

Machine Intelligence in Healthcare

Precision Medicine Analytics Platform

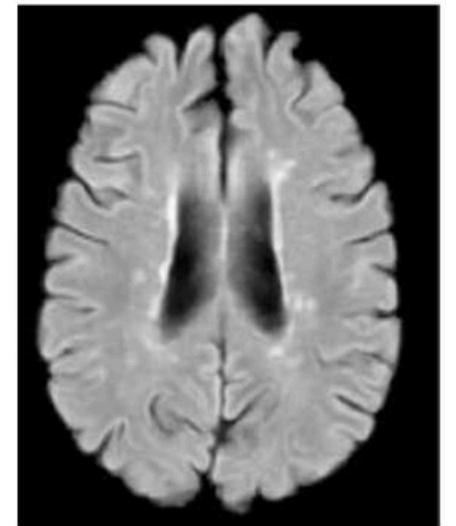
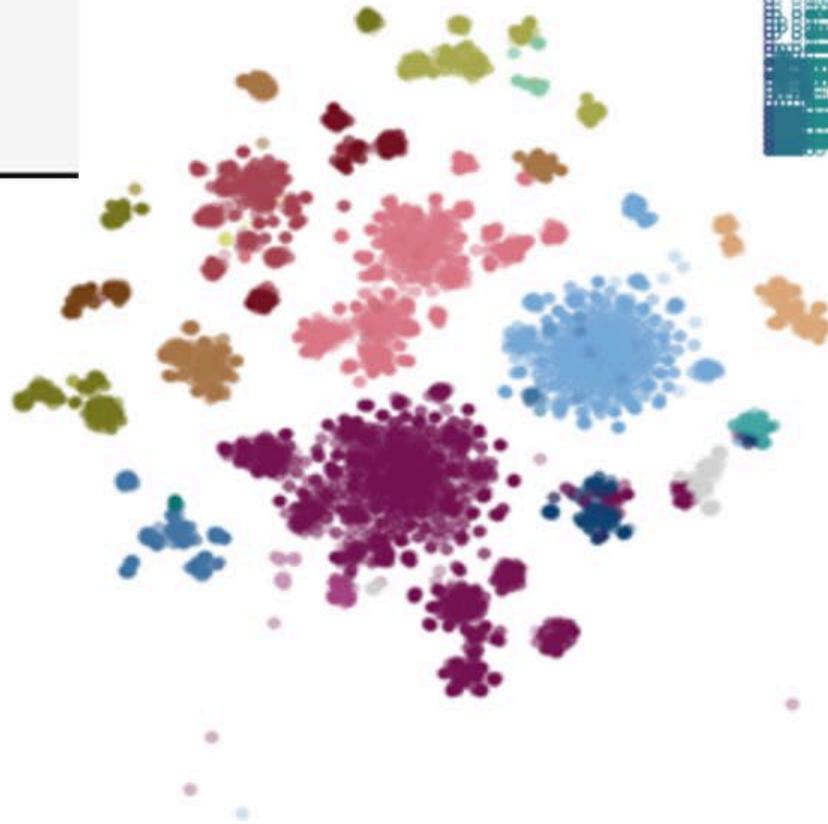
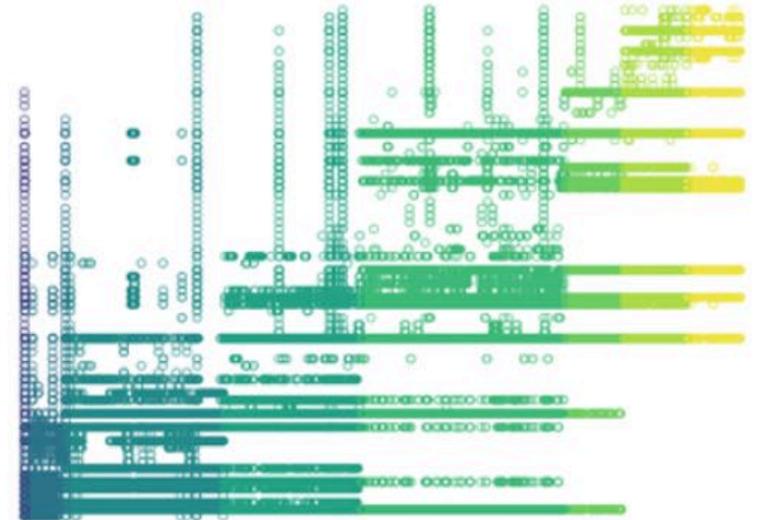
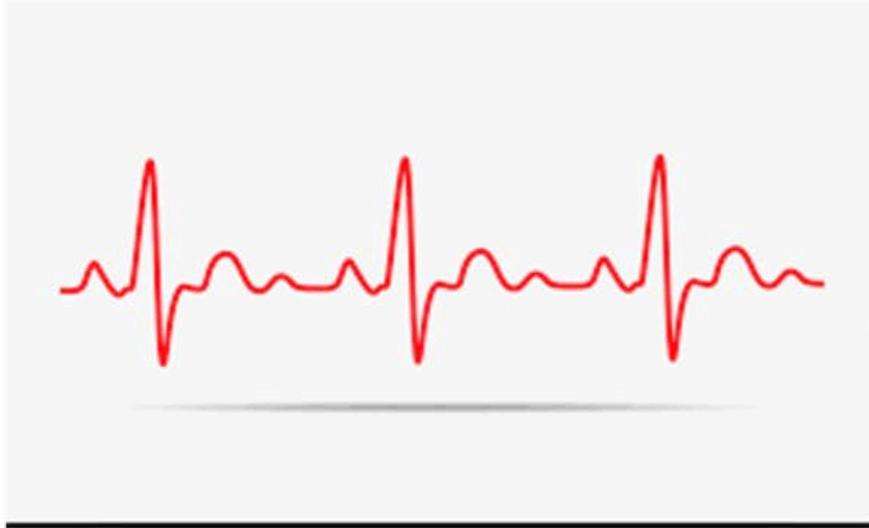
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Precision Medicine Analytics Platform



