Recognizing Skills in Data Science

Ernestina Menasalvas
BDVA Skills Task Force and the BDVe Project

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Introduction

We will present ongoing work which is the focus of a task of the BDVe project and being conducted in collaboration with the BDVA Skills Task Force.

Our goal is to provide a framework for the recognition of skills in data science which addresses the principal needs of all of the stakeholders.

We will start with some background on the BDVA and its Skills Task force.

Then we will briefly present an overview of the work related to skills in the BDVe project before focusing on the data science skills recognition program.
The mission of the BDVA is to develop the Innovation Ecosystem that will enable the data and AI-driven digital transformation in Europe delivering maximum economic and societal benefit, and, achieving and sustaining Europe’s leadership on Big Data Value creation and Artificial Intelligence.
BDVA Governance

The BDVA Governance structure includes a Contractual Agreement/MoU between Commission and Association, a Partnership Board, and Grand Agreements between Commission and projects Beneficiaries. The "Big Data Value" Association includes a President & Vice-Presidents, Board of Directors, Secretary General, and Programme TF/WG, PR TF/WG, Other TF. The Data Value PPP involves a Stakeholder Platform, Technology Committee, Steering Committee, User/Advisory Board, Project A, Project B, Project C.
Task forces

BDVA operational structure: Task Forces and Subgroups

TF1: Programme
TF2: Impact
TF3: Community
TF4: Communication
TF5: Policy & Societal
TF6: Technical
TF7: Application
TF8: Business
TF9: Skills and education

Big Data Value Multiple Dimensions of Big Data
BDVe

- Effectively combining in a consortium Large Enterprises, SMEs and Academia the Big Data Value eCosystem Project (BDVe) provides coordination and support for the current and future H2020 projects within the Big Data Value Public-Private Partnership.
  - WP4: SKILLS
The Skills Challenge

- Develop Capability
- Alignment of Supply & Demand
- Promote Mobility
Skills: People and Talent

T4.1 Centres of Excellence

T4.2 Education Hub

T4.3 Skills Recognition

T4.4 Mobility Framework
BDVe WP4 Highlights

Best Practice Framework & Supporting a new CoE in Sofia

http://bigdataprofessional.eu

170+ Courses in our EduHub
BDVe WP4 Highlights

Skills Badges Ready to Pilot

Internship Portal Ready to Launch
A Framework for Recognizing Skills for Big Data Professionals

- The BDVe, in collaboration with the BDVA, is developing a system for awarding badges for skills in data science that addresses the needs of all stakeholders.

Outline:
- An analysis of the needs of stakeholders
- A comparison of different tools to recognize skills
- Our proposal based upon Open Badges
- How will this work contribute to SMEs?
Stakeholder’s Needs – Data Scientists

- Credentials which are:
  - widely recognized
  - easily verified online
- A simple way to digitally display their skills online and in social networks.
- Mechanisms to recognize skills acquired through informal and non-formal training.
Stakeholder’s Needs – Employers of Data Scientists

- Candidates with credentials which are both granular and individual
- Tools to verify the authenticity of credentials
- A framework which simplifies the comparison of skills throughout the EU
- Influence in the design of the training data scientists receive
- A scheme which can quickly adapt to changes in the data science ecosystem.
Stakeholder’s Needs – Educators Who Train Data Scientists

- Publicity for their programs and the value of a branded recognition of their programs
- Recognitions for the partial completion of their programs (for students who want to work while studying)
- A mechanism to clarify the changing needs of industry and recommendations regarding how to adapt to those needs.
## Tools Available for Skills Recognition

<table>
<thead>
<tr>
<th>Accreditation</th>
<th>University/Academic Degrees</th>
<th>Certificates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="EQANIE" /></td>
<td><img src="image2" alt="University of Oxford" /></td>
<td><img src="image3" alt="CCNA" /></td>
</tr>
<tr>
<td><img src="image4" alt="Labels" /></td>
<td><img src="image5" alt="Badges" /></td>
<td></td>
</tr>
</tbody>
</table>
## Comparison of Tools for Skills Recognition

