Predicting judicial decisions of the European Court of Human Rights using Natural Language Processing

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Talk Outline

- Introduction

- European Court of Human Rights

- Methodology

- Findings

introduction

Background

- **Machine learning (ML)** is the subfield of computer science that "gives computers the ability to learn without being explicitly programmed" (Samuel, 1959)

- **Natural language processing (NLP)** is the subfield of computer science concerned with the interactions between computers and human languages

- Lawlor (1963): "What computers can do: analysis and prediction of judicial decisions".

AI-assisted Judicial Decision Making

- Data-driven methods for automating tasks related to

  - legal advice, representation

  - judicial decision-making

Why should we care?

- Assisting tools to rapidly identify cases and extract patterns which lead to certain decisions

- Automated systems could assess whether someone has got chances in filing a lawsuit

- Help legal scientists to understand judicial decision making

- Prioritise the decision process in cases where violation seems very likely

- Massive delays in judicial process due to vast amounts of cases

Previous Work

- Statistical models focused mainly on the US Supreme Court

- Analysis and prediction of judges' votes given **non textual information** (Kort, 1957; Nagel, 1963; Keown, 1980; Segal, 1984; Popple, 1996; Lauderdale & Clark, 2012)

Previous Work

- Manually crafted **features**

  - the nature of the crime

  - the gravity of the crime

  - the preferred policy position of each judge

- Not always using data prior to the decision

- Can we use textual information to predict judicial decision?

- Textual information prior to the decision:

  - facts

  - legal argumentation

methodology

Task Description

- **Predict** whether a particular Article of the ECHR has been violated, given **textual evidence extracted from a case**.

- Input: Text of a case

- Output:

  - -1: No-violation

  - +1: Violation

Hypotheses

- Important factors that are related to the outcome reached by the Court:

  - (1) The textual content and

  - (2) the different parts of a case

European Court of Human Rights (ECHtR)

- Major international court set up in 1959 by the European Convention of Human Rights

- ECHR: international treaty for the protection of civil and political liberties in European democracies committed to the rule of law;

- Has jurisdiction to rule on the applications of individuals or sovereign states alleging violations of the civil and political rights set out in the Convention;

- Convention covers 47 states with 800 million population

ECHtR

- Publicly available **textual** data:

    - http://hudoc.echr.coe.int

- Well-structured case format

Case Structure

1. Procedure

2. The Facts

    2.1 Circumstances of the case

    2.2 Relevant law

3. The Law

4. Operative Provisions

Case Structure: Procedure

Case of "Velcheva v. Bulgaria"

PROCEDURE

1. The case originated in an application (no. 35355/08) against the Republic of Bulgaria lodged with the Court under Article 34 of the Convention for the Protection of Human Rights and Fundamental Freedoms ("the Convention") by a Bulgarian national, Ms Gana Petkova Velcheva ("the applicant"), on 30 June 2008.

2. The applicant was represented by Mr M. Ekimdzhiev and Ms G. Chernicherska, lawyers practising in Plovdiv. The Bulgarian Government ("the Government") were represented by their Agent, Ms Y. Stoyanova, of the Ministry of Justice.

3. The applicant alleged that the authorities had failed to comply with a final court judgment allowing her claim for restitution of agricultural land.

4. On 7 May 2013 the application was communicated to the Government.

Procedure followed before the Court

Case Structure: The Facts

THE FACTS

I. THE CIRCUMSTANCES OF THE CASE

5. The applicant was born in 1927 and lives in the village of Ribaritsa.

6. Her father, of whom she is the sole heir, owned agricultural land in the area surround the village which was incorporated into an agricultural cooperative at the beginning of 1950s.

7. In 1991, following the adoption of the Agricultural Land Act ("the ALA", see paragraph below), the applicant applied for the land's restitution.

8. By a decision dated 10 March 1999 the land commission dealing with the case refus to restore her rights to two plots of 900 and 2,000 square metres respectively, noting sheep pens had been built on them by the agricultural cooperative. It held that the applic was entitled to compensation in lieu of restitution.

All material that is not considered as legal arguments
Circumstances of the Case: Factual background and procedure before domestic courts
Relevant Law: Legal provisions relevant to the case, outside of the articles of the Convention

Case Structure: The Law

A. **Arguments of the parties**

1. *The Government*

22. Referring to the Agriculture and Forestry Department's decision of 18 October 2006 (see paragraph 16 above) – of which the Court was not aware prior to communication of the present application – the Government argued that the applicant, in concealing its existence, had abused her right of individual application. On these grounds, the Government urged the Court to declare the application inadmissible.

23. On the merits, the Government argued that there had been no breach of the applicant's rights, because the judgment of 8 September 2005 had been enforced with the adoption of the decision of 18 October 2006. They contended that after this decision, and since the land claimed by the applicant had been transferred to a third party in 1995, it was up to the applicant to bring proceedings against that third party to defend her property rights.

