ITMO UNIVERSITY

Saint Petersburg, Russia

Научно-исследовательская работа

Александра Климова

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2021

О чем пойдет речь

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- Отчетность
- Наиболее частые ошибки
- Полезные ссылки и инструменты

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Магистерская диссертация

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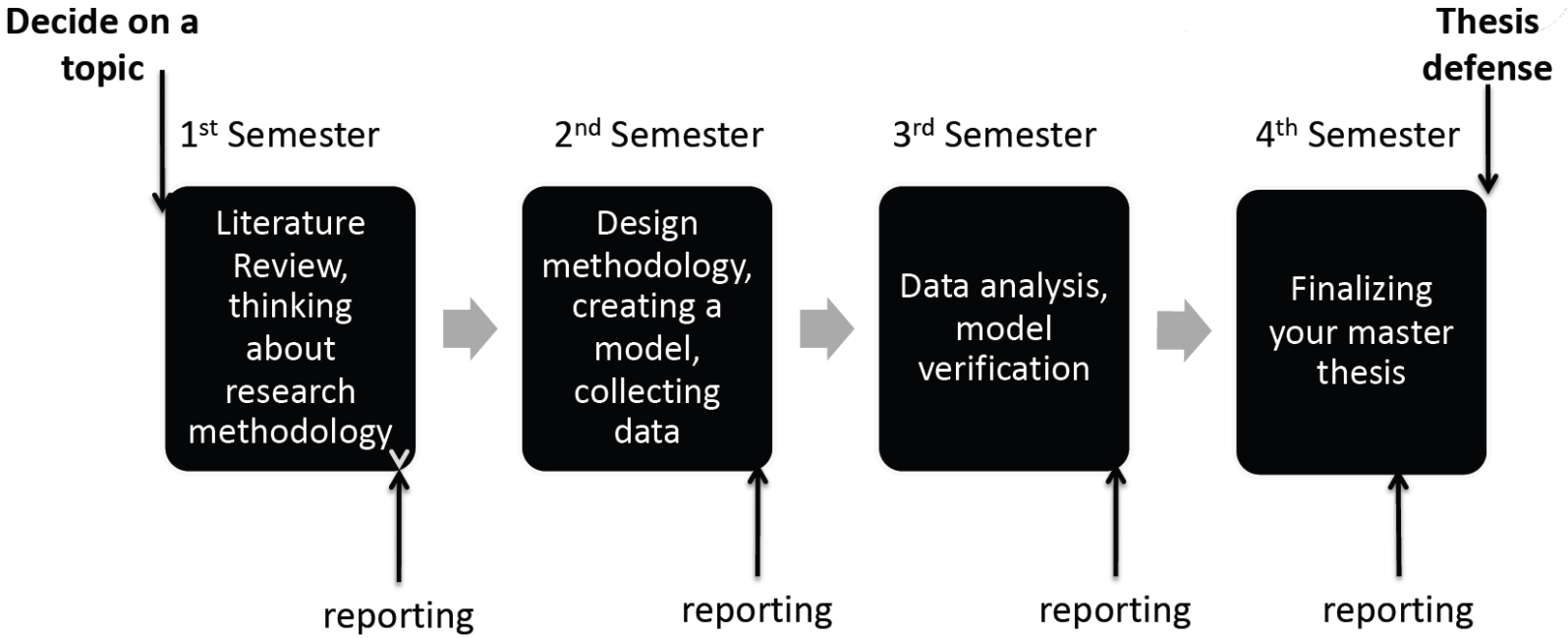

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Формальные документы:

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- Индивидуальное задание (заполняется в ИСУ)
- Отчет (загружается в ИСУ)
- Отзыв руководителя: оценка работы студента (заполняется в ИСУ)

