TRAINEESHIP CERTIFICATE

Name of the trainee:

Lukas Bunat

Name of the receiving organisation/enterprise:

UNIVERSIDAD PONTIFICIA COMILLAS - Telema

Sector of the receiving organisation/enterprise:

Telematics and Compi Sciences

Address of the receiving organisation/enterprise

c/ Alberto Aguilera 25, Madrid, Spain, +34915422800, azanmatti@comillas.edu

website: www.comillas.edu/en/

Start date and end date of the traineeship:
from 2/10/2017 to 22/12/2017 *[day/month/year]*

Traineeship title:

Application of Clustering Methods for Discovering Patterns of Energy Use in Regional Areas for the Residential Sector with Big Data techniques

Detailed programme of the traineeship period including tasks carried out by the trainee:

Lukas worked on the project which finds the best way of managing the current power distribution systems. The work was done at UPC in Madrid, Spain. His activities focused on researching energy consumption based on demand for each kind customer according to his location. These facts let companies pre-assigned the necessary resources in each range of time or season. He created a smart system based on clustering techniques in order to discover consumption patterns. Then finally, at the end, visualized the findings.

Task of Trainee:

Lukas worked under supervision of our head of department and he learnt how to work in international environment. He had worked mostly by himself but he was able to consult and then adjust his progress based on cooperation with others. He worked on the project described above. Due to large amount of information which had to be read and processed, Big Data technologies had to be used. Technologies are based on Spark batching programming.

Knowledge, skills (intellectual and practical) and competences acquired (learning outcomes achieved):

He learnt how to obtain necessary information, need for further work and research. Also, how to approach new professional technologies. As well as, getting used to work in an international environment.

After this given project, he has basic knowledge of clustering algorithms, Big Data architecture, Spark batching processing and noSQL databases in the given field of the project.

Furthermore, he is familiar with Spark technologies, Docker and PySpark.

Last but no least, he knows how to collaborate with other colleagues in a new environment.

Evaluation of the trainee:

Anexo G

ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA

I.C.A.I.

PROYECTOS FIN DE CARRERA

CURSO: 2017/18

Questionnaire: evaluation of the thesis work

Student: Lukas Bunat

Thesis: Application of Clustering Methods for Discovering Patterns of Energy Use in Regional Areas for the Residential Sector with Big Data techniques

Supervisor: David Contreras

Telephone number:

E-mail address: davidcb@comillas.edu

1.- COMPETENCES OF THE STUDENT: INITIATIVE, CREATIVITY, INNOVATION AND AUTONOMY

	A	B	C	D
Competences	Sporadically demonstrated	Some of these competences were demonstrated sometimes	These competences were demonstrated in many situations	The student stands out in all the competences
Mark with X			X	

Describe some situations where the student has shown these attitudes outstandingly. Indicate how the degree of knowledge has evolved over the thesis work.

2.- Quality of results:

Quality of results	The results found are not satisfactory	The results found are good, but are not consistent, reliable or useful.	The results found are good, consistent, and reliable, and could be useful.	The results found are excellent. They could be useful in other studies or applications. They could be used as the base for a publication.
Mark with X			X	

Describe the degree of usefulness of the results of the thesis work: industrial applications, patents, publications, etc.

3.- QUALITY OF THE REPORT

Writing quality	Low quality, with grammatical mistakes	Acceptable, but with grammatical mistakes	Good quality and no grammatical mistakes	Excellent
Mark with X			X	
Understanding	It is difficult to understand the report. There are too many words in cases where a figure, diagram or photograph would worth a thousand words.	It is difficult to understand the report even if figures, diagrams and photographs are used to support the line of reasoning.	It is very easy to understand the report. It uses figures, diagrams and photographs to support the line of reasoning.	It is very easy to understand the report. The quality of the figures and diagrams is excellent.
Mark with X				X
Quality of the figures and diagrams.	Colours or size make difficult the interpretation.	Bad choice of colours or size makes reading more difficult.	Clear and legible. Appropriate amount of information. Colours or size impede the interpretation.	Excellent clarity and legibility. Colours and size increase the clarity.
Mark with X				X
Clarity of the equations	Some equations are missing and notation is not consistent.	There are no equations missing, but notation is not consistent.	There are no equations missing and notation is consistent.	There are no equations missing and notation is consistent and follows the standards.
Mark with X			X	
State of the art	It is mentioned	It is not explained in detail	It is sufficiently developed	It is developed in detail
Mark with X	X			
References	Poor/few	Enough, but not complete or low-quality	Enough in amount and quality (relevant)	There are no references missing and are of good quality
Mark with X		X		

Conclusions	Poor	Sufficient, but could be improved	They really conclude the work clearly	Excellent
Mark with X			X	
Results	Results are described scantly	Results are commented but not in detail	All results are commented in detail	Results are thoroughly presented
Mark with X			X	
Economic study (if applicable)	It has been made up and is incomplete	It is complete but numbers are not reliable	It is complete and numbers are reliable	A thorough study has been made, all details have been considered and numbers are reliable.
Mark with X				

4.- DEGREE OF ACHIEVEMENT OF THE OBJECTIVES

	Minimum requirements have not been achieved	The minimum essential requirements have been achieved	Basic objectives and some complementary ones have been achieved	All objectives have been achieved excellently, even beyond the initial objectives suggested
Mark with X			X	

5.- DEGREE OF FULFILMENT OF THE MILESTONES OF THE PLANNING OF THE WORK

	Milestones and programmed tasks have not generally been achieved	Only final milestones by the end of the study have been achieved	Programmed milestones were achieved over the work time (the work has been done continuously)	All milestones were achieved excellently and work progress has been followed up continuously
Mark with X			X	

Months devoted by the student to the thesis work: 2

6.- DEGREE OF INNOVATION AND TECHNICAL COMPLEXITY OF THE THESIS WORK

	It is a conventional thesis work	It is a conventional thesis work, only some new aspects have been introduced	It is an innovative work due to its originality and complexity	It is a thesis work with high level of research and development and high complexity
Mark with X				X

Describe the techniques, methods, tools used (hardware, software, etc.) and their degree of complexity:

6. 7.- FINAL GRADE SUGGESTED

Grade (from 0 to 10, in a whole number or with 0.5; i.e.: 0 - 0.5 – 1 - 1.5 - … - 9.5 - 10)

Final grade suggested: 8

If corresponds, ¿is distinction suggested? (YES/NO)

General observations:

Date: 22.12.2017

David Contreras

Place: Madrid, Spain **Date:** 22.12.2017

Name of the responsible person at the receiving organisation/enterprise:

Alberto Zanmatti, International Coordinator

Signature: **Stamp:**