# Stronger Together: Where Data Meets Human Connection

#### Team G11

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Goal



Foster longer, more successful matches by identifying early signals of relationship health and risk

But..



Human relationships are **complex** 

The Key



Glimpse into the human brain with comments & textual features

So...

Here is our solution...

## Match Health Dashboard

Our real-time monitoring dashboard enables timely, informed actions by answering:



- 1. Who requires proactive intervention?
- 2. When should we take action?

Match ID	Risk & Conflict	Engagement	Relationship Quality	Months Until Expected Closure	Predicted Closure Reason
A123	0.66	1.21	1.16	3	Success
B456	0.92	0.08	-0.49	10	Safety Concerns
C789	-0.18	2.73	0.55	8	Incompatibility

# **Building Block 1 - Categories Derived from Call Note Patterns**

#### **Extracted Relationship Categories**

Match ID	Risk & Conflict	Engagement	Relationship Quality	Months Until Expected Closure	Predicted Closure Reason
A123	0.66	1.21	1.16	3	Success
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# **Key Categories for Model Training**



#### **Engagement**

Tracks match support involvement

Check-in cadence

**Calling Frequency** 



#### **Risk & Conflict**

Identifies relationship risks & conflicts between matches

Unresponsiveness

**External Stressor** 

Conflict Language



## Relationship Quality

Measures depth & positivity of a relationship

**Engagement Consistency** 

Mutual Sense of Growth

**Shared Interests** 

# **Leveraging LLM to Extract Features from Call Notes**

#### **LLM Call Note Summaries**

[{"Big": "I'm doing well."}, {"Big": "I feel Little isn't enjoying time with me."}, {"Big": "We went on a walk to Sculpture Garden and got ice cream on Tuesday."}, {"Big": "I saw P/G Unresponsiveness give Little money for ice cream, but Little didn't offer to pay, so I did."}, {"Big": "We met twice, the other time was Saturday at an antique shop." \, \{"Big": "Little isn't very talkative with me."}, {"Big": "Little goes on her phone in the car with headphones on, watches YouTube/movie."}, {"Big": "Little-**External Stressor** doesn't start conversation, is short with me."}, {"Big": "In the car, I said to Little, 'I get the feeling you don't really want to see me, but you are forced to join our meets.' Little didn't respond, was quiet."}, {"Big": "Yes, it would be helpful to have MEC there for a '2 month check-in.'"}, {"Big": "P/G seems **Engagement Consistency** super busy with their move, got a new job, etc."}, {"Big": "Little asks for food on the way home, said there wasn't dinner at home."}, {"Big": "Little had smiled about something on her show on her phone and shared it with me so I could laugh too. That made my day."}, {"Big": "I'm feeling sad as I want Little to enjoy our meets."}, {"Big": "I am not giving up, I want to **Future Oriented** continue to try. I am in this for the long haul."}]

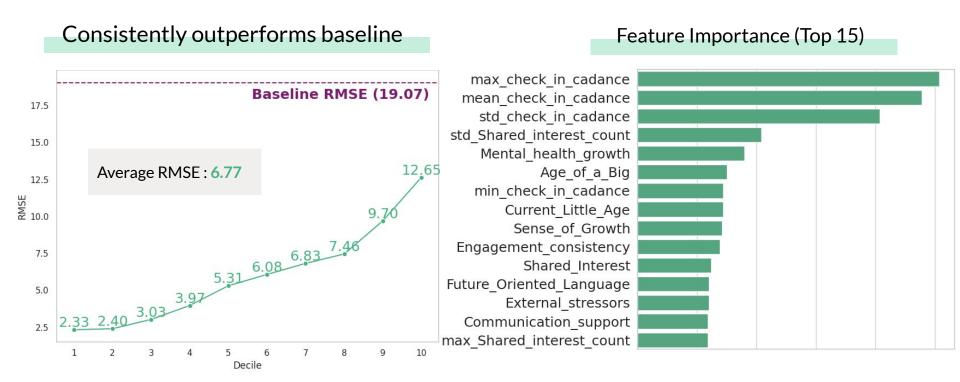
# **Building Block 2 - Match Length Prediction**