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№ этапа	Наименование этапа (пример)	Продолжительность этапа в днях	Задание этапа
1	Инструктаж обучающегося	1	Инструктаж обучающегося по ознакомлению с требованиями охраны труда, техники безопасности, пожарной безопасности, а также правилами внутреннего трудового распорядка
2	Участие в исследовании личностных и профессиональных характеристик обучающихся	2	Пройти тестирование и видеоинтервью
3	Знакомство с научными тематиками НЦКР	2-3	Прослушать презентации научных групп НЦКР, ознакомиться с темами научных работ, пройти собеседование с научным руководителем, получить одобрение на выбор темы
4	Аналитический обзор		[В соответствии с заданием]: Выполнить аналитически обзор методов, алгоритмов и т.д. [конкретизировать в соответствии с темой], провести их сравнение, указать преимущества и недостатки. Обосновать актуальность темы своей работы.
5	Получение и обработка исходных данных		Выполнить анализ исходных данных [конкретизировать в соответствии с темой]
6	Разработка схемы выполнения алгоритма		Проанализировав структуру алгоритма и исходных данных, предложить схему разбивки исходных данных для выполнения алгоритма вычисления меры похожести векторов. Предложенную схему протестировать на различных наборах данных.
7	Подготовка отчетных материалов	10	Подготовить пакет отчетных документов и презентацию. Объем отчета: 20 страниц, минимум 20 литературных источников, слайды для презентации 8 минут.

Научная работа

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- Выбор темы
- Инструктаж
- **до 17 ноября:** Согласование с научным руководителем графика работ и индивидуального задания (файл в формате docx направляется Екатерине Гавриш на адрес: eogavrish@itmo.ru с копией научному руководителю).
- Работа над проектом
- **10 января:** отчет направляется на проверку руководителю
- **24 января – 28 января:** защита
- **29 января 2022:** дата выставления зачета (оценка руководителя должна стоять в отзыве)

Первый семестр

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Для программы Big Data and Machine Learning все документы заполняются на английском языке

Анализ научной литературы

Отчет: минимум 20 страниц (не включая список литературы)

Презентация: 8 мин + Q&A

Пакет документов:

- Индивидуальное задание (заполняется в ИСУ)
- Отчет в соответствии с ГОСТ 7.32.(загружается в формате pdf)
- Отзыв научного руководителя (заполняется в ИСУ)
- Презентация

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Наиболее часто встречающиеся ошибки

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- Устаревшая литература: мин 20 научных статей начиная с 2016 года публикации
- Не сформулированы цель и задачи исследования
- Плагиат
- Не по ГОСТ (шрифт, заголовки, названия рисунков и таблиц)
- НЕ научная работа

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Плагиат

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1.1. Sequential Decision Making

Sequential decision making describes a situation where the decision-maker (DM) makes successive observations of a process before a final decision is formed, in contrast to dynamic decision making which is more concerned with controlling a process over time. Formally a sequential decision problem is defined, such the DM can take observations X_1, X_2 ,... one at a time. After each observation X_n the DM can conceive to terminate the method and make a final decision from a group of decisions D, or continue the method and take subsequent observation X_{n+1}. If the observations X_1, X_2,... form a random sample, the procedure is termed *sequential sampling*.

In most sequential decision problems there's an implicit or explicit cost related to each observation. The procedure to make a decision when to prevent taking observations and when to continue is termed *the stopping rule*. The target in sequential decision making is to search out a stopping rule that optimizes the decision in terms of minimizing losses or maximizing gains including observation costs. The optimal stopping rule is additionally called the optimal strategy or the optimal policy.

A wide sort of sequential decision problems are discussed within the statistics literature, including search problems, inventory problems, gambling problems, and secretary-type problems, including sampling with and without recall. Several methods are proposed to unravel the optimization problem under specified conditions, including dynamic programming, Markov chains, and Bayesian analysis.

Климова Александра Сергеевна
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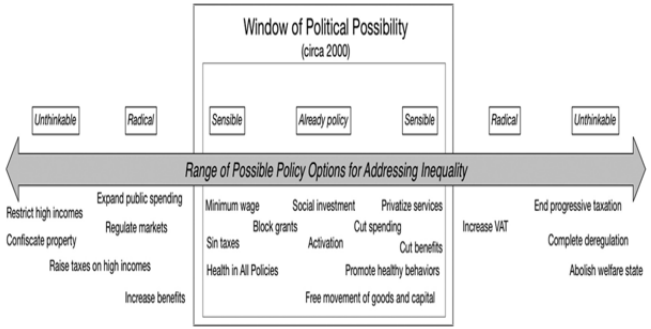

Fig. 2. The Overton Window around inequality

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Reference?

