Remarks

3: Proszę zaktualizować szablon pracy wg szablonu z repozytorium `https://github.com/ksiminski/polsl-aei-theses`.

5: state of the art dla aplikacji sieciowych

7: Dlaczego aplikacja webowa?

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SILESIAN UNIVERSITY OF TECHNOLOGY

FACULTY OF AUTOMATIC CONTROL, ELECTRONICS AND COMPUTER SCIENCE

PROGRAMME: INFORMATICS

Final Project

Title of engineer thesis

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Gliwice, January 2022

Contents

Abstract

The text of the abstract should be copied into a respective field in the APD system. The Abstract with keywords should not exceed one page.

Keywords: 2-5 keywords, separated by commas

Chapter 1

Introduction

[Proszę zaktualizować szablon pracy wg szablonu z repozytorium `https://github.com/ksiminski/polsl-aei-theses`.]

- introduction into the problem domain
- settling of the problem in the domain
- objective of the thesis
- scope of the thesis
- short description of chapters
- clear description of contribution of the thesis's author – in case of more authors table with enumeration of contribution of authors

Chapter 2

Data anonymisation

- definicja anonimizacji
- rodzaje animonimizacji (od razu odnośniki do literatury (bibliografia))
- metody, narzędzia
- problem analysis
- state of the art, problem statement
- literature research (all sources in the thesis have to be referenced [**bib:article**, **bib:book**, **bib:conference**, **bib:internet**])
- description of existing solutions (also scientific ones, if the problem is scientifically researched), algorithms, location of the thesis in the scientific domain

[state of the art dla aplikacji sieciowych]

Chapter 3

Requirements and tools

[Dlaczego aplikacja webowa?]

- functional and nonfunctional requirements
- use cases (UML diagrams)
- description of tools
- methodology of design and implementation

Chapter 4

External specification

- hardware and software requirements
- installation procedure
- activation procedure
- types of users
- user manual
- system administration
- security issues
- example of usage
- working scenarios (with screenshots or output files)

Figure 4.1: Figure caption (below the figure).

Chapter 5

Internal specification

- concept of the system
- system architecture
- description of data structures (and data bases)
- components, modules, libraries, resume of important classes (if used)
- resume of important algorithms (if used)
- details of implementation of selected parts
- applied design patterns
- UML diagrams

Use special environment for inline code, eg **descriptor** or **descriptor_gaussian**. Longer parts of code put in the figure environment, eg. code in Fig. 5.1. Very long listings–move to an appendix.

```
1  class descriptor_gaussian : virtual public descriptor
2  {
3      protected:
4          /** core of the gaussian fuzzy set */
5          double _mean;
6          /** fuzzyfication of the gaussian fuzzy set */
7          double _stddev;
8
9      public:
10         /** @param mean core of the set
11             @param stddev standard deviation */
12         descriptor_gaussian (double mean, double stddev);
13         descriptor_gaussian (const descriptor_gaussian & w
               );
14         virtual ~descriptor_gaussian();
15         virtual descriptor * clone () const;
16
17         /** The method elaborates membership to the
               gaussian fuzzy set. */
18         virtual double getMembership (double x) const;
19
20 };
```

Figure 5.1: The **descriptor_gaussian** class.

Chapter 6

Verification and validation

- testing paradigm (eg V model)
- test cases, testing scope (full / partial)
- detected and fixed bugs
- results of experiments (optional)

Chapter 7

Conclusions

- achieved results with regard to objectives of the thesis and requirements
- path of further development (eg functional extension ...)
- encountered difficulties and problems

Table 7.1: A caption of a table is **above** it.