<table>
<thead>
<tr>
<th>Desired Property</th>
<th>University degree</th>
<th>Certificate</th>
<th>Label</th>
<th>Badge</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 - transparent, accessible and allow the easy comparison of students’ skills throughout the EU (2015-JR-SFECT, NSAE, Europass, EQF)</td>
<td>✔️</td>
<td>✔️?</td>
<td>✔️</td>
<td></td>
</tr>
<tr>
<td>P2- include an assurance of quality (2015-JR-SFECT)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️?</td>
</tr>
<tr>
<td>P3 - provide tools for their verification and validation (2015-JR-SFECT)</td>
<td>✔️?</td>
<td>✔️?</td>
<td>✔️?</td>
<td>✔️</td>
</tr>
<tr>
<td>P4 - include skills acquired through traditional, digital, online, and open learning, as well as the validation of informal and non-formal learning (2015-JR-SFECT, NSAE, Europass, EQF)</td>
<td>✔️?</td>
<td>✔️</td>
<td>✔️?</td>
<td>✔️</td>
</tr>
<tr>
<td>P5 - compatible with the EQF (2015-JR-SFECT, EQF, e-QF)</td>
<td>✔️?</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>P6 - influence the relevance of the skills being acquired (NSAE)</td>
<td>✔️?</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>P7 - allow the digital analysis of both the demand for and the availability of skills (NSAE, Europass)</td>
<td>✔️?</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>P8 - allow their use online: in platforms like the Europass, social media and on mobile devices (Europass)</td>
<td>✔️?</td>
<td>✔️?</td>
<td>✔️?</td>
<td>✔️</td>
</tr>
<tr>
<td>P9 - focus on learning outcomes and not on traditional measures such as hours of study (EQF)</td>
<td>✔️?</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>P10 - require renewal after a set period of time (DS)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>P11 - provide a framework which can quickly adapt to changes in skill requirement (DS)</td>
<td>✔️</td>
<td>✔️?</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>P12 - measure skills on a highly granular and an individual by individual basis (DS)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

✔️ = Yes, easily accomplished  
✔️? = Not usually but it could be accomplished
What is a Badge?

Badges are images that can be included in curriculum, uploaded to platforms like LinkedIn, and shared in social media. They also contain meta-data to allow:

- The online verification of their authenticity and ownership
- Links to information regarding requirements to receive the badge
- Details regarding the organization who issued the badge
- Access to evidence of the acquisition of skills
- When the badge was issued and when it expires

Recipient
Badge Name
Description
Criteria
Issuer
Evidence
Date Issued
Expires
Standards
...
The Proposal

Verifiable

Useful Metadata
The Logistics

Applies to issue Badge

Teaches Skills

Demonstrates Skills

Awards Badge

Displays Badge
Design of the Badge Recognition System

Data Science Analytics Badge v0.1 (Edison EDSF R2)

Data Science Analytics Badge v0.2

Data Science Analytics Badge v1.0

Academic & Industrial Survey

Feedback BDVA Skills TF

EBDV, ICT & BDVe FtF

Pilot

Revise

Analyse Results

Feedback BDVA Skills TF

Feedback BDVA Skills TF

Revise

Revise

Revise

Revise

Revise

Rollout

Academic & Student Survey

Feedback BDVA Skills TF
Coming soon!!

A pilot of the Data Science Analytics Badge
**Badge 1: Data Science Analytics**

<table>
<thead>
<tr>
<th>Required Skills: Data Science Analytics (version 1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSA.1. Identify existing requirements to choose and execute the most appropriate data discovery techniques to solve a problem depending on the nature of the data and the goals to be achieved.</td>
</tr>
<tr>
<td>DSA.2. Select the most appropriate techniques to understand and prepare data prior to modeling to deliver insights.</td>
</tr>
<tr>
<td>DSA.3. Assess, adapt, and combine data sources to improve analytics.</td>
</tr>
<tr>
<td>DSA.4. Use the most appropriate metrics to evaluate and validate results, proposing new metrics for new applications if required.</td>
</tr>
<tr>
<td>DSA.5. Design and evaluate analysis tools to discover new relations in order to improve decision-making.</td>
</tr>
<tr>
<td>DSA.6. Use visualization techniques to improve the presentation of the results of a data science project in any of its phases.</td>
</tr>
</tbody>
</table>
DS Analytics Badge Requirements (#1)

