AI in Education
Agenda

1. **Introduction** - EDIA and 360AI
2. **What is AI?**
3. **How can AI be applied to Education?**
4. **Automated Metadata** Case Study
5. **Content Recommendation** Case Study
6. **Demonstration**
360AI

Set of AI tools designed to enhance and automate processes in education.

- AI as a service (AlaaS)
- Developed over 12+ years
- Integrated in 15+ products
- 200K+ users across products
360AI by EDIA

- EdTech since 2004
- Team of 35+ based in Amsterdam
- Supports 500k+ active users worldwide
- Software as a Service
- Strong pedigree in Artificial Intelligence (NLP, machine learning, predictive modeling)
SELECTION OF OR CLIENTS
Sssst...

Machine Learning
AI & Adaptive EdTech

- Not many adaptive systems exist
- Lots of uncharted territory
- AI tech constantly evolving

One thing is for sure: You need data!
So, what data is needed?

- Content
- Learning Goal
- Learner

... and their connections
AI Overview

How does it work?
What human capabilities can it perform?
How can these capabilities used?
What business case is there for AI?
Artificial Intelligence

The ability of a computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. (Encyclopaedia Britannica)

**Machine Learning**

is a field of computer science that gives computer systems the ability to "learn" (i.e., progressively improve performance on a specific task) with data, without being explicitly programmed.

**Deep Learning**

subset of ML that uses a cascade of multiple layers of processing units for feature extraction and transformation. Each successive layer uses the output from the previous layer as input. Used for highly complex problems.
Natural Language Processing

Area of computer science and AI concerned with the interactions between computers and human (natural) languages.

**Past**
Collecting Features of Text
- Sentence length
- Average word length
- Amount of syllables

**Now**
Vector Representation
- Machine readable format
- Easy to reason about and classify
- Computer picks out features
Placing words in a X dimensional space and expressing their position and relation to each other in numeric values.
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News Recommendation
Readability Analysis
Similarity Analysis
Named-Entity Recognition

Topic Classification
Learning Analytics
Automated Metadata Tagging
Learning Task Creation

Available for English, Dutch, French, German, Spanish and Italian
360AI - AI Applied to Education

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Why Metadata is Important?

- Faster content publishing
- Saved time and resources
- Increased searchability
- Monetize existing content archive
- Powerful content recommendations
- Adaptive and Personalised Learning!
1. Metadata is inconsistent (interpretation, quantity, values)
2. Metadata of poor quality (spelling errors, consistency, filled in?)
3. New metadata difficult to implement (need to go over entire library)

Challenge
Manual metadata tagging is too expensive.
Goals of the PoC

1. To assess if AI can tag content to the selected taxonomy at the same quality as a human.
2. Reach 60% accuracy of machine tagging vs human tagging.
Approach and Scope

3 subjects were analyzed - Chemistry, English, History with 33,000 total content items (i.e. paragraphs, questions, books, audio, video).

1. Analysis of metadata quality
2. Develop Bloom taxonomy topic classification model
3. Analyse results
4. Report
Analysis of Metadata Quality

40% of metadata is erroneous

- Misspelled metadata
- Wrongly applied metadata
- Missing metadata
- Partially missing metadata
- Abbreviated metadata
Data Preparation

- Remove not labelled content items
- Split remainder into:
  - 80% training set
  - 20% validation set
Bloom Classification

- Learning goal content description used for Bloom classification
- Try out several classification machine learning models
- Chose “Decision Tree” - train on the content
Analysis of Results

- Double blind test: asking authors to classify again without being influenced by past decisions
- Conclusion: Items that are difficult to classify for the machine are also difficult for humans.
Results

- **History** Bloom Taxonomy accuracy score: 0.68
- **Chemistry** Bloom Taxonomy accuracy score: 0.79
- **English** Bloom Taxonomy accuracy score: 0.95

Proved that the AI-based automatic meta-tagging is possible and of high quality.
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Content Recommendation

Use Case

1. Find suitable news content for test items
2. Classifying difficulty based on CEFR
3. Classify topics based on IAB Taxonomy

Challenge

Finding suitable content on correct CEFR level and at a given topic that can be used as learning & testing content.
Goal of the PoC

Prove that CEFR classification and Topic classification can be done reliably by AI and used in content search.
Approach and Scope

Data: English News Articles from own database

1. CEFR literature review
2. Develop CEFR level classification model
3. Develop IAB taxonomy topic classification model
4. Analyse results
5. Provide API for testing
Data Preparation

- Use 500 CEFR tagged texts for CEFR classification
- Use IAB-tagged Wikipedia texts for Topic classification
- Split into:
  - 80% training set
  - 20% validation set
Results

- IAB **Topic Classification** accuracy score: 0.87
- CEFR **Classification** accuracy score: 0.81

Proved that the AI-based recommendation is possible and of high quality.
Products Utilizing 360AI

KnowbleReader.com

AI Capabilities used
- Readability analysis
- Similarity analysis
- Recommend articles
- Generate tasks
TRY IT OUT

Or reach out to:
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