

NLP4DH 2024

**The 4th International Conference on
Natural Language Processing for Digital Humanities**

Proceedings of the Conference

November 16, 2024

©2024 The Association for Computational Linguistics

Order copies of this and other ACL proceedings from:

Association for Computational Linguistics (ACL)
209 N. Eighth Street
Stroudsburg, PA 18360
USA
Tel: +1-570-476-8006
Fax: +1-570-476-0860
acl@aclweb.org

ISBN 979-8-89176-181-0

Preface

Textual sources are a cornerstone for research in the digital humanities, especially when larger datasets are involved. In such cases, the use of natural language processing (NLP) technologies becomes indispensable. However, a significant challenge arises as NLP is often tailored to standard written languages, which can differ substantially from the genres and text types of primary interest to today's digital humanists. This complexity increases when research is conducted on minority languages, historical texts, or dialectal materials.

NLP, with its strong foundation in computer science, tends to focus on optimizing numerical outcomes and addressing abstract tasks like machine translation, poem generation, or sentiment analysis. In contrast, digital humanities, deeply rooted in the humanities, focuses on concrete research questions aimed at understanding specific phenomena rather than merely solving a problem. Where NLP strives to validate its methods, digital humanists often take methodological validity as a given, treating these tools as a means to an end rather than the end goal itself. This fundamental difference in approach highlights the need for more collaborative spaces where scholars from both fields can come together to exchange knowledge and methodologies.

Digital humanists are increasingly aware of the limitations of current NLP tools, while the NLP community has already developed several viable solutions. However, both fields would greatly benefit from enhanced communication. For instance, techniques like model fine-tuning and retraining, widely used in NLP, could be harnessed to improve results for diverse linguistic varieties. Similarly, research in the digital humanities frequently produces open datasets, offering opportunities for comparative analysis across different NLP strategies. This workshop aimed to stimulate such dialogue, encouraging the sharing of examples that illustrate how NLP tools can best address the research questions central to the humanities.

This year NLP4DH received 81 submissions which was our highest number yet.

Organizing Committee

- Mika Hämäläinen, Metropolia University of Applied Sciences
- Emily Öhman, Waseda University
- So Miyagawa, The University of Tsukuba / National Institute for Japanese Language and Linguistics
- Khalid Alnajjar, F-Secure Oyj
- Yuri Bizzoni, Aarhus University

Program Committee

- Joshua Wilbur, University of Tartu
- Stefania Degaetano-Ortlieb, Saarland University
- Luke Gessler, University of Colorado Boulder
- Leo Leppänen, University of Helsinki
- Quan Duong, University of Helsinki
- Iana Atanassova, University of Franche-Comté
- Won Ik Cho, Samsung
- Tyler Shoemaker, Dartmouth College
- Jouni Tuominen, University of Helsinki
- Enrique Manjavacas, Arevalo University of Leiden
- Kenichi Iwatsuki, Mirai Translate
- Matej Martinc, Jožef Stefan Institute
- Maciej Janicki, University of Helsinki
- Shuo Zhang, Bose
- Aynat Rubinstein, The Hebrew University of Jerusalem
- Frederik Arnold, Humboldt University of Berlin
- Thibault Clerice, National Institute for Research in Digital Science and Technology
- Nicolas Gutehrlé, University Bourgogne Franche-Comté
- Lama Alqazlan, University of Warwick
- Lidia Pivovarova, University of Helsinki
- Balázs Indig, Eötvös Loránd University
- Pierre Magistry, Institut national des langues et civilisations orientales
- Yoshifumi Kawasaki, The University of Tokyo

- Anna Dmitrieva, University of Helsinki
- Antti Kanner, University of Helsinki
- Maria Antoniak, Allen Institute for AI
- Katerina Korre, University of Bologna
- Daniela Teodorescu, University of Alberta
- Dongqi Pu, Saarland University
- Nils Hjortnaes, Indiana University Bloomington
- Noémi Ligeti-Nagy, Hungarian Research Centre for Linguistics
- Allison Lahnala, University of Bonn
- Gabriel Simmons, University of California, Davis
- Vilja Hulden, University of Colorado Boulder
- Jaihyun Park, Nanyang Technological University
- Jonne Sälevä, Brandeis University
- Martin Ruskov, University of Milan
- Youngsook Song, Sionix AI
- Pascale Moreira, Aarhus University
- Maciej Kurzynski, Lingnan University
- Aatu Liimatta, University of Helsinki
- Sourav Das, Indian Institute of Information Technology Kalyani
- Sebastian Oliver Eck, University of Music Franz Liszt Weimar
- Elissa Nakajima, Wickham Waseda University
- Nicole Miu Takagi, Waseda University
- Ken Kawamura, Revelata Inc
- Bo Dang, San Francisco Bay University
- Jack Rueter, University of Helsinki

