

## ***Interactive comment on “INSPIRE standards as framework for artificial intelligence applications: a landslides example” by Gioachino Roberti et al.***

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Received and published: 22 June 2020

### **1 Introduction**

Reading this manuscript was interesting and stimulating. The article deals with the problem of landslide susceptibility mapping by combining different aspects, ranging from (i) the definition of a landslides classification compliant with the INSPIRE Directive, (ii) the definition of a multi-hierarchical model for the same classification, (iii) the definition of an INSPIRE scheme for landslide susceptibility and (iv) the definition of an expert-based method for the generation of maps of susceptibility to specific types of landslides in areas where inventories are scarce. In this sense the paper is adequate to the journal also because it presents innovative concepts which are adequate to in-

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ternational standards. Despite this I think that interventions are needed to improve the paper and make it suitable to be published.

### **2 General comments**

The manuscript makes extensive use of the term artificial intelligence (also in the title). However, the type of approach used is not the classical application of artificial intelligence expected from the literature. I think it is important to clarify why this terminology is used (using the literature) or alternatively to modify the title and the text focusing more on ontology and taxonomy. In the latter case some of the titles used for the different sections of the manuscript should be changed.

In the Method section, I think that there is a need of an introductory sub-sections which briefly introduce the flowchart of the method, even using a figure. I suggest something like: (I) defining taxonomies, (ii) defining expert-based rules, (iii) performing matching, (iv) deriving the susceptibility map. As a consequence of the flow-chart introduction the subsequent sub-sections could use a title which is compliant with the flowchart content.

Sub-section 3.1.1 describe the creation of the NH classification code list for landslides. It was used for defining the expert-based rules. I wonder if this sub-section should be moved in the method section. Moreover it could be helpful to describe how the flat representation of your classification differs from the classification of Hungr et al. (2014)

The method used for building the susceptibility map is based on the definition of the rules and setting of the matching scores. I wonder if these scores can have a huge impact on the final calculation of the map. I think that a discussion about how the scores are defined and which is the effect of changing those values is needed. Looking at the matching score table it seems that unmatched means -10. Is this something that should be added in the text?

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The set of rules used for defining the expert-based model are important and should be visible. Maybe I'm wrong but I can't find a table or a web address where those rules can be observed. I think that for a reader it could be very helpful to have access to those set of rules.

In the conclusions you stated that in this study you present some landslide susceptibility maps. I would rather say that you present a method for building a landslide susceptibility map using taxonomy and predictors/covariates and that this method is useful where accurate landslides inventories are not available.

About figures and tables: figure 5 is not clear. I would transform it to a table and I would let the user to go and see it in the website putting a link in the caption.

### 3 Specific comments

Row 45: I would remove the reference to jpeg or wav.

Row 50: I think that the concept of entities and relationships should be defined a priori or some literature should be cited.

Rows 52 -54: This sentence is not immediately clear. An example could help the reader.

Row 81: In my opinion the approach is based on the domain-expert reasoning, since rules are defined a priori. Then it mimics these rules.

At rows 104-105 the definitions of the model is too cryptic. I would add some examples to make clear to the reader that, if I understand correctly, a model is a set of rules defined a priori by the expert and based on the properties of the entities defined in the taxonomy.

Row 110: semantic triple format and semantic network. Please cite a reference or

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define them.

Row 111: "revered" or "referred" ?

Rows 135-136: I would use "channels" and "steep channels" in place of "streams"

Row 160: About the stream line vector layer. I suppose that only the segments in in the mountain valleys were used. But what about the starting point of these segments? This is relevant since debris flows can be triggered also in the upper part of the watersheds where channels may not have been delineated. You can discuss this point for completeness.

Row 167: is r.avaflow suitable also for slides in rock?

Rows 224-226: please use an example to describe what you have done to align the data to INSPIRE standards and explain why the same was not done for the other datasets (lakes, watersheds, etc).

Table 2: please explain how you have used the IFFI database in your model. I suppose it was used for helping to define the expert-based rules.

Table 3: how the Watersheds, Railroad and Road layers have been used in the model?

Rows 231-234: what about the slope map? Was the map expressed in terms of classes of slope and not in degrees or percentage?

Row 245: 99,9th percentile of the slope units susceptibility values. I suppose. Please specify it.

Row 275: please remove brackets

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-134>, 2020.

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