Moderní trendy v analýzách a mapování kriminality
+Geoinformační technologie v sociální geografii

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Lessons plan for spring 2019

- 3 sessions dealing with:
  - Scientific writing principles – focus on state-of-the-art
  - **Predictive modelling principles**
  - **Crime mapping and modelling (general principles)**
  - Practical exercises
  - Team work
  - English
  - Resulting in EN (journal) article (?)
- **April 12th, April 26 th (??) – negotiable, let me know ASAP.**

Ice breaking session

- **You know who I am.**

- **Who are you?**
  - Briefly describe your research topic and future plans.

Scientific writing

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- To enable **beginning researchers**/writers to have the well-founded confidence to **submit their scientific articles** to impact factor **journals** and **complete dissertations** that will pass first time.

Publication strategy in geography

- „scientometry" – all around Europe.

- Even for PGS.

- Connected with – accreditation and department future.

- Why is this relevant for Ph.D. students??:

- Dissertation thesis – monograph x article series (+ intro + conclusion).

- Money talks – Specific research, category A for IF and Scopus publications (20 – 45 K).

How to ...?

- **Quality vs. quantity**
- **No points – conference proceedings (work in progress, discuss the preliminary results), journal (CZ + EU).**
- **Minimum – SCOPUS journals (AIMT, Annals of GIS, ...)**
- **WoS – journals with IF**
- **Geography (67 journals indexed on WoS).**
- **Multidisciplinary research.**

Research idea????

Is it novel/original? ——→ In a big or small way?

Check Literature/Discuss with colleagues/Peers

Reference data bases
(Web of Science/Science Direct/PubMed
Google Scholar/Infoseek/Journals/etc)

Can the "research" be carried out by you?

Nature of research

↓

Laboratory based: Literature/survey based

If something's worth doing – its worth doing properly.

Can the "research" be carried out by <u>you</u> at <u>your</u> institute?

What are the requirements:
i) Scientific expertise
ii) Available facilities /resources
   (equipped laboratory + computing)
iii) Time frame (make a GANNT chart)
iv) Group project/collaborations through networks
v) Multi-disciplinary teams
vi) Collaborative approach
vii) Management/end goals
viii) Financing – increasingly the driving force.

Key Elements of Good Scientific Writing (Kathleen Fahy)

– **Have an argument:** (hypothesis, thesis)

– Use evidence to support your argument

– Achieve **clarity** & **brevity** with:

- careful and consistent **word choice**

- short sentences with **subject first**

- Clear and logical **structure**, flow

- Coherence and avoidance of extraneous ideas or data.

Word Choices

- **Accuracy**
  - Define your key terms
  - Choose precise words and **use the same word consistently** each time
- **Brevity**
  - Use the fewest words possible
- **Clarity**
  - Use simple words so that an educated reader can understand you

Accuracy in Word Choices

Word	Definition	Example
Affect (noun)	To act upon or to influence	**The environment negatively *affected* the wellbeing**
Effect (verb)	The result of a cause	**Failure to progress is an effect of an epidural**
Practise (verb)	To do repeatedly in order to gain a skill	The *practise* of midwifery
Practice (noun)	The exercise of a profession	Midwifery *practice*
Its (possessive pronoun)	Its, like hers and his, does not have an apostrophe	Nursing has *its* problems
It's (contraction)	It's = it is	*It's* a lovely day today

Simplicity in Word Choices

Poor Word Choices	Better Word Choices
Utilised	Used
Acquired	Got
Ascertained	Made sure
Subsequent	Next
Voluminous	Large, full, big
Remainder	Rest

Scientific Sentences

A sentence is a group of words about a single idea, which contains a least one subject and at least one verb. **SVO**MPT (word classes).

Scientific sentences are short. The subject of the sentence comes first.

Write Short Sentences

Poor Sentence

When <u>tobacco smoke</u> is inhaled it takes 10-20 seconds for nicotine to be delivered to the central nervous system via the arterial circulation.

When <u>tobacco smoke</u> (not the main subject) is inhaled it takes 10-20 seconds for nicotine to *be delivered* (passive verb) to the central nervous system via the arterial circulation.

Improved Shorter Sentence

<u>Nicotine</u> (main subject) takes 10—20 seconds to *reach* (active verb, simple language) the brain after inhalation.

18

Use Active (not passive) Voice

- **In the active voice the subject names the actor**

Example: Passive

- **Participants under aged 14, who did not get parental consent, were not recruited.**

Improved: Active

- *I decided not to recruit participants under age 14 unless they had parental consent.*

19

Characteristics of Good Paragraphs

Paragraph begins with a topic sentence (i.e. the main idea) and the paragraph has:

- **Unity:** Each sentence is on the topic of the paragraph.

