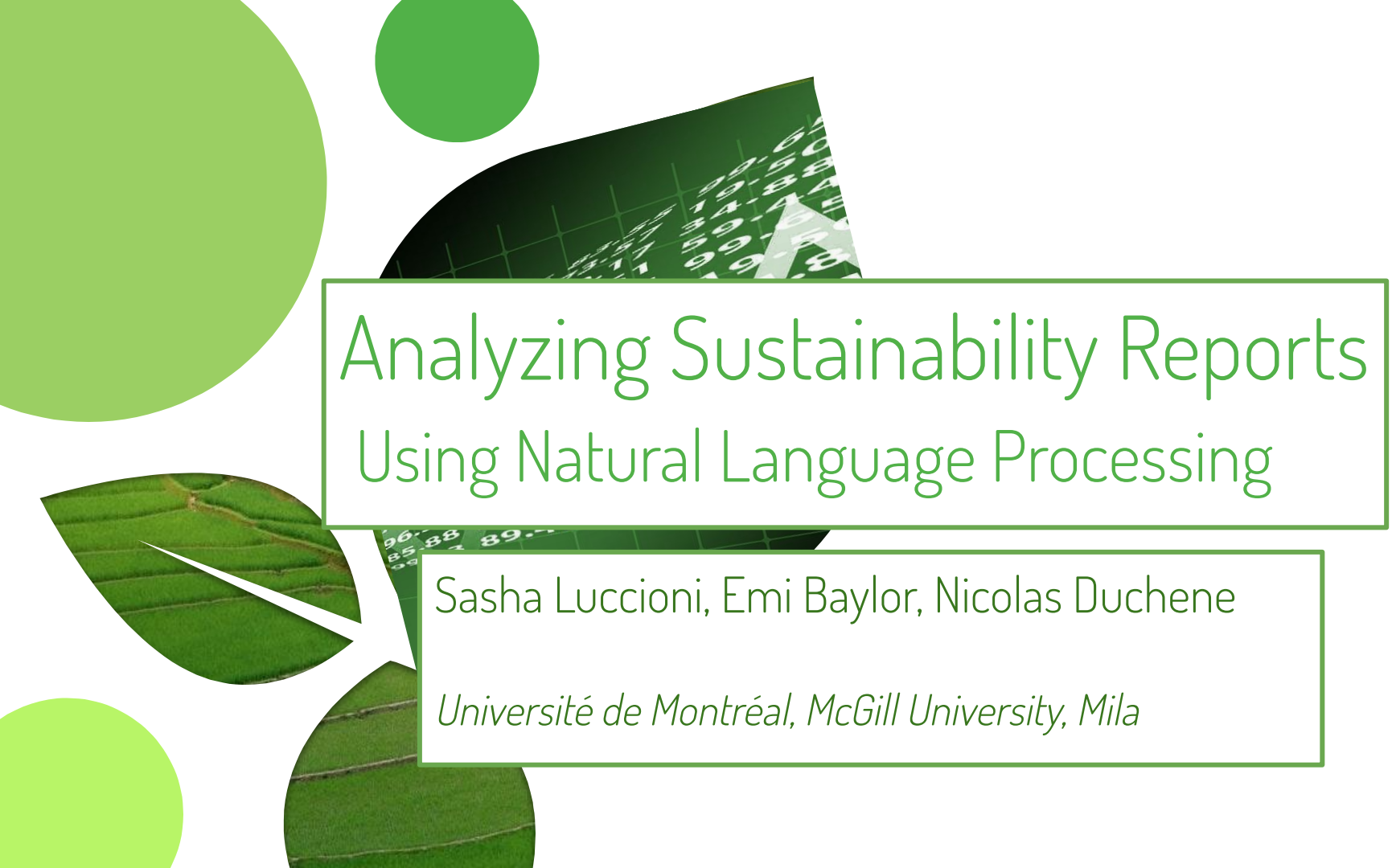


Analyzing Sustainability Reports

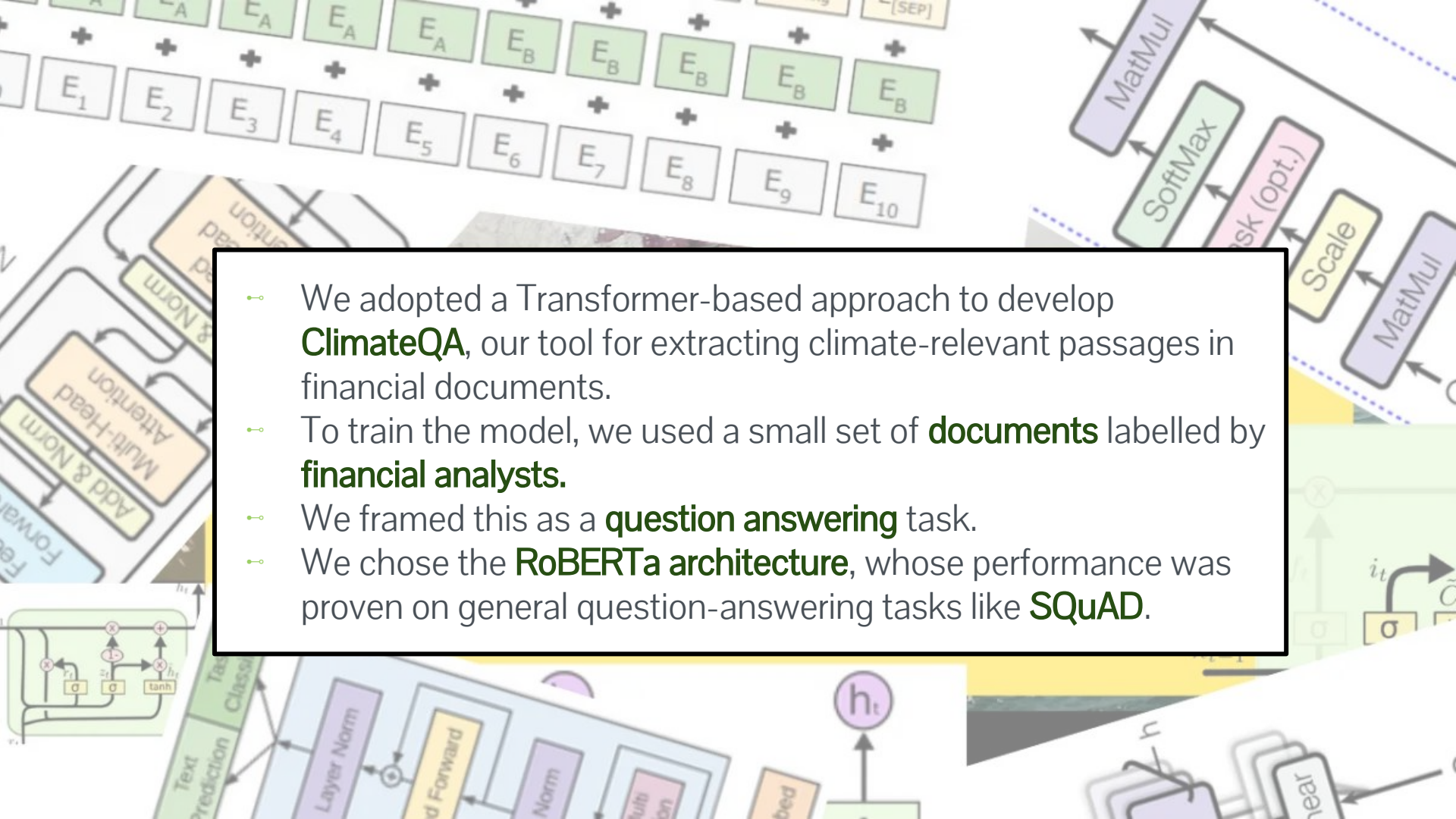
Using Natural Language Processing

Sasha Luccioni, Emi Baylor, Nicolas Duchene

Université de Montréal, McGill University, Mila

- Climate change poses a substantial risk to global assets and stocks, measured in the **trillions of dollars**.
- It is hard to forecast **where, how, or when** climate change will impact financial assets, largely due to the lack of quantitative data on the subject.
- Gathering data regarding the **risks** and **exposure** that climate change poses to specific companies is a key part of predicting the extent of climate change impacts on the stock market.

- Disclosing climate change **risks** and **liabilities** currently consists of a mix of mandatory and voluntary initiatives.
- In 2015, the **Task Force on Climate-related Financial Disclosures (TCFD)** was founded to improve the state of voluntary climate disclosing and to encourage companies to increase their climate transparency.
- They released a set of **14 questions** to guide sustainability reporting.
  - These questions are extensively used to guide the analysis of climate risk disclosures, with analysts using them to assess the extent and type of **climate exposure** of companies.