The Overton window may be a theory that aims to elucidate why at a while the consensus of socially accepted opinions and statements changes, and what's behind the

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one of the most common traffic jams source. The model should take into account both regulated intersections and unregulated ones, and the regulatory algorithm should use the following priority [5]:

1) Traffic light signals
2) Road signs
3) Right-before-left rule, priority for vehicles turning right or going straight on compared to left-turners
4) Closest vehicle (minimal time)

Naturally, traffic lights are the major type of regulation, which always are applied as soon as they are active. If n traffic lights exist for a specific intersection or they are not active (e.g. yellow blinking), the next level of regulatio becomes active. Road signs specify the priorities in the second level. In situations where no unique preferred vehicl can be determined, level 3 comes in. If even right-before-left rules leads to multiple equally prioritized vehicles instea of a single one, entry is granted to the closest vehicle (minimal time to entry point). The scheme in Fig. 3 represent the decision process clearly. The right-before-left rule is applied through ordering the entry road segments by lookin at the incoming angle for easy determination of the neighbor segments.

Оригинальная статья:

Backfrieder, Christian & Ostermayer, Gerald. (2014). Modeling a Continuous and Accident-Free Intersection Control for Vehicular Traffic in TraffSim. 10.1109/EMS.2014.29.

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B. Regulation Algorithm

The regulation algorithm uses the following levels of priority evaluation, which are applied one after the other:

1) Traffic light signals
2) Road signs
3) Right-before-left rule, priority for vehicles turning right or going straight on compared to left-turners
4) Closest vehicle (minimal time)

Naturally, traffic lights are the major type of regulation, which always are applied as soon as they are active. If no traffic lights exist for a specific intersection or they are not active (e.g. yellow blinking), the next level of regulation becomes active. Road signs specify the priorities in the second level. In situations where no unique preferred vehicle can be determined, level 3 comes in. If even right-before-left rules leads to multiple equally prioritized vehicles instead of a single one, entry is granted to the closest vehicle (minimal time to entry point). The diagram in figure 2 represents the decision process clearly.

The right-before-left rule is applied through ordering the entry road segments by looking at the incoming angle for easy determination of the neighbour segments. Special attention has to be paid to intersections where a road segment has neighbours, but same must not be considered as preferred entry for right-before-left rule because of a

Below is a passage taken from Raymond S. Nickerson's "How We Know-and Sometimes Misjudge-What Others Know: Imputing One's Own Knowledge to Others." *Psychological Bulletin* 125.6 (1999): p737.

In order to communicate effectively with other people, one must have a reasonably accurate idea of what they do and do not know that is pertinent to the communication. Treating people as though they have knowledge that they do not have can result in miscommunication and perhaps embarrassment. On the other hand, a fundamental rule of conversation, at least according to a Gricean view, is that one generally does not convey to others information that one can assume they already have.

For effective communication, it is necessary to have a fairly accurate idea of what our listeners know or do not know that is pertinent to the communication. If we assume that people know something they do not, then miscommunication and perhaps embarrassment may result (Nickerson, 1999).

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In order to communicate effectively with other people, one must have a reasonably accurate idea of what they do and do not know that is pertinent to the communication. Treating people as though they have knowledge that they do not have can result in miscommunication and perhaps embarrassment. On the other hand, a fundamental rule of conversation, at least according to a Gricean view, is that one generally does not convey to others information that one can assume they already have.

For **effective communication**, it is necessary to have a fairly **accurate idea** of what our listeners **know or do not know** that is **pertinent** to the communication. If we assume that people know something they do not, then **miscommunication** and perhaps **embarrassment** may result (Nickerson, 1999).