	method						
			alg. 3			alg. 4, $\gamma = 2$	
ζ	alg. 1	alg. 2	$\alpha = 1.5$	$\alpha = 2$	$\alpha = 3$	$\beta = 0.1$	$\beta = -0.1$
0	8.3250	1.45305	7.5791	14.8517	20.0028	1.16396	1.1365
5	0.6111	2.27126	6.9952	13.8560	18.6064	1.18659	1.1630
10	11.6126	2.69218	6.2520	12.5202	16.8278	1.23180	1.2045
15	0.5665	2.95046	5.7753	11.4588	15.4837	1.25131	1.2614
20	15.8728	3.07225	5.3071	10.3935	13.8738	1.25307	1.2217
25	0.9791	3.19034	5.4575	9.9533	13.0721	1.27104	1.2640
30	2.0228	3.27474	5.7461	9.7164	12.2637	1.33404	1.3209
35	13.4210	3.36086	6.6735	10.0442	12.0270	1.35385	1.3059
40	13.2226	3.36420	7.7248	10.4495	12.0379	1.34919	1.2768
45	12.8445	3.47436	8.5539	10.8552	12.2773	1.42303	1.4362
50	12.9245	3.58228	9.2702	11.2183	12.3990	1.40922	1.3724

Appendices

Index of abbreviations and symbols

DNA	deoxyribonucleic acid
MVC	model–view–controller
N	cardinality of data set
μ	membership function of a fuzzy set
$\mathbb{E}$	set of edges of a graph
$\mathcal{L}$	Laplace transformation

Listings

(Put long listings in the appendix.)

```
1  partition fcm_possibilistic::doPartition
2                                  (const dataset & ds)
3  {
4      try
5      {
6          if (_nClusters < 1)
7              throw std::string ("unknown␣number␣of␣clusters"
                   );
8          if (_nIterations < 1 and _epsilon < 0)
9              throw std::string ("You␣should␣set␣a␣maximal␣
                   number␣of␣iteration␣or␣minimal␣difference␣--
                   ␣epsilon.");
10         if (_nIterations > 0 and _epsilon > 0)
11             throw std::string ("Both␣number␣of␣iterations␣
                   and␣minimal␣epsilon␣set␣--␣you␣should␣set␣
                   either␣number␣of␣iterations␣or␣minimal␣
                   epsilon.");
12
13         auto mX = ds.getMatrix();
14         std::size_t nAttr = ds.getNumberOfAttributes();
15         std::size_t nX    = ds.getNumberOfData();
16         std::vector<std::vector<double>> mV;
17         mU = std::vector<std::vector<double>> (_nClusters)
```

```
        ;
18      for (auto & u : mU)
19          u = std::vector<double> (nX);
20      randomise(mU);
21      normaliseByColumns(mU);
22      calculateEtas(_nClusters, nX, ds);
23      if (_nIterations > 0)
24      {
25          for (int iter = 0; iter < _nIterations; iter++)
26          {
27              mV = calculateClusterCentres(mU, mX);
28              mU = modifyPartitionMatrix (mV, mX);
29          }
30      }
31      else if (_epsilon > 0)
32      {
33          double frob;
34          do
35          {
36              mV = calculateClusterCentres(mU, mX);
37              auto mUnew = modifyPartitionMatrix (mV, mX);
38
39              frob = Frobenius_norm_of_difference (mU,
                    mUnew);
40              mU = mUnew;
41          } while (frob > _epsilon);
42      }
43      mV = calculateClusterCentres(mU, mX);
44      std::vector<std::vector<double>> mS =
            calculateClusterFuzzification(mU, mV, mX);
45
46      partition part;
47      for (int c = 0; c < _nClusters; c++)
```

```
48          {
49              cluster cl;
50              for (std::size_t a = 0; a < nAttr; a++)
51              {
52                  descriptor_gaussian d (mV[c][a], mS[c][a]);
53                  cl.addDescriptor(d);
54              }
55              part.addCluster(cl);
56          }
57          return part;
58      }
59      catch (my_exception & ex)
60      {
61          throw my_exception (__FILE__, __FUNCTION__,
                __LINE__, ex.what());
62      }
63      catch (std::exception & ex)
64      {
65          throw my_exceptionn (__FILE__, __FUNCTION__,
                __LINE__, ex.what());
66      }
67      catch (std::string & ex)
68      {
69          throw my_exception (__FILE__, __FUNCTION__,
                __LINE__, ex);
70      }
71      catch (...)
72      {
73          throw my_exception (__FILE__, __FUNCTION__,
                __LINE__, "unknown␣expection");
74      }
75  }
```

List of additional files in electronic submission (if applicable)

Additional files uploaded to the system include:

- source code of the application,
- test data,
- a video file showing how software or hardware developed for thesis is used,
- etc.

List of Figures

List of Tables