



PUCRS



LUT
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English



CONSENT TERM

===

Hi! Welcome to our Survey!

You are being invited to participate in a research developed by Olimar Teixeira Borges (doctoral student), Bárbara Santos Vilela (undergraduate student), Valentina Lenarduzzi (post-doctoral researcher), and Rafael Prikladnicki (professor advisor) entitled “**Artificial Intelligence and Machine Learning in the context of Software Engineering in Startups**”, in partnership with the universities PUCRS (Pontifical Catholic University of Rio Grande do Sul - Brazil) and LUT (Lappeenranta-Lahden Teknillinen Yliopisto LUT - Finland)

Please read the **CONSENT TERM** and, if deemed appropriate, express your consent to participate in this survey before starting, selecting the option “**I agree to participate**,” presented in the next question.

Target Audience: People who work or research in Artificial Intelligence using Machine Learning, with intersection within Software Engineering. That is, people who have already developed or managed any type of Software Engineering project (be it business, research, or even individual), using AI/ML techniques, tools, or algorithms to solve Software Engineering Tasks (how to classify requirements, refactor software, predict software defects, estimate effort, analyze code and other tasks).

*For this survey, consider: **AI** (Artificial Intelligence), **ML** (Machine Learning), and **SE** (Software Engineering).

Thank you for your availability!

Do you agree with the Consent Terms?

I'm over 18 years old, and I agree to participate.

SURVEY - Using Artificial Intelligence/Machine Learning in Software Engineering

Olimar Teixeira Borges^a, Valentina Lenarduzzi^b, Rafael Prikladnicki^a

^aSchool of Technology, PUCRS, Porto Alegre (Brazil)

^bLUT University, Lathi (Finland)

Beginning of the Block: Profile

Profile

A.1: Full name:
(Optional)

A.2: Contact email:
(Optional)

A.3: Gender:

- ☐ Male
 - ☐ Female
 - ☐ I prefer not to say
 - ☐ Other: _____
-

A.4: Age range:

- ☐ Under 18
 - ☐ 18 - 24
 - ☐ 25 - 34
 - ☐ 35 - 44
 - ☐ 45 - 54
 - ☐ 55 - 64
 - ☐ 65 - 74
 - ☐ 75 - 84
 - ☐ 85 or more
-

A.5: Academic Background

(Check how many courses you have. Consider 'incomplete' to be in progress, locked or canceled)

- ☐ Incomplete Graduation
 - ☐ Completed Graduation
 - ☐ Incomplete Specialization
 - ☐ Completed Specialization
 - ☐ Incomplete Master's degree
 - ☐ Completed Master's degree
 - ☐ Incomplete Ph.D. degree
 - ☐ Completed Ph.D. degree
 - ☐ Others _____
-

A.6: What best describes your main area of work nowadays?

- ☐ Data & Applied Science (Example job titles: Applied Scientist, Data Scientist, Data Scientist Lead, Applied Science Mgr, etc.)
 - ☐ Program Management. (Example job titles: Program Manager, Program Manager Lead, PM Manager, etc.)
 - ☐ Research. (Example job titles: Researcher, Lead Researcher, Research Manager, etc.)
 - ☐ Software Engineering. (Example job titles: Software Engineer, SDE, Software Engineering Mgr, etc.)
 - ☐ Other _____
-

A.7: What roles do you play in your team?

- ☐ Project manager
 - ☐ Developer
 - ☐ Software Designer
 - ☐ Product Manager
 - ☐ Systems Analyst
 - ☐ Data Scientist
 - ☐ Other _____
-

A.8: Which software development methodologies used for your team?

- ☐ Extreme Programming (XP)
 - ☐ Rational Unified Process (RUP)
 - ☐ Agile
 - ☐ Others _____
-

A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions?

- ☐ Yes
 - ☐ No
-

Display this question:

If A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

**A.10: Where did you acquire your basic Artificial Intelligence/Machine Learning skills and knowledge?
(Select everything that applies)**

- ☐ Formal education (eg BSc, MSc, Ph.D.)
- ☐ Company training programs
- ☐ At work (for example, creating AI products)
- ☐ Online materials (for example, Coursera, Edx, Udacity, YouTube)
- ☐ Self-taught

Display this question:

If A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

A.11: How much experience do you have with using Artificial Intelligence/Machine Learning-based solutions?

- ☐ I don't have any experience
- ☐ Up to 1 year
- ☐ Up to 2 years
- ☐ More than 2 years

Display this question:

If A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

A.12: How much experience do you have with using Artificial Intelligence/Machine Learning-based solutions TO SOLVE Software Project Tasks?