Nickerson (1999) suggests that effective communication depends on a **generally accurate knowledge** of what the audience knows. If a speaker assumes too much knowledge about the subject, the audience will either **misunderstand or be bewildered**; however, assuming too little knowledge among those in the audience may cause them to feel **patronized** (p.737).

reasonably accurate idea	generally accurate knowledge
miscommunication and embarrassment	misunderstand, bewildered, and "patronized

Поиск научных статей

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Наименование	Краткая характеристика
Российский индекс научного цитирования https://www.elibrary.ru/	Российская национальная библиографическая база данных научного цитирования, содержит более 12 миллионов публикаций.
Scopus https://www.scopus.com	Реферативная и наукометрическая база данных, содержащая аннотации публикаций и информацию о цитируемости рецензируемой научной литературы, со инструментами отслеживания, анализа и визуализации данных.
Web of Science https://clarivate.com/webofsciencegroup/	Реферативная и наукометрическая база данных, содержит встроенные инструменты отслеживания, анализа и визуализации данных.
Google Scholar https://scholar.google.com/	Поисковая система, которая специализируется на индексации различного вида научных публикаций, в том числе статей, книг, глав в публикациях, отчетов, препринтов.
SpringerLink https://link.springer.com/	Одна из крупнейших мировых полнотекстовых баз данных. Политематическая база, преимущественно STM (научного, технического и медицинского) содержания.
ScienceDirect https://www.sciencedirect.com/	База полнотекстовых научных журналов издательства Elsevier

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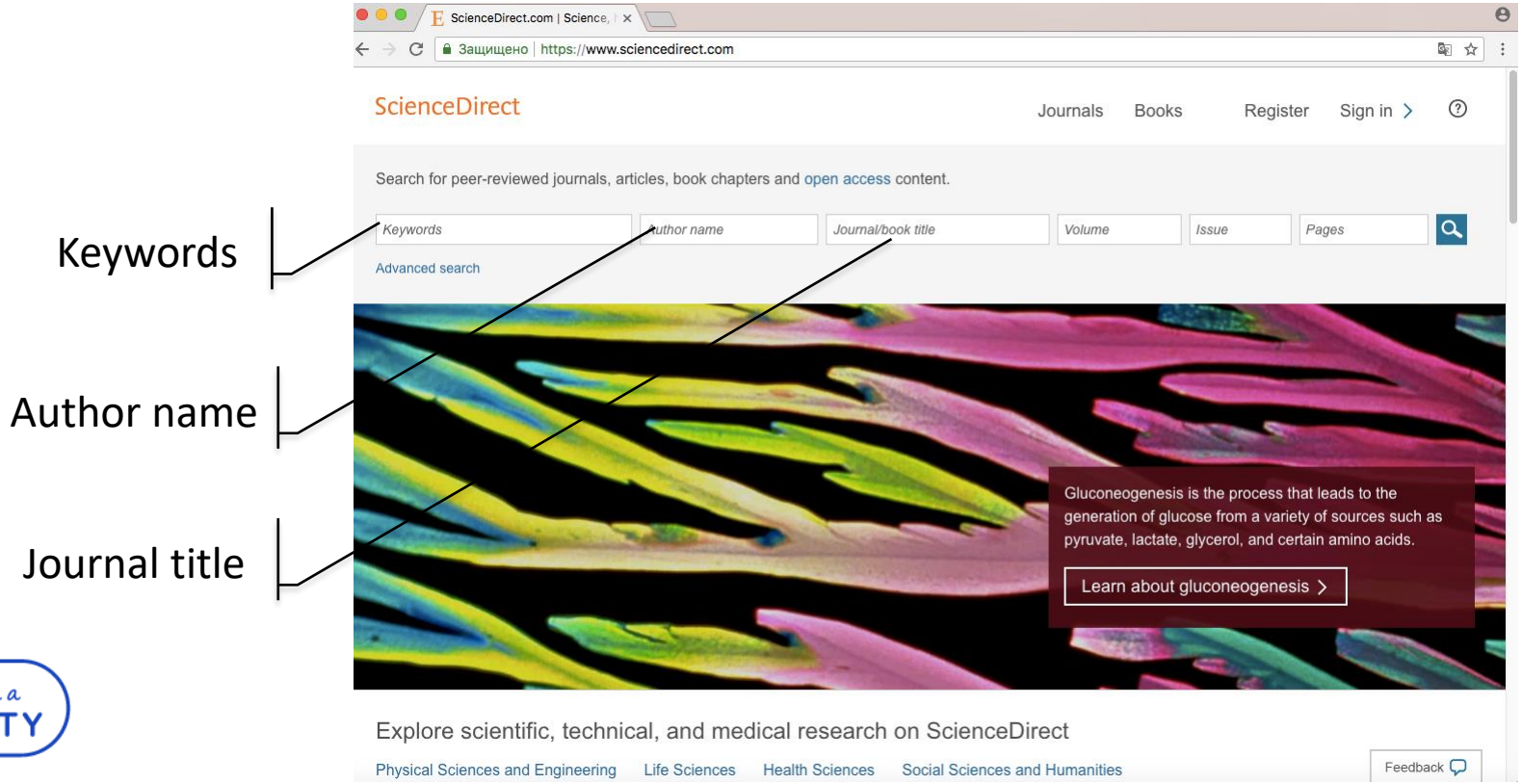
Поиск научной статьи в базе данных