Merits of the case, through the use of legal argument

Case Structure: Operative Provisions

FOR THESE REASONS, THE COURT, UNANIMOUSLY,

1. *Declares* the application admissible;

2. *Holds* that there has been a violation of Article 6 § 1 of the Convention;

3. *Holds* that there has also been a violation of Article 1 of Protocol No. 1;

4. *Holds* that the question of the application of Article 41, insofar as it concerns the applicant's claims for pecuniary and non-pecuniary damage, is not ready for decision; accordingly,
   (a) reserves the said question;
   (b) invites the Government and the applicant to submit, within four months from the date on which the judgment becomes final in accordance with Article 44 § 2 of the Convention,

The outcome of the case, which is a decision to the effect that a violation of some Convention article either did or did not take place.

Data set

- **Article 3:** Prohibits torture and inhuman and degrading treatment (250 cases)

- **Article 6:** Protects the right to a fair trial (80 cases)

- **Article 8:** Provides a right to respect for one's private and family life, his home and his correspondence (254 cases)

- Articles split in two equal classes: violation/ non-violation

- **Caveat:** these are only (theoretically unbiased) transcripts summarising the case

Text Representation

- Contiguous word sequences i.e. n-grams (2000)

  - "cat": unigram

  - "a cat": bigram

  - "a cat sat": trigram

- Clusters of related words, i.e. topics (30)

  - *prison, detainee, visit, well, access, food, situation, problem, remained, living, visited, establishment, admissibility merit, overcrowding*

Experimental Setup

- Each case is represented as a vector.

- Each element of a case vector represents a feature, e.g. an n-gram or topic

- Each element is weighted by the number of times the n-gram (or the words of a topic) appears in the case.

Experimental Setup

- **Classifier:**

  - Linear Support Vector Machine (SVM)
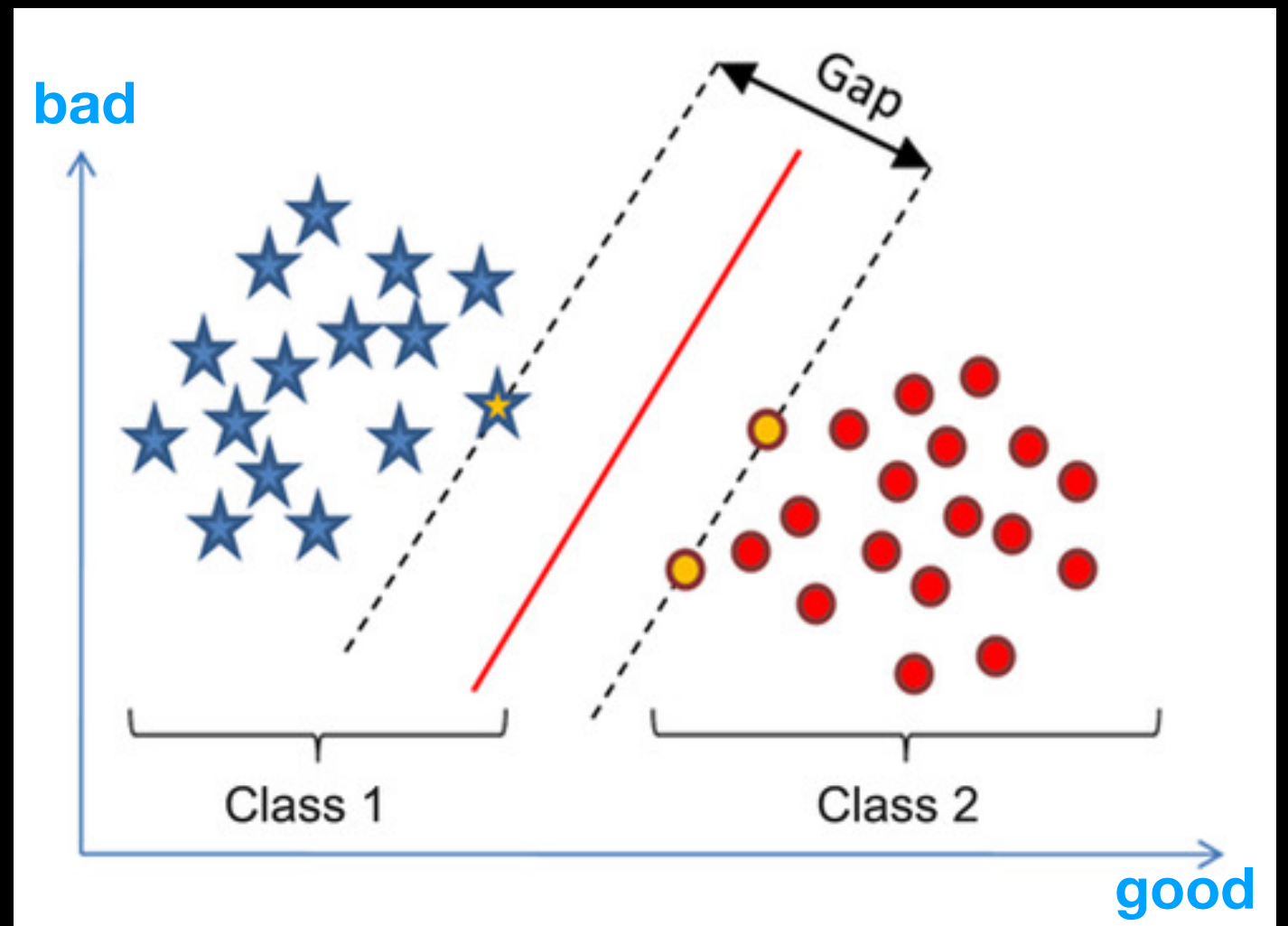
Supervised Learning - Exam Analogy