- **Coherence:** The relationship between the sentences is clear and logical.

- **Development:** The main idea of the paragraph is well supported with specific evidence, examples and details.

- **Length:** Paragraphs should be a minimum of 3 sentences

20

What is wrong with this paragraph?

Women who have an episiotomy more frequently report painful intercourse and marital problems six months after birth. Compared to women who had a 1st or 2nd degree tear, episiotomy is associated with higher rates of perineal trauma in subsequent births. Episiotomy is associated with long-term morbidity. Urinary incontinence is preventable.

Problems:

- Topic sentence is 2nd last
- Last sentence is not related to the topic of the paragraph

**Episiotomy is associated with long-term morbidity.
Compared to women who had a 1st or 2nd degree tear,
episiotomy is associated with higher rates of perineal
trauma in subsequent births. Women who had an
episiotomy were more likely to report painful intercourse
and ongoing marital problems six months after birth.**

Better because:

- Topic sentence first and gives overview
- Supporting sentences give detail and support
- All sentences relate to the topic sentence

Generic Structure of Scientific Paper: AIMRDC

- **Abstract**
- **Introduction**
- **Methods**

- **Results**
- **Discussion**
- **Conclusion**

Title and Keywords

References

1. ICMJE (2013) Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. Available at: www.icmje.org Accessed September 8th, 2013.
2. Cargill, M. O'Connor, P. (2009) Writing Scientific Research Articles: Strategy and Steps. Wiley-Blackburn. West Sussex, UK

23

- Titles contain key words.
- Some are more important than others.
- Place key words near the start of the title – makes it easier for reader to determine what paper is about.
- Insert searchable keywords in your title.
- This makes it easier for your work to be found using web-based engine.

Compare – word search

- Interim Technical Report on progress from the ADAPPT project.

- Optimising use of Pesticidal Plants against cattle ticks and maize pests in Africa: ADAPPT Project interim report.

Compare – different titles (journal specific)

- Fat Rats: What Makes Them Eat?

– *New Scientist.*

- The role of Luteinising Hormone to Obesity in the Zucker Rat

– *Journal of Neuroendocrinology*

- Rats hold the key to a gorgeous body.

– *The Daily Mail.*

- opportunity to add words used by indexing and abstracting services.

- They are often but not exclusively additional to those in the title.

- Helps others find your work and cite it.

- **All research quality now determined by citation indices**.

- **How are the citations measured?**

Research Abstracts

- **Background (context)**
- **Purpose (aim or question)**
- **Methods (participants, setting, data collection and analysis)**
- **Results (main findings, statistical significance, effect size)**
- **Discussion/Conclusion (clinical significance, recommendations, limitations)**

  - **Abstract must accurately reflect the content of the article**

Elements of Effective Introductions to Research Articles

Write in a way that takes the reader from general to specific, from the known to the unknown.

1. Problem and broad context for present study
2. What is already known
3. Need for present study made clear
4. Purpose/Aim or Question for present study
5. Define key terms
6. Optional justification for the present study

   !Cite only directly relevant research. Do not report data or results from present study!

Methods Section of Research Paper

- **Purpose: to demonstrate that the methods were scientifically rigorous and thus give confidence that the results of the study are credible.**

- **In experimental studies – call for replicability or reproducibility (?).**

Statistical Methods

- Describe in enough detail for reader to be able judge credibility
- **Reference** credible sources for **methods** of collection and analysis
- Define statistical **terms**, abbreviations, and most symbols
- Specify the **statistical software package(s**) and versions used
- When possible, quantify findings and present appropriate indicators of measurement error (e.g. confidence intervals)

30

- **Only report results relevant to the hypothesis/question in your Introduction**

- **GENERIC for all journals**

- **Individual – journal dependat**

- **Data are facts (numbers); they cannot stand alone.**

- **Most data belong in figures, graphs and tables.**

- **Statistics belong with data and therefore should (mostly) be in the figures, graphs and tables.**

- **Present data after stating the results they support.**

- **Results are the meaning of the data; they must be stated**

31

Results (Generic)

- **Emphasize only the most important results in text**
- **Put supplementary materials in an appendix (online)**
- **Give numeric results, not just derivatives (e.g. parentages)**
- **Specify how derivatives were calculated, and their statistical significance**
- **Restrict tables and figures to those needed to explain the argument**
- **Use graphs as an alternative to tables; do not duplicate data.**

Discussion/Conclusion

- **Purpose: "To emphasise the new and important aspects of the study and the conclusions that follow from them in the context of the totality of the best available evidence".**

- **Briefly summarise the main findings .**

- **Then explore possible explanations.**

- **Then compare and contrast your results with results from relevant studies.**

Conclusion

- **Link the conclusions to the aim/s of your study.**

- **Make recommendations (research, practice, theory)**

- Ensure that the **formatting** of the citations in the text and reference list conform with the style of the journal your article will be sent to.