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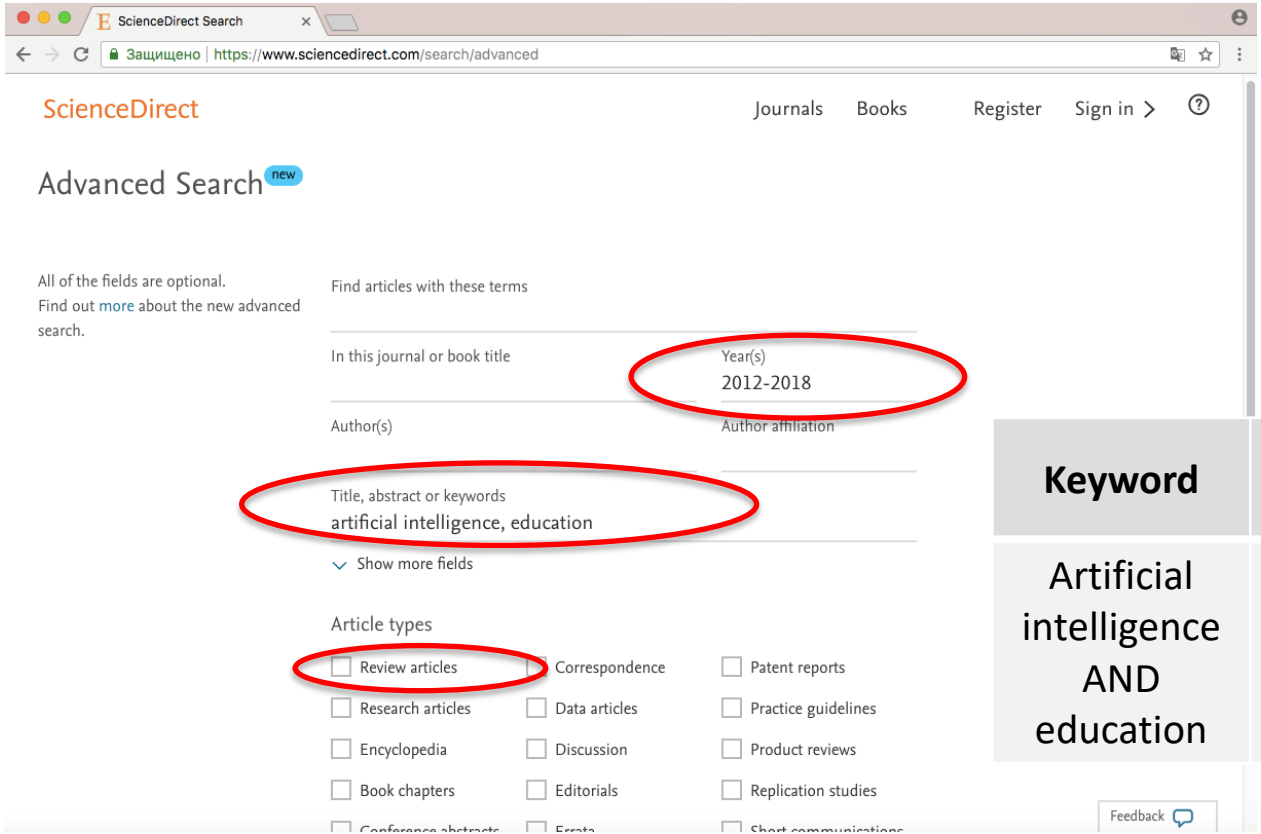

