pamäťou(LSTM) pri analýze dát z platobných brán pre používanie online spravodajských portálov. Takáto analýza poskytuje náhľad do používateľského správania a z toho vyplývajúce možnosti spätnej väzby voči návštevníkom online spravodajských portálov.

Annotation

Slovak University of Technology Bratislava

FACULTY OF INFORMATICS AND INFORMATION TECHNOLOGIES

Study program: Informačné systémy

Master thesis: Advanced processing of sequential data by artificial
neural networks

Author: Michal Fašánek

Supervisor: Ing. Michal Barla, PhD

2016, January

Data analysis of user behaviour in accessing web sources has become a popular topic, due to its potential in improvement of services offered to the visitors of web. Most recent approaches examine possibilities of applying methods machine-learning. Among these approaches, deep belief networks and recurrent neural networks are gaining popularity. They work with principles of unsupervised learning to identify important patterns in given data. In this paper, I focus on using recurrent neural networks with long short-term memory(LSTM) to analyze data from paywall of online news portals. Such analysis provides insight into the user behaviour and resulting feedback possibilities to the users of online news portals.

POĎAKOVANIE

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ČESTNÉ PREHLÁSENIE

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Michal Fašánek

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Kapitola 1

Introduction

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Claritas est etiam processus dynamicus, qui sequitur mutationem consuetudinum lectorum. Mirum est notare quam littera gothica, quam nunc putamus parum claram, anteposuerit litterarum formas humanitatis per seacula quarta decima et quinta decima. Eodem modo typi, qui nunc nobis videntur parum clari, fiant sollemnes in futurum.

Kapitola 2

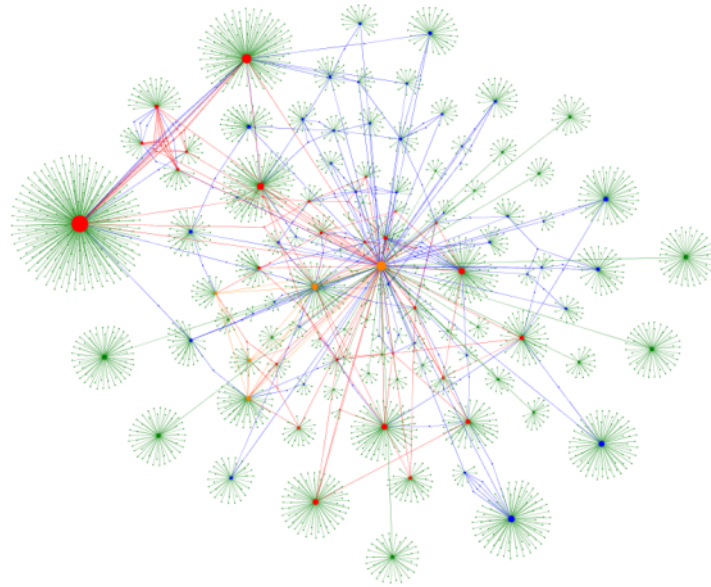
Analysis

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2.1 Section

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quinta decima. Eodem modo typi, qui nunc nobis videntur parum clari, fiant sollemnes in futurum.



Obr. 2.1: *Name figure*

2.1.1 Enumeration

1. goal 1
 - (a) goal 1.a
 - (b) goal 1.b
2. goal 2
3. goal 3

2.1.2 Itemization

- item 1
 - item 1.1
 - item 1.2
- item 2

- item 3

2.1.3 Citation

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2.1.4 Labels & References

See Section [2.1.5](#).

See Figure [2.1](#).

See Listing [2.1](#).

See Table [2.1](#).

2.1.5 Examples

```
<table class="metric_index">
  <tr>
    <th>Lines of code</th>
    <th>Value</th>
  </tr>
  <% if (filenum and modulenum) then %>
    <tr>
      <td class="name">Number of files</td>
      <td class="value"><%=filenum%></td>
    </tr>
    <tr>
      <td class="name">Number of modules</td>
      <td class="value"><%=modulenum%></td>
    </tr>
  <% end %>
  <tr>
    <td class="name">Lines Total</td>
    <td class="value"><%=LOC.lines%></td>
  </tr>
  <!--
      skryty zdrojovy kod
      podobne zobrazenie ostatnych metrik riadkov
  -->
</table>
```

Ukážka 2.1: *Example 1*


```

local parser = require 'leg.parser'
local rules = require 'metrics.rules'
-- << skryty zdrojovy kod >> --
local capture_table = {}
grammar.pipe(LOC_capt.captures, AST_capt.captures)
grammar.pipe(block_capt.captures, LOC_capt.captures)
-- << viacero rovnakych volani s tabulkami captures inych modulov >> --
grammar.pipe(capture_table, cyclo_capt.captures)
local lua = lpeg.P(grammar.apply(parser.rules, rules.rules, capture_table))
local patt = lua / function(...)
    return {...}
end
local result = patt:match(code)[1]

```

Ukážka 2.2: *Názov*

Ukážka 2.3: *Manager*

```
int a;
```

Number of males	51
Number of woman	57
Gender not given	27
Average age	21,83

Tabuľka 2.1: *Information about users*

Kapitola 3

Design

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3.1 Section

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quinta decima. Eodem modo typi, qui nunc nobis videntur parum clari, fiant sollemnes in futurum.

Kapitola 4

Results

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4.1 Section

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quinta decima. Eodem modo typi, qui nunc nobis videntur parum clari, fiant sollemnes in futurum.

Kapitola 5

Conclusions

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Príloha A

Technical documentation

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A.1 Implementation

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Príloha B

User documentation

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B.1 Instalation

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B.1.1 Run the application

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Príloha C

Electronic medium

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/Application

- implementácia opisovaného riešenia

/Documentation

- bakalárska práca spolu s anotáciami v slovenskom a anglickom jazyku

/Documentation/Latex

- latex zdrojové súbory dokumentácie

/Documentation/BibTeX

- BibTeX súbor s použitými referenciami

/Documentation/Resources

- dostupné použité zdroje

/Resources

- vstupné/testovacie dáta opisované v dokumente

/Source/Dependencies

- inštalačné súbory pre knižnice, ktoré potrebuje aplikácia

read.me - popis obsahu média v slovenskom a anglickom jazyku