- This really bugs editors – get it right!

- Laziness here could tempt a referee to assume laziness elsewhere in carrying out the work or even collating results.

- Every part of your written work gives an impression of your overall scientific quality.

- **Quote your colleagues (Citation Index – H) – if relevant!**

Non native speakers specifics

- **Direct English writing vs translation**
- **Carefully consider the quality!**
- **Proofreading:**
  - Grammar and overall legibility
  - Terminology (content specific)
  - Structure (see all above section)

- **Sloppy English vs English style**
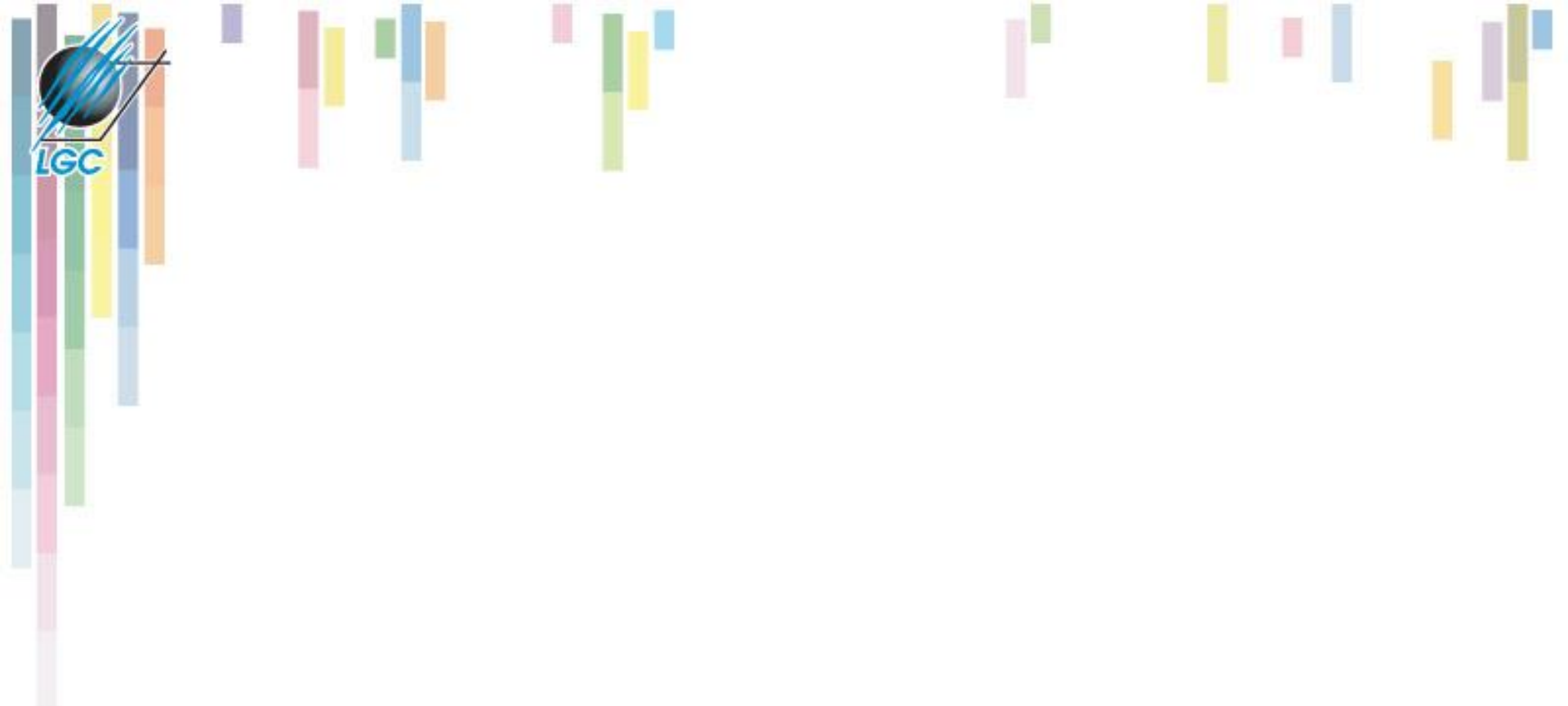
HOW TO SUBMITT?
PRACTICAL PROBLEMS