Keyword	All fields	Title, abstract, keywords
Artificial intelligence AND education	7736	45

Использовали ли вы менеджеры ссылок и системы управления библиографической информацией?

bresciani-eppler-risks-visualization-wpaper-08.pdf>.
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Reference management software

- **Mendeley** (https://www.mendeley.com/): a free reference manager and an academic social network.
- **Zotero** (https://www.zotero.org/): a powerful, easy-to-use research tool that helps you gather, organize, and analyze sources and then share the results of your research.
- **EndNote** (endnote.com/) - is the industry standard software tool for publishing and managing bibliographies, citations and references on the Windows and Macintosh desktop.

Зачем они нужны?

ITMO UNIVERSITY

- Автоматизировать цитирование статей
- Осуществлять поиск полнотекстовых статей в открытых источниках
- Цитировать статьи и сохранять их в своих собственных библиотеках
- Аннотировать статьи с помощью “заметок на полях”
- Организовать совместную работу над научной статьей

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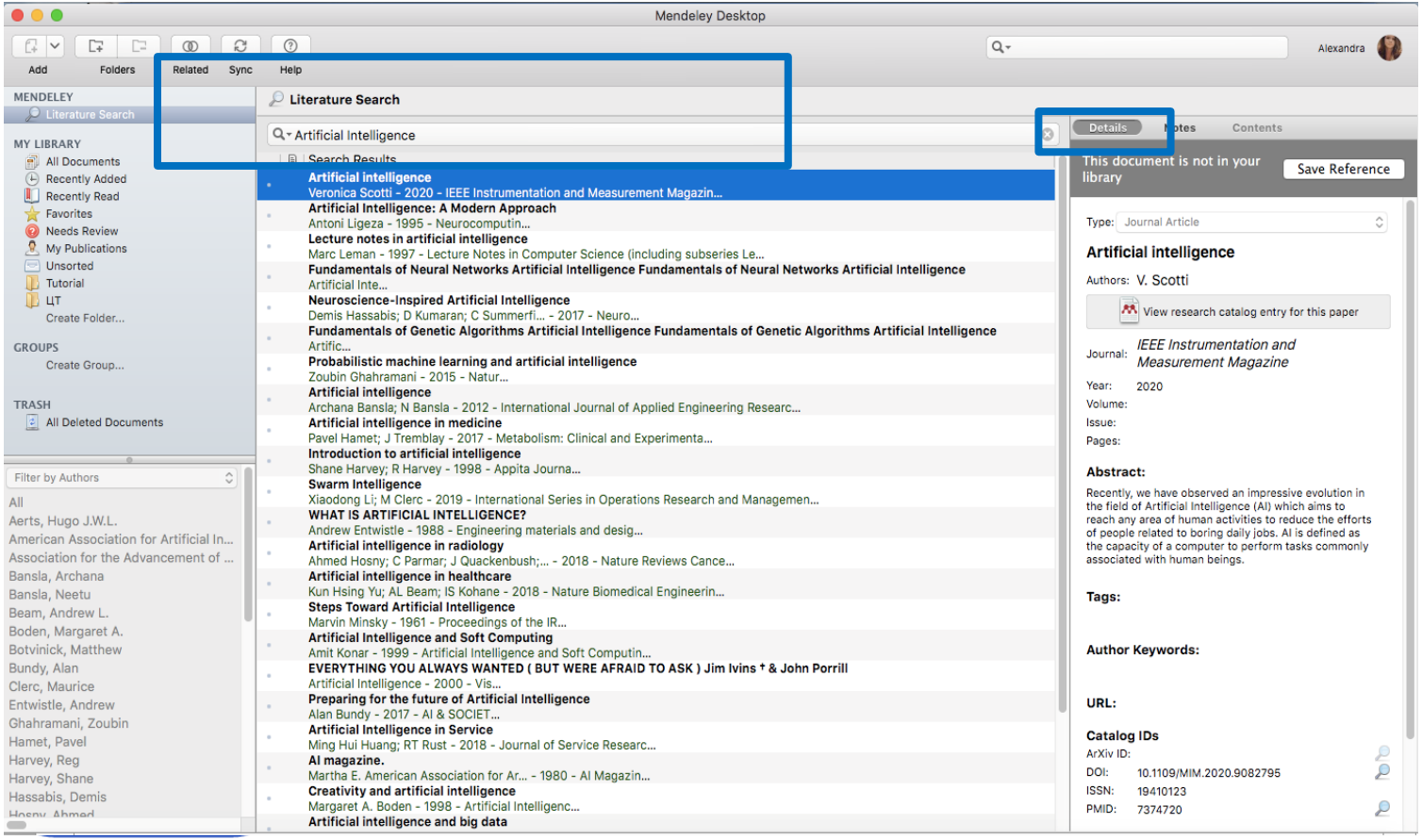
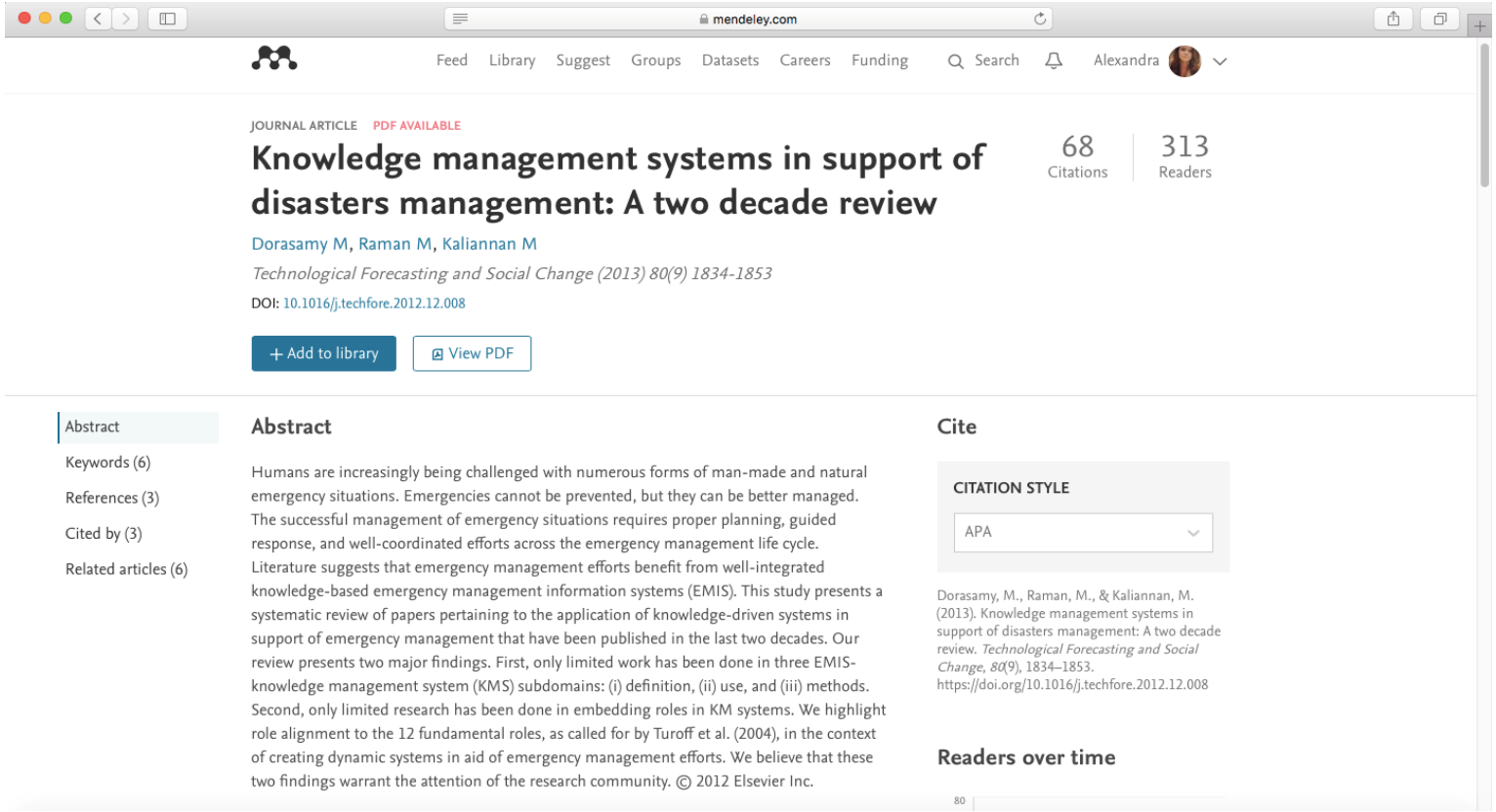


