



# Chedid Re

Here for you. Far together.

## How NLP and LLM Reshape Actuarial Risk Assessment

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Innovating Underwriting Efficiency



**CRMI**  
CORPORATE  
RISK MANAGEMENT  
INSTITUTE

*A company of Chedid Capital*





# The Theory: Syntactic vs. Semantic Intelligence

## NLP: Computational Linguistics

### Deterministic Extraction

NLP operates on **Syntactic Parsing**—mapping text to rigid actuarial ontologies through tokenization and NER.

$$f(T) \rightarrow \{V_i, C_{score}\}$$

- **Named Entity Recognition:** Locating rigid facts (Dates, Ages, ISO Ratings).
- **Medical Mapping:** Direct clinical text conversion to ICD-10/11 standards.
- **Structure:** Turns "Dark Data" into queryable SQL-ready variables.

## LLM: Neural Transformers

### Probabilistic Reasoning

LLMs leverage **Semantic Vector Spaces** to interpret nuance and infer risk through attention mechanisms.

$$P(R|C) = \prod \text{Attention}(\text{Tokens})$$

- **Contextual Understanding:** Interpreting a provider's tone or implied risks in a 50-page survey.
- **RAG (Retrieval):** Anchoring LLM reasoning to specific UW guidelines.
- **Synthesis:** Summarizing complex engineering failure modes.

*Result: NLP ensures **High-Fidelity Extraction** while LLM provides **High-Context Interpretation**.*





# The Ecosystem: Data Pool to Actuarial Model

Our architecture bridges the gap between raw internal/external sources and predictive actuarial models.



 90% Faster Processing Time

 91-94% Extraction Confidence



# Practical Application: Medical Data Processing

## Clinical Extraction Logic

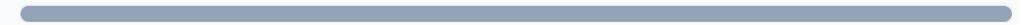
Processing patient symptoms, lab results, and provider assessments to inform mortality & morbidity scores.

- **Pattern Detection:** Correlating chronic history with current lab vitals.
- **Automated ICD-10:** Mapping "Elevated Blood Glucose" + "HbA1c 7.8%" to Type 2 Diabetes codes.
- **Risk Mitigation:** Flagging conditional underwriting needs for CV risks.

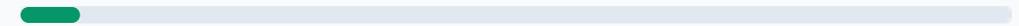
```
INPUT: "Patient presents with 145/92 mmHg & suboptimal  
HbA1c..."  
NLP: [Diagnosis: Diabetes T2] [BP: Elevated]  
LLM: Recommendation for Stress Test based on CV risk profile.
```

### Efficiency Impact

Manual Review: **45 Mins**



AI-Powered: **3 Mins**



**94% Accuracy vs Human Error**



# Practical Application: Property Risk Assessment

## Case Study: 52-Page Survey

Automated extraction of construction details, age of systems, and code compliance from complex engineering files.

### EXTRACTED VARIABLES:

- Construction: Steel Frame, Class 2 (1985)
- HVAC: 38 yrs old (End of Life)
- Roof: 28 yrs old / Full Sprinkler: YES
- Confidence Score: 0.91

## Underwriting Outcomes

- **ISO Rating:** Automated generation of guidance based on component age and protection systems.
- **Component Life-Cycle:** Flagging mechanical/HVAC equipment reaching depreciation limits.
- **Consistency:** Eliminating subjective bias in building condition assessments.



3 vs 60 Mins Process  
Acceleration

## THANKYOU!

### Beirut

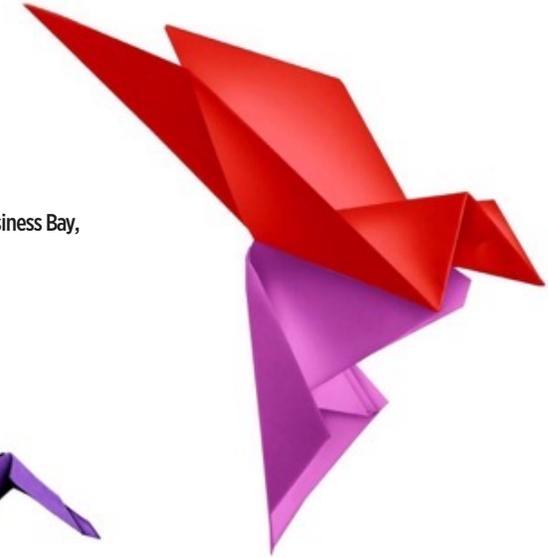
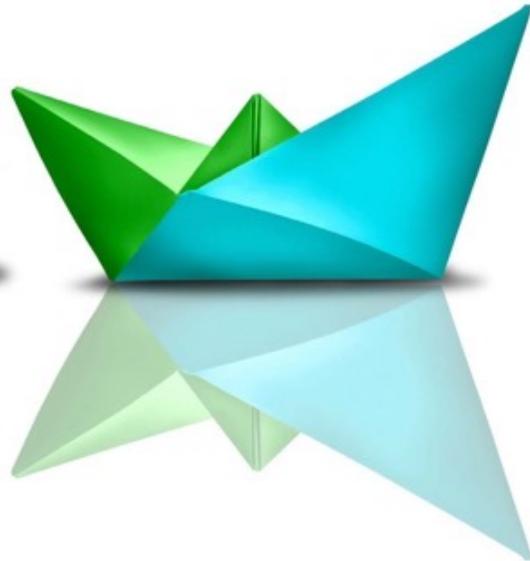
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