Pauline McGuirk   University of Wollongong, Australia

Other Titles in:

Cultural Geography | Philosophy & Theory of Geography

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   1.1 Aims & Scope
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   1.3 Writing your paper
2. Editorial policies
   2.1 Peer review policy
   2.2 Authorship
   2.3 Acknowledgements
   2.4 Funding
   2.5 Declaration of conflicting interests
   2.6 Research Data

Progress in Human Geography

Plagiarism and tools to avoid it

- **Check the CrossCheck** ☺

landslides are likely to occur in similar conditions of the past (Varnes, 1984). Typically, a range of predictors (i.e., independent variables) is used to represent landslide preparatory conditions (van Westen et al., 2008). The exact relationship of the predictors to the response (i.e., landslide presence/absence) is not always well known a priori. In most cases, the predictors are proxies for conditions and processes that are difficult to measure across large regions (Pachauri and Pant, 1992; Guzzetti et al., 1999; Goetz et al., 2011). The susceptibility model output is a prediction surface or map that spatially represents the distribution of predicted values, usually probabilities distributed across grid cells.

The freedom of choice to decide which modeling method is most suitable for a particular application is challenging. Numerous comparisons of susceptibility modeling methods have been conducted; yet no single best method has been identified (Brenning, 2005; Yesilnacar and Topal, 2005; Lee et al., 2007; Yilmaz, 2009, 2010; Yalcin et al., 2011; Goetz et al., 2011; Pradhan, 2013). The search for the optimal susceptibility modeling method is a complicated one and should not only consider model accuracy. Robustness to sampling variation and adequacy to describe processes associated with landslides are also crucial model properties (Frattini et al., 2010).

The simplest approach to select an optimal model for prediction is to compare the error rates estimated from cross-validation, where the modeling method with the lowest error estimate is determined as the best one to use. This assessment on the prediction performance is also viewed as essential for a model to have any practical or scientific significance (Chung and Fabbri, 2003; Guzzetti et al., 2006). There are a variety of measures to assess the

techniques can be challenging. A standardized approach for comparing the relative variable importance of different modeling statistical and machine learning techniques for geospatial problems was demonstrated by Brenning et al. (2012b). They assessed variable importance using internal estimates of changes in error rates by randomly permuting predictors in out-of-bag samples (Breiman, 2001; Strobl et al., 2007).

There are many criteria that can be considered for model selection in the context of landslide susceptibility (Brenning, 2012a). This study focuses on one particular aspect, which is the predictive performance. Therefore, a rigorous assessment of prediction performance is performed on various statistical and machine learning techniques in an attempt to determine the 'best' predictive model. The modeling techniques include logistic regression (GLM), generalized additive models (GAM), weights of evidence (WOE), the support vector machine (SVM), random forest classification (RF), and bootstrap aggregated classification trees (bundling) with penalized discriminant analysis (BPLDA). The importance of predictor variables in each model is also analyzed to demonstrate how a standard measure of variable importance can be applied to communicate and compare model behavior, even when a model is considered 'black box'. The main objective of this paper is to demonstrate an approach to make a rigorous comparison of landslide susceptibility models for the purpose of spatial prediction.

2. Materials and methods

2.1 Study area

Originality report and similarity index

ORIGINALITY REPORT

25% SIMILARITY INDEX

12% INTERNET SOURCES

23% PUBLICATIONS

1% STUDENT PAPERS

PRIMARY SOURCES

1. "Researchers' Work from University of Jena Focuses on Machine Learning (Evaluating machine learning a", Science Letter, July 24 2015 Issue
Publication — 5%

2. Alexander Brenning, Shilei Long, Paul Fieguth. "Detecting rock glacier flow structures using Gabor filters and IKONOS imagery", Remote Sensing of Environment, 2012
Publication — 1%

3. Hamid Reza Pourghasemi, Omid Rahmati. "Prediction of the landslide susceptibility: Which algorithm, which precision?", CATENA, 2018
Publication — 1%

4. Alireza Motevalli, Hamid Reza Pourghasemi, Mohsen Zabihi. "Assessment of GIS-Based — 1%

- **What is a bearable level of similarity index?**
- **What is the level of conformity with particular sources?**