Table of Contents

<i>Text Length and the Function of Intentionality: A Case Study of Contrastive Subreddits</i> Emily Sofi Ohman and Aatu Liimatta	1
<i>Tracing the Genealogies of Ideas with Sentence Embeddings</i> Lucian Li	9
<i>Evaluating Computational Representations of Character: An Austen Character Similarity Benchmark</i> Funing Yang and Carolyn Jane Anderson.....	17
<i>Investigating Expert-in-the-Loop LLM Discourse Patterns for Ancient Intertextual Analysis</i> Ray Umphrey, Jesse Roberts and Lindsey Roberts.....	31
<i>Extracting Relations from Ecclesiastical Cultural Heritage Texts</i> Giulia Cruciani	41
<i>Constructing a Sentiment-Annotated Corpus of Austrian Historical Newspapers: Challenges, Tools, and Annotator Experience</i> Lucija Krusic.....	51
<i>It is a Truth Individually Acknowledged: Cross-references On Demand</i> Piper Vasicek, Courtni Byun and Kevin Seppi	63
<i>Extracting position titles from unstructured historical job advertisements</i> Klara Venglarova, Raven Adam and Georg Vogeler	75
<i>Language Resources From Prominent Born-Digital Humanities Texts are Still Needed in the Age of LLMs</i> Natalie Hervieux, Peiran Yao, Susan Brown and Denilson Barbosa	85
<i>NLP for Digital Humanities: Processing Chronological Text Corpora</i> Adam Pawłowski and Tomasz Walkowiak.....	105
<i>A Multi-task Framework with Enhanced Hierarchical Attention for Sentiment Analysis on Classical Chinese Poetry: Utilizing Information from Short Lines</i> Quanqi Du and Veronique Hoste	113
<i>Exploring Similarity Measures and Intertextuality in Vedic Sanskrit Literature</i> So Miyagawa, Yuki Kyogoku, Yuzuki Tsukagoshi and Kyoko Amano.....	123
<i>Historical Ink: 19th Century Latin American Spanish Newspaper Corpus with LLM OCR Correction</i> Laura Manrique-Gomez, Tony Montes, Arturo Rodriguez Herrera and Ruben Manrique	132
<i>Canonical Status and Literary Influence: A Comparative Study of Danish Novels from the Modern Breakthrough (1870–1900)</i> Pascale Feldkamp, Alie Lassche, Jan Kostkan, Márton Kardos, Kenneth Enevoldsen, Katrine Baunvig and Kristoffer Nielbo.....	140
<i>Deciphering psycho-social effects of Eating Disorder : Analysis of Reddit Posts using Large Language Model(LLM)s and Topic Modeling</i> Medini Chopra, Anindita Chatterjee, Lipika Dey and Partha Pratim Das.....	156
<i>Topic-Aware Causal Intervention for Counterfactual Detection</i> Thong Thanh Nguyen and Truc-My Nguyen	165