Combine large, disparate data sources, data analytics, and the fundamental science of medicine to enable medical discovery and delivery in a continuous learning system

Machine Intelligence Will Transform Health...

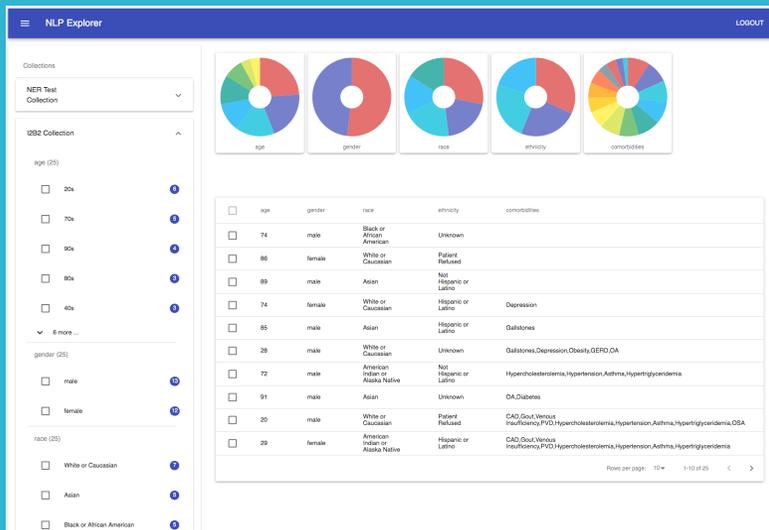


...And There Are Challenges To Overcome

- Amplification of human bias
- Using representative data sets to avoid bias in results
- Using appropriate machine learning approaches
- Verification and validation of results – particularly to inform decision making