Reviewign process

- **Time consuming (1 year +)**
- Reviewer Blind Comments to Author:
  - Please include specific, detailed comments regarding the originality, scientific quality, relevance to the field of this journal, and presentation. Check the need for tables and figures, and the adequacy of the references.
- **Acceptance (with minor/major revision, reject...)**
- **Even negative reviews can help!**
- **Do not hesitate do re-submit!**
- **Choose journals with DOI.**

Main Reasons Articles Rejected

PROBLEM	SOLUTION
Novelty not explained	Show how your results are different from current knowledge
Results not explained	Make the meaning of results clear
Too many results	Focus on main results – remove others
Communicates only to a specialist audience	Communicate to an audience including students and journalists
Misuse of abbreviations	Do not use abbreviations
Does not conform to journal requirements	Follow the guide for authors to the letter
Outside the scope of the journal	Select the correct journal by reading Aims and Scope
Poor English	Use a professional English editor

Good Writing is Hard Work

- **Experienced, well published authors still take weeks and months to write and refine their papers.**

- **Expect 10-20 drafts to be written before achieving an appropriate quality ☺**

Melanie Kunz - journal articles based PhD thesis

- **INTERACTIVE VISUALIZATIONS OF NATURAL HAZARDS DATA AND ASSOCIATED UNCERTAINTIES**
- **ETH Zurich**
- **Supervised by Lorenzo Hurni**
- based on **five scientific publications** + an introductory and a concluding section.
- The articles are structured in three sections:
  - Paper 1 and Paper 2 focus on the **visualization of natural hazards**
  - Paper 3 addresses the **visualization of uncertainties in the field of natural hazards**
  - Paper 4 and Paper 5 finally present the developed **prototype** and **provide feedback of hazard experts** as well as a comparison with existing systems.

How to enhance cartographic visualizations of natural hazards assessment results

- Melanie Kunz & Lorenz Hurni
- **The Cartographic Journal 48(1): 60-71,**
- **Abstract :**

- *The objective of this research is to offer suggestions for enhanced hazard visualizations to facilitate hazard management tasks and decision making. Existing cartographic shortcomings are identified based on an extensive analysis of hazard visualizations and an expert survey. These shortcomings are discussed and improvements for important cartographic elements are presented.*

Cartographic visualizations of quantitative assessment results for multiple natural hazards

- Melanie Kunz, Adrienne Grêt-Regamey & Lorenz Hurni
- **5th Canadian Conference on Geotechnique and Natural Hazards, 2011, Kelowna, BC, Canada**
- ***Abstract*** *Cartographic visualizations have proved to be effective means to communicate these results. However, the large volume of available data, the presence of multiple natural processes and the heterogeneity of the user group pose visualization challenges. In this paper, we* **analyze results of natural hazards assessments and present cartographic techniques for the visualization of multiple natural hazards.** *In addition, we discuss how* **interactive cartographic information systems** *can facilitate the communication of hazard related data among experts.*

Visualization of uncertainty in natural hazards assessments using an interactive cartographic information system

- Melanie Kunz, Adrienne Grêt-Regamey & Lorenz Hurni

- **Natural Hazards,**

- *Abstract:*

- *Natural hazard assessments are always subject to uncertainties* *due to missing knowledge about the complexity of hazardous processes as well as their natural variability. Decision makers in the field of natural hazard management need to understand the concept, components, sources, and implications of existing uncertainties in order to reach informed and transparent decisions. Until now, however, only few* **hazard maps include uncertainty visualizations which would be much needed for an enhanced communication among experts and decision makers in order to make informed decisions possible.**

Customized visualization of natural hazards assessment results and associated uncertainties through interactive functionality

- Melanie Kunz, Adrienne Grêt-Regamey & Lorenz Hurni
- **Cartography and Geographic Information, 2011**
- **Abstract:**

The challenge of this research is to overcome these existing shortcomings by combining high quality cartographic visualizations of natural hazard data as well as associated uncertainties with interactive functionality. In this paper we *summarize requirements that have to be considered, suggest functionalities necessary to perform natural hazards management tasks, and present a prototype of an expert system for the visualization and exploration of natural hazards assessments results and associated uncertainties*.

Interactive functionality of cartographic information systems for natural hazards data – comparison of selected geoportals with an expert system

- Melanie Kunz and Lorenz Hurni

- **25th International Cartographic Conference ICC, 2011, Paris, France (LNGandC)**

- *Natural hazards assessment results are often presented in form of cartographic visualizations. Due to the advantages of **interactive systems hazard representations are increasingly integrated in web-based information systems.** In this paper we give an **overview on functionality and included data of freely accessible Swiss Geoportals, compare them to an expert system, and finally present how this expert system can facilitate natural hazards management tasks.***