<i>UD for German Poetry</i>	
Stefanie Dipper and Ronja Laarmann-Quante	177
<i>Molyé: A Corpus-based Approach to Language Contact in Colonial France</i>	
Rasul Dent, Juliette Janes, Thibault Clerice, Pedro Ortiz Suarez and Benoît Sagot	189
<i>Vector Poetics: Parallel Couplet Detection in Classical Chinese Poetry</i>	
Maciej Kurzynski, Xiaotong Xu and Yu Feng	200
<i>Adapting Measures of Literality for Use with Historical Language Data</i>	
Adam Roussel	209
<i>Improving Latin Dependency Parsing by Combining Treebanks and Predictions</i>	
Hanna-Mari Kristiina Kupari, Erik Henriksson, Veronika Laippala and Jenna Kanerva	216
<i>From N-grams to Pre-trained Multilingual Models For Language Identification</i>	
Thapelo Andrew Sindane and Vukosi Marivate	229
<i>Visualising Changes in Semantic Neighbourhoods of English Noun Compounds over Time</i>	
Malak Rassem, Myrto Tsigkouli, Chris W. Jenkins, Filip Miletic and Sabine Schulte im Walde	240
<i>SEFLAG: Systematic Evaluation Framework for NLP Models and Datasets in Latin and Ancient Greek</i>	
Konstantin Schulz and Florian Deichsler	247
<i>A Two-Model Approach for Humour Style Recognition</i>	
Mary Ogbuka Kenneth, Foad Khosmood and Abbas Edalat	259
<i>N-gram-Based Preprocessing for Sandhi Reversion in Vedic Sanskrit</i>	
Yuzuki Tsukagoshi and Ikki Ohmukai	275
<i>Enhancing Swedish Parliamentary Data: Annotation, Accessibility, and Application in Digital Humanities</i>	
Shafqat Mumtaz Virk, Claes Ohlsson, Nina Tahmasebi, Henrik Björck and Leif Runefelt	280
<i>Evaluating Open-Source LLMs in Low-Resource Languages: Insights from Latvian High School Exams</i>	
Roberts Dargis, Guntis Bārzdiņš, Inguna Skadiņa and Baiba Saulite	289
<i>Computational Methods for the Analysis of Complementizer Variability in Language and Literature: The Case of Hebrew "she-" and "ki"</i>	
Avi Shmidman and Aynat Rubinstein	294
<i>From Discrete to Continuous Classes: A Situational Analysis of Multilingual Web Registers with LLM Annotations</i>	
Erik Henriksson, Amanda Myntti, Saara Hellström, Selcen Erten-Johansson, Anni Eskelinen, Liina Repo and Veronika Laippala	308
<i>Testing and Adapting the Representational Abilities of Large Language Models on Folktales in Low-Resource Languages</i>	
J. A. Meaney, Beatrice Alex and William Lamb	319
<i>Examining Language Modeling Assumptions Using an Annotated Literary Dialect Corpus</i>	
Craig Messner and Thomas Lippincott	325

<i>Evaluating Language Models in Location Referring Expression Extraction from Early Modern and Contemporary Japanese Texts</i>	
Ayuki Katayama, Yusuke Sakai, Shohei Higashiyama, Hiroki Ouchi, Ayano Takeuchi, Ryo Bando, Yuta Hashimoto, Toshinobu Ogiso and Taro Watanabe	331
<i>Evaluating LLM Performance in Character Analysis: A Study of Artificial Beings in Recent Korean Science Fiction</i>	
Woori Jang and Seohyon Jung	339
<i>Text vs. Transcription: A Study of Differences Between the Writing and Speeches of U.S. Presidents</i>	
Mina Rajaei Moghadam, Mosab Rezaei, Gülşat Aygen and Reva Freedman	352
<i>Mitigating Biases to Embrace Diversity: A Comprehensive Annotation Benchmark for Toxic Language</i>	
Xinmeng Hou	362
<i>Classification of Buddhist Verses: The Efficacy and Limitations of Transformer-Based Models</i>	
Nikita Neveditsin, Ambuja Salgaonkar, Pawan Lingras and Vijay Mago	377
<i>Intersecting Register and Genre: Understanding the Contents of Web-Crawled Corpora</i>	
Amanda Myntti, Liina Repo, Elian Freyermuth, Antti Kanner, Veronika Laippala and Erik Henriksen	386
<i>Sui Generis: Large Language Models for Authorship Attribution and Verification in Latin</i>	
Svetlana Gorovaia, Gleb Schmidt and Ivan P. Yamshchikov	398
<i>Enhancing Neural Machine Translation for Ainu-Japanese: A Comprehensive Study on the Impact of Domain and Dialect Integration</i>	
Ryo Igarashi and So Miyagawa	413
<i>Exploring Large Language Models for Qualitative Data Analysis</i>	
Tim Fischer and Chris Biemann	423
<i>Cross-Dialectal Transfer and Zero-Shot Learning for Armenian Varieties: A Comparative Analysis of RNNs, Transformers and LLMs</i>	
Chahan Vidal-Gorène, Nadi Tomeh and Victoria Khurshudyan	438
<i>Increasing the Difficulty of Automatically Generated Questions via Reinforcement Learning with Synthetic Preference for Cost-Effective Cultural Heritage Dataset Generation</i>	
William Thorne, Ambrose Robinson, Bohua Peng, Chenghua Lin and Diana Maynard	450
<i>Assessing Large Language Models in Translating Coptic and Ancient Greek Ostraca</i>	
Audric-Charles Wannaz and So Miyagawa	463
<i>The Social Lives of Literary Characters: Combining citizen science and language models to understand narrative social networks</i>	
Andrew Piper, Michael Xu and Derek Ruths	472
<i>Multi-word expressions in biomedical abstracts and their plain English adaptations</i>	
Sergei Bagdasarov and Elke Teich	483
<i>Assessing the Performance of ChatGPT-4, Fine-tuned BERT and Traditional ML Models on Moroccan Arabic Sentiment Analysis</i>	
Mohamed HANNANI, Abdelhadi Soudi and Kristof Van Laerhoven	489