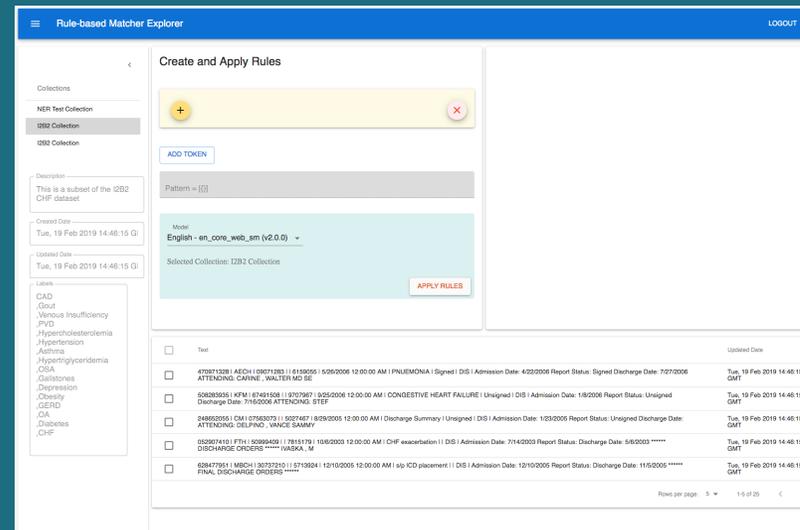
Natural Language Processing Tools

Explorer



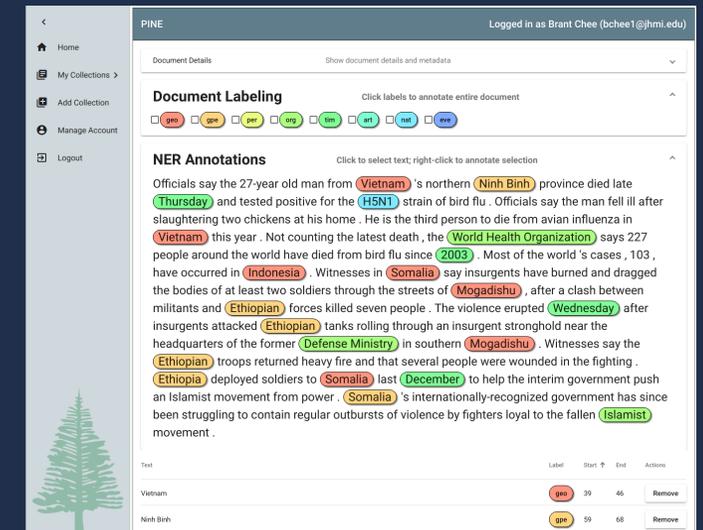
- High level dashboard describing contents of free text
- Based on keyword matching

Matcher



- Ability to search over free text with rule-based search
- Advanced regular expressions