- We adopted a Transformer-based approach to develop **ClimateQA**, our tool for extracting climate-relevant passages in financial documents.
- To train the model, we used a small set of **documents** labelled by **financial analysts.**
- We framed this as a **question answering** task.
- We chose the **RoBERTa architecture**, whose performance was proven on general question-answering tasks like **SQuAD**.

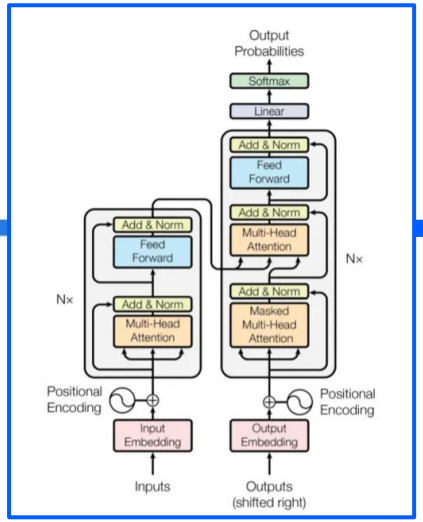
	Validation F1 Score	Test F1 Score	Val - Test Difference
Agriculture, Food & Forests	89.4%	72.1%	-17.2%
Energy	94.2%	89.8%	-4.4%
Banks	91.9%	86.6%	-5.3%
Transportation	86.9%	72.5%	-14.4%
Insurance	92.9%	78.7%	-14.2%
Materials & Buildings	91.8%	67.6%	-24.2%
Average across sectors	**91.7%**	**82.0%**	**-9.7%**

AllenNLP

TCFD Question

Does the organization describe the climate-related risks or opportunities the organization has identified?

PDF



ClimateQA

Relevant Passages

We also understand there can be a financial impact on our operations from climate-related risks.

We continue to develop processes to quantify the potential financial impacts of climate-related risks and the costs of actions taken to manage these risks.

Thank you!

Come see us at the poster session!