CLAMP ANNOTATIONS MULTIPLE CRITERIA NAMED ENTITY MODIFIER **RAW DATA** THE GOOD, THE BAD AND THE UGLY **PROBLEM SEVERITY** TREATMENT **NEGATION** UNCERTAINTY **MEDICATION REGEX SEARCH ASSERTION** MIOCARD. INFARCT **ANGINA** automatically analyzing clinical notes – ISCHAEMIA RELATION comparing approaches for patient screening <2 **EXAMPLE RELATIONS TOKENIZATION** "NOT MET ENTITY 1 (PROBLEM) IS NEGATED ENTITY 1 (TREATMENT) OCCURS_AT BODY PART **INFORMATION EXTRACTION** SPARSE REPRESENTATION **DOUBLE CRITERIA INFER DATES** records **ASPIRIN** ABDOMINAL UMLS SPARSE REPRESENTATION TF * IDF "MET" **ALL CORPUS** UNIGRAMS CLAMP ANNOTATION SURGERY SCOPE SEARCH "NOT MET" **DENSE REPRESENTATION** CREATININE CONCEPT EMBEDDINGS WORD EMBEDDINGS ADVANCED_CAD SCOPE: N CHARACTERS REPRESENTATION K MEANS ASP_FOR_MI "MET" BAG OF CLUSTERS **ABDOMINAL** REPRESENTATION CREATININE WORD2VEC DATE VALIDATION DIETSUPP_2MOS REPRESENTATION **NAIVE BAYES** FREQ. COUNT **PUBMED** ≤N MONTHS KETO_1YR WIKIPEDIA **BAG OF CONCEPTS** SUPPLEMENT abstracts MI_6MOS **SUPPORT VECTOR** MACHINE ALCOHOL_ABUSE >N MONTHS PERCEPTRON DRUG_ABUSE **ENGLISH DECISION TREE** MAKES_DECISIONS MAIN CONCLUSIONS SKEWED DISTRIBUTIONS MAJOR_DIABETES RANDOM FOREST UNBALANCED NUMBER OF TRANSPARENT OVERALL MANUAL **PERFORMANCE** CRITERIA **FEATURES** LABOUR KNOWLEDGE SOLUTION MAJORITY CLASS "MET" "NOT MET" OUTPUT BAG OF WORDS CLASSIFIERS ML CLASSIFIER MINORITY CLASS BAG OF CONCEPTS DESCRIMINATIVE TERMS REGEX to see whichs DISCRIMINATIVE TERMS TERMS are PRESENT FUTURE WORK: AUTOMATIC EXTRACTION OF DESCRIMINATIVE TERMS? F1 SCORE PER CATEGORY AND PER APPROACH, AVERAGED OVER "MET" AND "NOT MET" MANY, VARIABLY PHRASED COMPLICATIONS for each PATIENT, for each SEMANTIC ENTITY... N2C2: National NLP clinical challenges if ENTITY is a KNOWN COMPLICATIONS PRESENT PROBLEM Merijn Beeksma*, Madhumita Sushil[☆], Pieter Fivez[☆], EMBED as CUI Simon Šuster[∞], Florian Kunneman*, Ghiath Ghanem*, CUI Walter Daelemans[☆], Antal van den Bosch* COMPLICATION PROBLEM EMBEDDING **EMBEDDING** *Radboud University Nijmegen ☆University of Antwerp Contact: m.beeksma@let.ru.nl "MET"