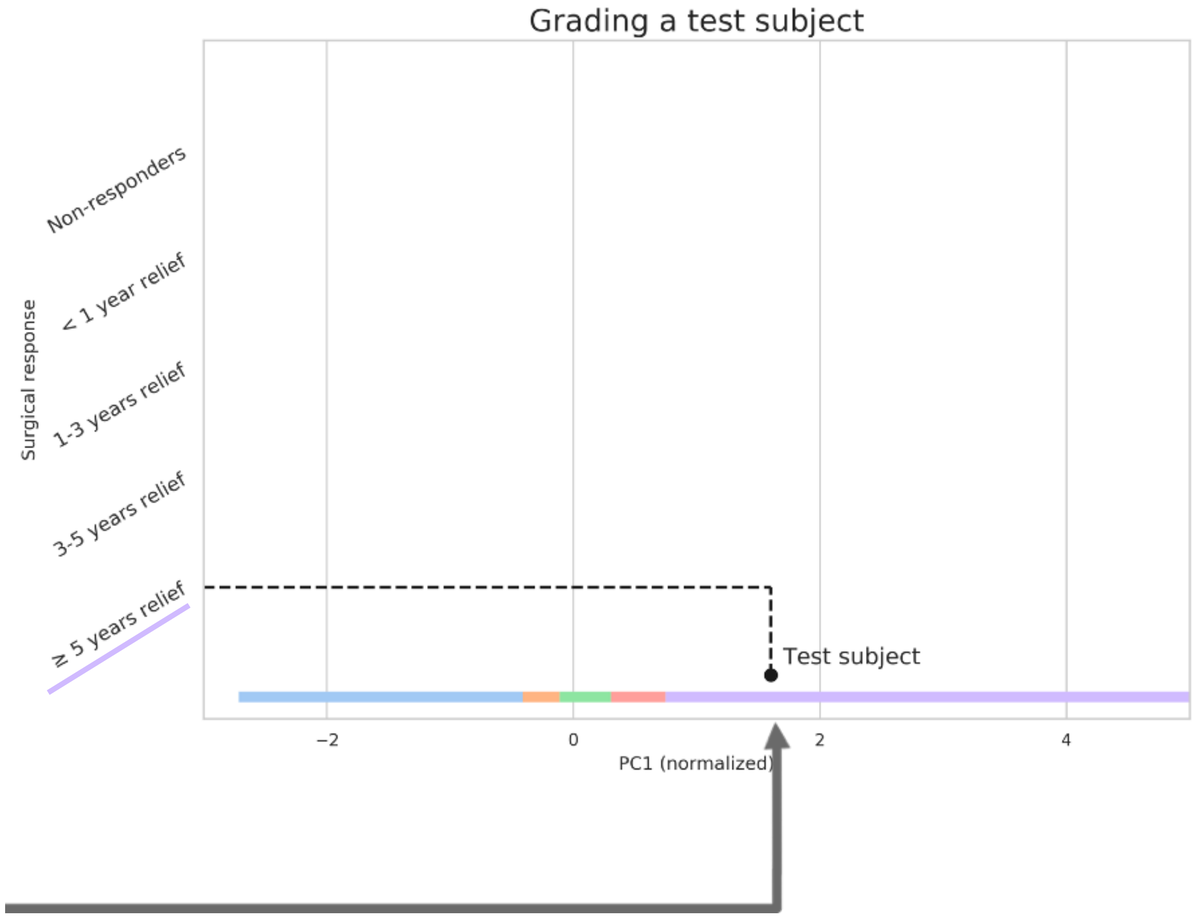
Results

Example of the grading

- Subject is graded based on the clinical expression of pain
- Total score determines the position of subject on a scale
- Scale sections correspond to different levels of surgical response
- Final grade is being confirmed with Supervised ML task and pre-surgical imaging data

Feature (factors -1 and 1)	PC Weight	Test subject scoring	Scoring
Medication relief	0.58	1 (Medication helps)	0.58
Rare pain attacks	0.44	-1 (Seasonal pain)	-0.44
Seasonal pain attacks	0.38	1 (Seasonal pain - winter)	0.38
Multiple attacks daily	-0.25	-1 (Seasonal pain)	0.25
Sex	0.23	1 (Female)	0.23
Hypothyroid (on medication)	0.22	-1 (No thyroid problems)	-0.22
Type 2 diabetes	-0.19	-1 (No diabetes)	0.19
Constant pain	-0.18	-1 (No constant pain)	0.18
Spontaneously triggered pain	-0.17	-1 (Pain triggered by wind)	0.17
Cancer history	-0.13	-1 (No history of cancer)	0.13
Shock-like pain	0.13	1 (Electric shock-like pain)	0.13
		Total score	1.58



Summary

Outcome

- Potential framework to provide a foundation for future development of ML-driven, clinical tools for TN assessment and surgical outcome prognostication.

Key takeaways

- Comparably to imaging data, clinical data may also be applied in ML to better understand and treat TN.
- TN-related features were largely prioritized by unsupervised ML
- TN classes defined based on the duration of surgical response are distinguishable by ML algorithms and express specific clinical symptoms, identified by PC1 (Pain grade).

Future directions

- **Supervised ML** utilizing advanced imaging data (objective measure) and novel pain grade metric (from subjective reports) to develop a surgical outcome prognostication tool. Exploring deep learning architectures
- **A novel classification of TN** which will reflect the potential surgical outcome and allow for better patient selection for surgery