<i>Analyzing Pokémon and Mario Streamers' Twitch Chat with LLM-based User Embeddings</i>	
Mika Hämäläinen, Jack Rueter and Khalid Alnajjar	499
<i>Corpus Development Based on Conflict Structures in the Security Field and LLM Bias Verification</i>	
Keito Inoshita	504
<i>Generating Interpretations of Policy Announcements</i>	
Andreas Marfurt, Ashley Thornton, David Sylvan and James Henderson	513
<i>Order Up! Micromanaging Inconsistencies in ChatGPT-4o Text Analyses</i>	
Erkki Mervaala and Ilona Kousa	521
<i>CIPHE: A Framework for Document Cluster Interpretation and Precision from Human Exploration</i>	
Anton Eklund, Mona Forsman and Frank Drewes	536
<i>Empowering Teachers with Usability-Oriented LLM-Based Tools for Digital Pedagogy</i>	
Melany Vanessa Macias, Lev Kharlashkin, Leo Einari Huovinen and Mika Hämäläinen	549

Conference Program

16.11.2024

9:10–10:30 **Oral session 1**

9:10–9:30 *Lightning talks*

9:30–9:50 *Text Length and the Function of Intentionality: A Case Study of Contrastive Sub-reddits*

Emily Sofi Ohman and Aatu Liimatta

9:50–10:10 *Tracing the Genealogies of Ideas with Sentence Embeddings*

Lucian Li

10:10–10:30 *Evaluating Computational Representations of Character: An Austen Character Similarity Benchmark*

Funing Yang and Carolyn Jane Anderson

10:30–11:00 **Coffee break**

11:00–12:40 **Oral session 2**

11:00–11:20 *Investigating Expert-in-the-Loop LLM Discourse Patterns for Ancient Intertextual Analysis*

Ray Umphrey, Jesse Roberts and Lindsey Roberts

11:20–11:40 *Extracting Relations from Ecclesiastical Cultural Heritage Texts*

Giulia Cruciani

11:40–12:00 *Constructing a Sentiment-Annotated Corpus of Austrian Historical Newspapers: Challenges, Tools, and Annotator Experience*

Lucija Krusic

12:00–12:20 *It is a Truth Individually Acknowledged: Cross-references On Demand*

Piper Vasicek, Courtni Byun and Kevin Seppi

12:20–12:40 *Extracting position titles from unstructured historical job advertisements*

Klara Venglarova, Raven Adam and Georg Vogeler

16.11.2024 (continued)

12:40–13:10 Lunch

13:10–15:30 Oral session 3

13:10–13:30 *Language Resources From Prominent Born-Digital Humanities Texts are Still Needed in the Age of LLMs*

Natalie Hervieux, Peiran Yao, Susan Brown and Denilson Barbosa

13:30–13:50 *NLP for Digital Humanities: Processing Chronological Text Corpora*

Adam Pawłowski and Tomasz Walkowiak

13:50–14:10 *A Multi-task Framework with Enhanced Hierarchical Attention for Sentiment Analysis on Classical Chinese Poetry: Utilizing Information from Short Lines*

Quanqi Du and Veronique Hoste

14:10–14:30 *Exploring Similarity Measures and Intertextuality in Vedic Sanskrit Literature*