21 Mendeley Basics: A guide to the basic uses of the Mendeley citation manager. [Electronic resource]. URL: https://guides.lib.umich.edu/c.php?g=283006&p=1885644 (accessed: 20.07.2020).



Harward style or author-date

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In-text Example:

"Literature reviews often require more subjective interpretation and codification than what a simple concept map can provide. Cameron (2007) notes Leximancer's limitations as being less valuable for data sets that could produce "false positives" as a result of simplifying complex original data through machine analysis. Others (e.g., Hepworth & Paxton, 2007; Liu, 2004) instead argue for Leximancer's objectivity, face validity, and reliability and say that these features outweigh the possible risk of simplification in an exploratory study".

References:

Cameron, J. (2007). An Integrated framework for managing eBusiness collaborative projects (Doctoral thesis). University of New South Wales.

Hepworth, N., & Paxton, S. J. (2007). Pathways to help-seeking in bulimia nervosa and binge eating problems: A concept mapping approach. International Journal of Eating Disorders, 40(6), 493-504.

Liu, S. (2004). An examination of the social categorization of Chinese ethnic groups and its influence on intergroup relations in Australia. In Proceedings of the 54th Annual Conference of the ICA.

Oxford Style

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In-text Example:

Further, by participating in such activities, decision-makers and scientists can develop a greater understanding of each other's operational uncertainties, such as those arising from economic, social, and political influences[1].

References:

[1] Emma E.H. Doyle and Douglas Paton, 'Decision-Making: Preventing Miscommunication and Creating Shared Meaning Between Stakeholders', in *Advances in Volcanology*, 2018.

The IEEE (Institute of Electrical and Electronic Engineers)

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In-text Example:

"Numerous papers (29, 26%, Table 12) consider techniques and approaches for the visualisation of spatial uncertainty, with a focus on maps and GIS. They discuss the range of different media and methods available [10,25,48], the range of decision-maker perspectives and understanding related to their prior knowledge and numeracy [127], whether visualisation actually enhances decision making [128], issues with probability shading colour schemes and biases [129], as well as display issues [103] in terms of how much information to include in a single image or display. Two documents [109,130] discuss in detail the technical and numerical aspects of employing visualisation options". [6]

References:

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Методы анализа фактографической информации:

- Русский: https://www.youtube.com/watch?v=eQvvgz92fyQ
- Английский: https://www.youtube.com/watch?v=2bYFV7vzDWc