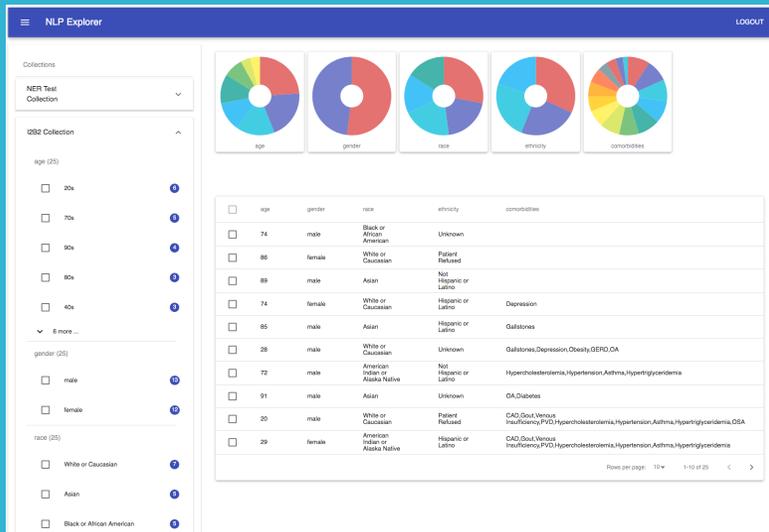
PINE



- SME annotations used to train an underlying machine learning model

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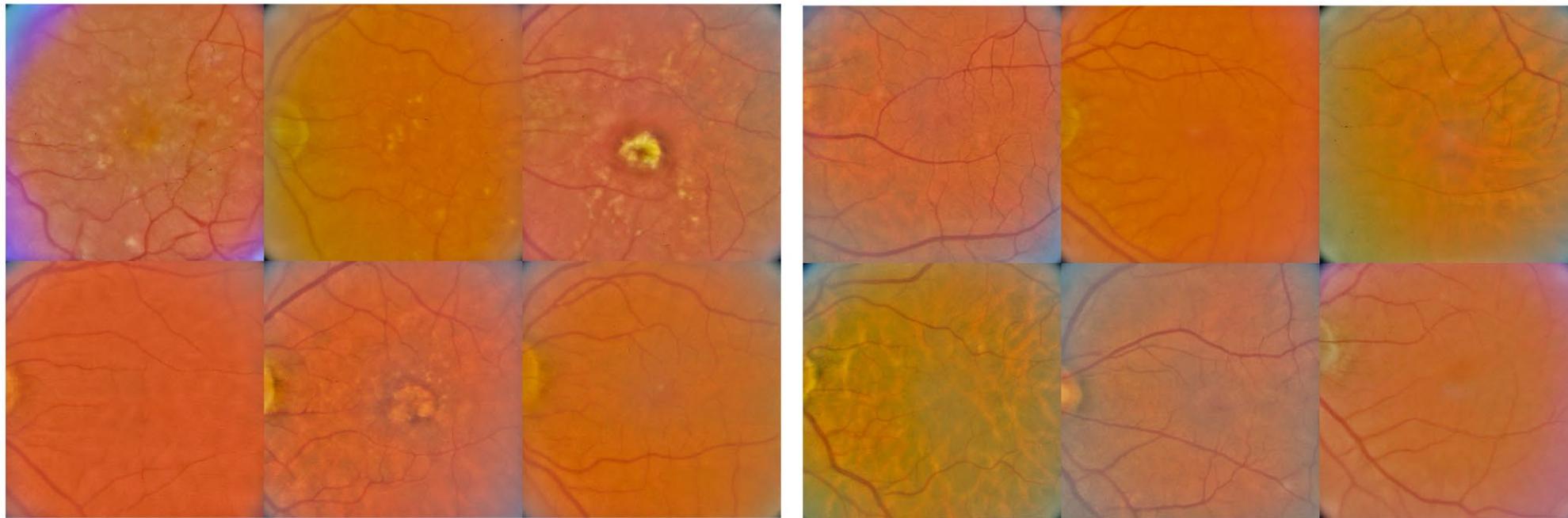
Allows visibility into distribution of data

Identifying Sources of Bias*

- Conducting research to examine disrespectful language within EMR
 - Existing sentiment-based tools not useful – nature of medical notes contain negative language with no negative sentiment
- Developing new linguistic markers of bias
- Goal is development of quantitative methods over EMR text to identify bias

Bias and Privacy are Important Considerations in Clinical Deployment of Diagnostic AI

One solution for debiasing and anonymization: generative models that synthesize novel realistic images with attributes that can be controlled



Synthetically generated retinal images: with AMD

Synthetically generated retinal images: healthy

Future Focus

Bias can be introduced by humans, algorithms and/or data

- Humans: Tracking and education regarding biased language
- Algorithms: Approaches to identification of bias in results
- Data: Representative data sets – privacy / data sharing