- Imagine you want to prepare for an exam in a module.

- Your **training data** consist of only of all the available past exam papers.

- During **training** (studying), you learn by studying past exam papers.

- You can test yourself by holding out a number of past exams (**development set**).

- **Evaluation** is performed on the exam day (**test data**)! Your score is computed by your examiner.

Experimental Setup

- Data is split into training and testing sets (90-10%)

- **Training**

  - Classifier learns from cases (vectors) and the Court's decision (-1/+1 - no violation/violation)

- **Testing**

  - Classifier is given case vectors and makes a prediction.

Experimental Setup

- **Evaluation:**

  - How many times the Classifier matched the Court's outcome (Accuracy)

  - 10-fold cross validation

Results

Feature Type		Article 3	Article 6	Article 8	Average
N-grams	Full	.70 (.10)	.82 (.11)	.72 (.05)	0.75
	Procedure	.67 (.09)	.81 (.13)	.71 (.06)	0.73
	Circumstances	.68 (.07)	.82 (.14)	.77 (.08)	0.76
	Relevant law	.68 (.13)	.78 (.08)	.72 (.11)	0.73
	Facts	.70 (.09)	.80 (.14)	.68 (.10)	0.73
	Law	.56 (.09)	.68 (.15)	.62 (.05)	0.62
Topics		**.78 (.09)**	.81 (.12)	.76 (.09)	0.78
Topics & Circumstances		.75 (.10)	**.84 (0.11)**	**.78 (0.06)**	**0.79**

Topic	Label	Words	w
		Top-5 Violation	
4	Positive State Obligations	injury, protection, ordered, damage, civil, caused, failed, claim, course, connection, region, effective, quashed, claimed, suffered, suspended, carry, compensation, pecuniary, ukraine	13.50
10	Detention conditions	prison, detainee, visit, well, regard, cpt, access, food, situation, problem, remained, living, support, visited, establishment, standard, admissibility merit, overcrowding, contact, good	11.70
3	Treatment by state officials	police, officer, treatment, police officer, July, ill, force, evidence, ill treatment, arrest, allegation, police station, subjected, arrested, brought, subsequently, allegedly, ten, treated, beaten	10.20
		Top-5 No Violation	
8	Prior Violation of Article 2	june, statement, three, dated, car, area, jurisdiction, gendarmerie, perpetrator, scene, June applicant, killing, prepared, bullet, wall, weapon, kidnapping, dated June, report dated, stopped	−12.40
19	Issues of Proof	witness, asked, told, incident, brother, heard, submission, arrived, identity, hand, killed, called, involved, started, entered, find, policeman, returned, father, explained	−15.20
13	Sentencing	sentence, year, life, circumstance, imprisonment, release, set, president, administration, sentenced, term, constitutional, federal, appealed, twenty, convicted, continued, regime, subject, responsible	−17.40

Findings

- 'Circumstances' subsection highest predictive accuracy against the 'law' subsection

- Realism v formalism in legal theory: judicial decision-making is significantly correlated to the stimulus of the facts

- Topics appear to correlate with trends/patterns in the case law of the ECtHR

  - long detention sentences under Article 3 ECHR

  - social policy of states

Limitations

- ML models only "learn" correlations (and existing biases) in the data - no causality

- ML models do not understand language or "meaning"

- Data can change over time, legislation can also change

- We cannot take the human out of the loop - AI assisted decision making

Transparency

- Reproducibility

    - Open source code

    - Data availability - privacy

    - Access to computational resources

- Model interpretability

    - causality

    - explanations

- Can such models be used "in production"?

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References

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