*(*If you have already used AI/ML techniques, tools, or algorithms, to solve some SE Tasks, such as to classify requirements, refactor software, predict software defects, estimate software effort, analyze code, etc.)*

- ☐ I don't have any experience
- ☐ Up to 1 year
- ☐ Up to 2 years
- ☐ More than 2 years

Display this question:

If A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions TO AUTOMATE any phase of the Software Development Process?

*(*Consider how to "automate" if, after using AI/ML techniques, tools, or algorithms, you have turned any of the Phases of Software Development, which previously needed human intervention, into an automated process, without the need for constant manual intervention.)*

- ☐ Yes
- ☐ No

Beginning of the Block: Automation of the Software Development Process (SWEBOK)

Display this block:

If A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

And A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

Automation of the Software Development Process (SWEBOK)

Display this question:

If A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

And A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

The Phases of the Software Development Process are based on the first 10 SWEBOK Knowledge Areas (KA):

- 1. Software Requirements:** Understands the process, obtaining, analyzing, specifying, and validating requirements.
- 2. Software Design:** Describes the processes for creating the software structure and architecture, showing how to create, analyze, and evaluate the user interface design.
- 3. Software Construction:** Presents tools and technologies for software development.
- 4. Software Testing:** Addresses the phases, tools, techniques, processes, and measures related to tests.
- 5. Software Maintenance:** Comprises processes, techniques, and the main issues related to the maintenance of software development.
- 6. Software Configuration Management:** Presents how to plan and control the software development environment.
- 7. Software Engineering Management:** It presents the processes related to the management of software projects, such as planning, scope definition, promulgation, review and evaluation, closure, and how to measure the progress of the project.
- 8. Software Engineering Process:** It addresses the definition of the process, the software life cycles, how to evaluate and improve the software projects, and the tools to be used in the ES process.
- 9. Models and Methods of Software Engineering:** It presents the types of models and analyzes the models and methods of ES, such as heuristics, formalizations, and prototypes.
- 10. Software Quality:** Introduces processes to manage and maintain the software quality process.

Display this question:

If A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

And A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

B.1: What phases of software development have you or your team automated using Artificial Intelligence/Machine Learning?

	Never	Few Times	Often
1. Software Requirements:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Software Design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Software Construction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Software Testing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Software Maintenance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Software Configuration Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Software Engineering Management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Software Engineering Process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Models and Methods of Software Engineering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Software Quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Display this question:

If A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

And A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

B.2: For each Phase of the Software Development previously selected, briefly describe HOW the automation of the Development Process was carried out:

- ☐ 1. Software Requirements _____
- ☐ 2. Software Design _____
- ☐ 3. Software Construction _____
- ☐ 4. Software Testing _____
- ☐ 5. Software Maintenance _____
- ☐ 6. Software Configuration Management _____
- ☐ 7. Software Engineering Management _____
- ☐ 8. Software Engineering Process _____
- ☐ 9. Models and Methods of Software Engineering _____
- ☐ 10. Software Quality _____
- ☐ Other: _____

End of Block: Automation of the Software Development Process (SWEBOK)

Beginning of the Block: Techniques and Tools

Display this block:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

Or A.12: How much experience do you have with using Artificial Intelligence/Machine Learning-based s... != I don't have any experience

And A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

Techniques and Tools

Display this question:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

Or A.12: How much experience do you have with using Artificial Intelligence/Machine Learning-based s... != I don't have any experience

And A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

C.1: What ML TOOLS do you or your team already used TO AUTOMATE SE PROCESSES? And Which Machine Learning TOOLS have you or your team already used TO SOLVE any Software Engineering TASK?

	I never used	I used it TO AUTOMATE SE PROCESSES	I used it TO SOLVE SE TASKS
WEKA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MATLAB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scikit-learn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Python	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Java based	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
R Language	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
libsvm library	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mulan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RapidMiner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RNNLM Toolkit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TensorFlow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Display this question:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

Or A.12: How much experience do you have with using Artificial Intelligence/Machine Learning-based s... != I don't have any experience

And A.9: Have you already worked with Artificial Intelligence/Machine Learning-based solutions? = Yes

C.2: What ML TECHNIQUES have you or your team already used TO AUTOMATE SE PROCESSES? And Which Machine Learning TECHNIQUES have you or your team already used TO SOLVE any Software Engineering TASK?