So Miyagawa, Yuki Kyogoku, Yuzuki Tsukagoshi and Kyoko Amano

14:30–14:50 *Historical Ink: 19th Century Latin American Spanish Newspaper Corpus with LLM OCR Correction*

Laura Manrique-Gomez, Tony Montes, Arturo Rodriguez Herrera and Ruben Manrique

14:50–15:10 *Canonical Status and Literary Influence: A Comparative Study of Danish Novels from the Modern Breakthrough (1870–1900)*

Pascale Feldkamp, Alie Lassche, Jan Kostkan, Márton Kardos, Kenneth Enevoldsen, Katrine Baunvig and Kristoffer Nielbo

15:10–15:30 *Deciphering psycho-social effects of Eating Disorder : Analysis of Reddit Posts using Large Language Model(LLM)s and Topic Modeling*

Medini Chopra, Anindita Chatterjee, Lipika Dey and Partha Pratim Das

16.11.2024 (continued)

15:30–16:30 Posters and coffee

- 15:30–16:30 *Topic-Aware Causal Intervention for Counterfactual Detection*
Thong Thanh Nguyen and Truc-My Nguyen
- 15:30–16:30 *UD for German Poetry*
Stefanie Dipper and Ronja Laarmann-Quante
- 15:30–16:30 *Molyé: A Corpus-based Approach to Language Contact in Colonial France*
Rasul Dent, juliette janes, Thibault Clerice, Pedro Ortiz Suarez and Benoît Sagot
- 15:30–16:30 *Vector Poetics: Parallel Couplet Detection in Classical Chinese Poetry*
Maciej Kurzynski, Xiaotong Xu and Yu Feng
- 15:30–16:30 *Adapting Measures of Literality for Use with Historical Language Data*
Adam Roussel
- 15:30–16:30 *Improving Latin Dependency Parsing by Combining Treebanks and Predictions*
Hanna-Mari Kristiina Kupari, Erik Henriksson, Veronika Laippala and Jenna Kanerva
- 15:30–16:30 *From N-grams to Pre-trained Multilingual Models For Language Identification*
Thapelo Andrew Sindane and Vukosi Marivate
- 15:30–16:30 *Visualising Changes in Semantic Neighbourhoods of English Noun Compounds over Time*
Malak Rassem, Myrto Tsigkouli, Chris W. Jenkins, Filip Miletic and Sabine Schultes im Walde
- 15:30–16:30 *SEFLAG: Systematic Evaluation Framework for NLP Models and Datasets in Latin and Ancient Greek*
Konstantin Schulz and Florian Deichsler
- 15:30–16:30 *A Two-Model Approach for Humour Style Recognition*
Mary Ogbuka Kenneth, Foaad Khosmood and Abbas Edalat
- 15:30–16:30 *N-gram-Based Preprocessing for Sandhi Reversion in Vedic Sanskrit*
Yuzuki Tsukagoshi and Ikki Ohmukai

16.11.2024 (continued)

- 15:30–16:30 *Enhancing Swedish Parliamentary Data: Annotation, Accessibility, and Application in Digital Humanities*
Shafqat Mumtaz Virk, Claes Ohlsson, Nina Tahmasebi, Henrik Björck and Leif Runefelt
- 15:30–16:30 *Evaluating Open-Source LLMs in Low-Resource Languages: Insights from Latvian High School Exams*
Roberts Dargis, Guntis Bārzdiņš, Inguna Skadiņa and Baiba Saulite
- 15:30–16:30 *Computational Methods for the Analysis of Complementizer Variability in Language and Literature: The Case of Hebrew "she-" and "ki"*
Avi Shmidman and Aynat Rubinstein
- 15:30–16:30 *From Discrete to Continuous Classes: A Situational Analysis of Multilingual Web Registers with LLM Annotations*
Erik Henriksson, Amanda Myntti, Saara Hellström, Selcen Erten-Johansson, Anni Eskelinen, Liina Repo and Veronika Laippala
- 15:30–16:30 *Testing and Adapting the Representational Abilities of Large Language Models on Folktales in Low-Resource Languages*
J. A. Meaney, Beatrice Alex and William Lamb
- 15:30–16:30 *Examining Language Modeling Assumptions Using an Annotated Literary Dialect Corpus*
Craig Messner and Thomas Lippincott
- 15:30–16:30 *Evaluating Language Models in Location Referring Expression Extraction from Early Modern and Contemporary Japanese Texts*
Ayuki Katayama, Yusuke Sakai, Shohei Higashiyama, Hiroki Ouchi, Ayano Takeuchi, Ryo Bando, Yuta Hashimoto, Toshinobu Ogiso and Taro Watanabe
- 15:30–16:30 *Evaluating LLM Performance in Character Analysis: A Study of Artificial Beings in Recent Korean Science Fiction*
Woori Jang and Seohyon Jung
- 15:30–16:30 *Text vs. Transcription: A Study of Differences Between the Writing and Speeches of U.S. Presidents*
Mina Rajaei Moghadam, Mosab Rezaei, Gülşat Aygen and Reva Freedman
- 15:30–16:30 *Mitigating Biases to Embrace Diversity: A Comprehensive Annotation Benchmark for Toxic Language*
Xinmeng Hou