Edison EDSF (v0.1):

<table>
<thead>
<tr>
<th>Basic</th>
<th>Intermediate</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose and execute existing data analytics and predictive analytics tools.</td>
<td>Identify existing requirements and develop predictive analysis tools.</td>
<td>Design and evaluate predictive analysis tools to discover new relations.</td>
</tr>
</tbody>
</table>

Revised (v0.2):

Identify existing requirements to choose and execute the most appropriate data discovery technique to solve a problem depending on the nature of the data and the goals to be achieved.
DS Analytics Badge Requirements (#2)

**Edison EDSF (v0.1):**

<table>
<thead>
<tr>
<th>Basic</th>
<th>Intermediate</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify existing requirements and develop predictive analysis tools.</td>
<td>Select statistical techniques and model available data to deliver insights.</td>
<td>Assess and optimize organization processes using statistical techniques.</td>
</tr>
</tbody>
</table>

**Revised (v0.2):**

Select the most appropriate statistical techniques to understand and prepare data prior to modeling to deliver insights
DS Analytics Badge Requirements (#3)

Edison EDSF (v0.1):

<table>
<thead>
<tr>
<th>Basic</th>
<th>Intermediate</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and evaluate predictive analysis tools to discover new relations.</td>
<td>Analyze available data sources and develop tool that work with complex datasets.</td>
<td>Assess, adapt, and combine data sources to improve analytics.</td>
</tr>
</tbody>
</table>

Revised (v0.2):

Assess, adapt, and combine data sources to improve analytics.
DS Analytics Badge Requirements (#4)

Edison EDSF (v0.1):

<table>
<thead>
<tr>
<th>Basic</th>
<th>Intermediate</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name and use basic performance assessment metrics and tools.</td>
<td>Use multiple performance and accuracy metrics, select and use most appropriate for specific type of data analytics.</td>
<td>Evaluate and recommend the most appropriate metrics, propose new for new applications.</td>
</tr>
</tbody>
</table>

Revised (v0.2):

Use the most appropriate metrics to evaluate and validate results, proposing new metrics for new applications if required.
DS Analytics Badge Requirements (#5)

Edison EDSF (v0.1):

<table>
<thead>
<tr>
<th>Basic</th>
<th>Intermediate</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define data elements necessary to develop analytics.</td>
<td>Develop specialized analytics to enable decision-making.</td>
<td>Design specialized analytics to improve decision-making.</td>
</tr>
</tbody>
</table>

Revised (v0.2):

Design and evaluate analysis tools to discover new relations in order to improve decision-making.
DS Analytics Badge Requirements (#6)

Edison EDSF (v0.1):

<table>
<thead>
<tr>
<th>Basic</th>
<th>Intermediate</th>
<th>Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose and execute standard visualization.</td>
<td>Build visualizations for complex and variable data.</td>
<td>Create visualizations to influence executive decisions.</td>
</tr>
</tbody>
</table>

Revised (v0.2):

Use visualization techniques to improve the presentation of the results of a data science project in any of its phases.
How will this work contribute to SMEs?

▪ Simplify the evaluation of a job candidate’s data science skills
  o Allow the comparison of candidates with different training
  o Provide access to evidence of the acquisition of data science skills
  o Facilitate the verification of credentials

▪ Using the badges of your employees as a competitive value

▪ Opportunity for your employees to be recognized for their professional work

▪ By contributing to the design of the requirements and types for the badges, you are influencing the training of data scientists

▪ Future work will focus on online training and informal non-formal training.
Feedback?

Contacts:
- Ernestina Menasalvas (ernestina.menasalvas@upm.es)
- Nik Swoboda (nswoboda@fi.upm.es)
- Ana M. Moreno (ammoreno@fi.upm.es)
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THANKS!!!

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