	I never used	I used it TO AUTOMATE SE PROCESSES	I used it TO SOLVE SE TASKS
Naïve Bayes (NB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Support Vector Machine (SVM)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Random Forest (RF)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K-Nearest Neighbor (KNN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C4.5 (J48)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decision Tree (DT)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logistic Regression (LR)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bayes Network (BN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Radial Basis Function Network (RBF)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regression Tree (CART)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bagging (Ba)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AdaBoost (AB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boosting (Bo)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
K- Means (KM)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Support Vector Regression (SVR)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OneR (OR)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Artificial Neural Network (ANN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Multi Layer Perceptron (MLP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convolutional Neural Network (CNN)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End of Block: Techniques and Tools

Beginning of the Block: Product, Feature or Service

Display this block:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

Product, Feature or Service

Display this question:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

D.1: What kind of product, resource, or service have you or your team ever used Artificial Intelligence/Machine Learning to automate the development phases? How was this AUTOMATION of Development Phases done?

End of Block: Product, Feature or Service

Beginning of the Block: Priority

Priority

The Phases of the Software Development Process are based on the first 10 SWEBOK Knowledge Areas (KA):

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 - 10. Software Quality:** Introduces processes to manage and maintain the software quality process.
-

E.1: Which phases of software development WOULD YOU LIKE to automate with Artificial Intelligence/Machine Learning to facilitate the development process for you or your time?

(Drag and drop the phases below to form their order of priority. Indicate in order of priority from 1 to 10.)

- _____ 1. Software Requirements
- _____ 2. Software Design
- _____ 3. Software Construction
- _____ 4. Software Testing
- _____ 5. Software Maintenance
- _____ 6. Software Configuration Management
- _____ 7. Software Engineering Management
- _____ 8. Software Engineering Process
- _____ 9. Models and Methods of Software Engineering
- _____ 10. Software Quality

End of Block: Priority

Beginning of the Block: Challenges

Display this block:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

Challenges

Display this question:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

F.1: What CHALLENGES did you and your team face during the AUTOMATION of Development Phases?

- ☐ 1. **Software Requirements** _____
- ☐ 2. **Software Design** _____
- ☐ 3. **Software Construction** _____
- ☐ 4. **Software Testing** _____
- ☐ 5. **Software Maintenance.** _____
- ☐ 6. **Software Configuration Management** _____
- ☐ 7. **Software Engineering Management** _____
- ☐ 8. **Software Engineering Process** _____
- ☐ 9. **Models and Methods of Software Engineering** _____
- ☐ 10. **Software Quality** _____
- ☐ **Other:** _____

Display this question:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

F.2: What were the SOLUTIONS found for these challenges?

- ☐ 1. **Software Requirements** _____
- ☐ 2. **Software Design** _____
- ☐ 3. **Software Construction** _____
- ☐ 4. **Software Testing** _____
- ☐ 5. **Software Maintenance.** _____
- ☐ 6. **Software Configuration Management** _____
- ☐ 7. **Software Engineering Management** _____
- ☐ 8. **Software Engineering Process** _____
- ☐ 9. **Models and Methods of Software Engineering** _____
- ☐ 10. **Software Quality** _____
- ☐ **Other:** _____

Display this question:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = No

F.3: What CHALLENGES did you and your team face during the Development Phases TO SOLVE Software Engineering tasks?

- ☐ 1. Software Requirements _____
- ☐ 2. Software Design _____
- ☐ 3. Software Construction _____
- ☐ 4. Software Testing _____
- ☐ 5. Software Maintenance. _____
- ☐ 6. Software Configuration Management _____
- ☐ 7. Software Engineering Management _____
- ☐ 8. Software Engineering Process _____
- ☐ 9. Models and Methods of Software Engineering _____
- ☐ 10. Software Quality _____
- ☐ Other: _____

Display this question:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = No

F.4: What were the SOLUTIONS found for these challenges?

- ☐ 1. Software Requirements _____
- ☐ 2. Software Design _____
- ☐ 3. Software Construction _____
- ☐ 4. Software Testing _____
- ☐ 5. Software Maintenance. _____
- ☐ 6. Software Configuration Management _____
- ☐ 7. Software Engineering Management _____
- ☐ 8. Software Engineering Process _____
- ☐ 9. Models and Methods of Software Engineering _____
- ☐ 10. Software Quality _____
- ☐ Other: _____

Display this question:

If A.13: Have you or your team already used Artificial Intelligence/Machine Learning-based solutions... = Yes

F.5: From your experience regarding the AUTOMATION of the Development Phases, what do you consider to be EXTREMELY IMPORTANT to automate the Software Development Process with Artificial Intelligence/Machine Learning?

End of Block: Challenges

Beginning of the Block: Closure

Closure

G.1: What would be the "DREAM TOOL" that would help you or your team automate software development phases using Artificial Intelligence/Machine Learning resources?

G.2: If you have any other comments about software engineering, Artificial Intelligence/Machine Learning, or this research in general, please describe it here.

G.3: We are still improving this research and we want to make sure it is useful and clear. If any questions are unclear to you or if there are any changes you want to make, share your comments here.

End of Block: Closure