16.11.2024 (continued)

16:30–17:30 Virtual posters

- 16:30–17:30 *Classification of Buddhist Verses: The Efficacy and Limitations of Transformer-Based Models*
Nikita Neveditsin, Ambuja Salgaonkar, Pawan Lingras and Vijay Mago
- 16:30–17:30 *Intersecting Register and Genre: Understanding the Contents of Web-Crawled Corpora*
Amanda Myntti, Liina Repo, Elian Freyermuth, Antti Kanner, Veronika Laippala and Erik Henriksson
- 16:30–17:30 *Sui Generis: Large Language Models for Authorship Attribution and Verification in Latin*
Svetlana Gorovaia, Gleb Schmidt and Ivan P. Yamshchikov
- 16:30–17:30 *Enhancing Neural Machine Translation for Ainu-Japanese: A Comprehensive Study on the Impact of Domain and Dialect Integration*
Ryo Igarashi and So Miyagawa
- 16:30–17:30 *Exploring Large Language Models for Qualitative Data Analysis*
Tim Fischer and Chris Biemann
- 16:30–17:30 *Cross-Dialectal Transfer and Zero-Shot Learning for Armenian Varieties: A Comparative Analysis of RNNs, Transformers and LLMs*
Chahan Vidal-Gorène, Nadi Tomeh and Victoria Khurshudyan
- 16:30–17:30 *Increasing the Difficulty of Automatically Generated Questions via Reinforcement Learning with Synthetic Preference for Cost-Effective Cultural Heritage Dataset Generation*
William Thorne, Ambrose Robinson, Bohua Peng, Chenghua Lin and Diana Maynard
- 16:30–17:30 *Assessing Large Language Models in Translating Coptic and Ancient Greek Ostraca*
Audric-Charles Wannaz and So Miyagawa
- 16:30–17:30 *The Social Lives of Literary Characters: Combining citizen science and language models to understand narrative social networks*
Andrew Piper, Michael Xu and Derek Ruths
- 16:30–17:30 *Multi-word expressions in biomedical abstracts and their plain English adaptations*
Sergei Bagdasarov and Elke Teich
- 16:30–17:30 *Assessing the Performance of ChatGPT-4, Fine-tuned BERT and Traditional ML Models on Moroccan Arabic Sentiment Analysis*
Mohamed HANNANI, Abdelhadi Souidi and Kristof Van Laerhoven

16.11.2024 (continued)

- 16:30–17:30 *Analyzing Pokémon and Mario Streamers' Twitch Chat with LLM-based User Embeddings*
Mika Hämäläinen, Jack Rueter and Khalid Alnajjar
- 16:30–17:30 *Corpus Development Based on Conflict Structures in the Security Field and LLM Bias Verification*
Keito Inoshita
- 16:30–17:30 *Generating Interpretations of Policy Announcements*
Andreas Marfurt, Ashley Thornton, David Sylvan and James Henderson
- 16:30–17:30 *Order Up! Micromanaging Inconsistencies in ChatGPT-4o Text Analyses*
Erkki Mervaala and Ilona Kousa
- 16:30–17:30 *CIPHE: A Framework for Document Cluster Interpretation and Precision from Human Exploration*
Anton Eklund, Mona Forsman and Frank Drewes
- 16:30–17:30 *Empowering Teachers with Usability-Oriented LLM-Based Tools for Digital Pedagogy*
Melany Vanessa Macias, Lev Kharlashkin, Leo Einari Huovinen and Mika Hämäläinen