#### Match Length Prediction

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Match ID	Risk & Conflict	Engagement	Relationship Quality	Months Until Expected Closure	Predicted Closure Reason
A123	0.66	1.21	1.16	3	Success
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# LightGBM Outperforms Other Models in "Match Length" Prediction



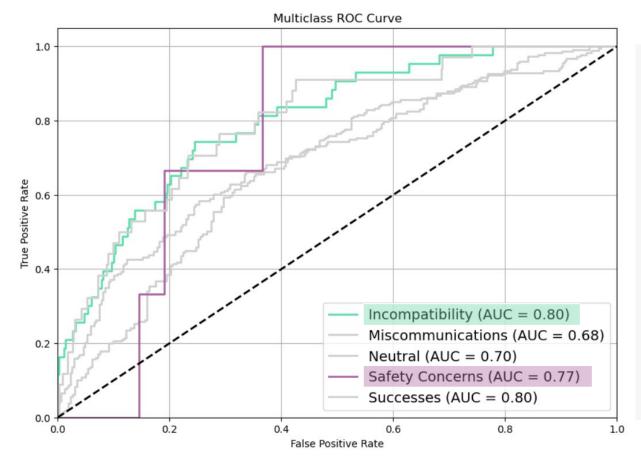
# **Building Block 3 - Closure Reason Prediction**

#### **Closure Reason Prediction**

:---:

Match ID	Risk & Conflict	Engagement	Relationship Quality	Months Until Expected Closure	Predicted Closure Reason
A123	0.66	1.21	1.16	3	Success
B456	0.92	0.08	-0.49	10	Safety Concerns
C789	-0.18	2.73	0.55	8	Incompatibility

# **Strong Predictive Power on Closure Reasons**



#### Random Forest

#### **Features Driving Incompatibility:**

- 1) Age of a Big
- 2) Current Little Age
- 3) Conflict Language
- 4) Sentiment
- 5) LDA Formal Tone Topic

#### **Features Driving Safety Concerns:**

- 1) LDA Safety Topic
- 2) Age of a Big
- 3) Sentiment
- 4) Check-in frequency
- 5) Check-in Cadence
- 6) Conflict Flags

# **Understanding How Key Features Affect Match Length**

- Relationship quality and engagement are associated with longer relationships
- Demographic and risk & conflict features have higher risk of early closure

	Engagement	Risk & Conflict	Relationship Quality	Demographic
Lower risk of early closure	Check-in Cadence Call Frequency		Engagement_consistency Future_Oriented_Language Communication_Support Relationship_quality Shared_Interest LDA Formal Tone Topic	
<u>Higher</u> risk of early closure		Unresponsiveness Conflict Language External Stressors LDA Friction Topic		Age of a Little Age of a Big

# Recommendations

Goal	Initiatives	Actions
Timing Intervention	Closure Intervention Strategy	Implement a monitoring system: <b>Real-Time Dashboard</b> using match health score for timely interventions

# Match Health Dashboard in Real-Time

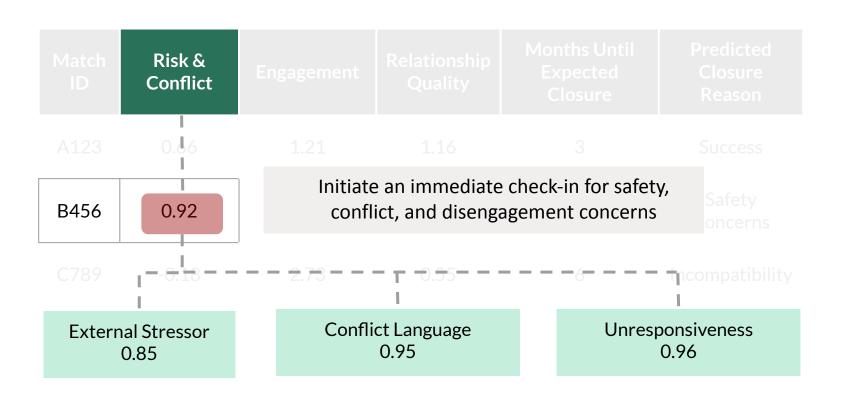
An example of early intervention walk through - WHO & WHEN needs intervention?

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A123	0.66	1.21	1.16	3	Success
B456	0.92	0.08	-0.49	2	Safety Concerns
C789	-0.18	2.73	0.55	6	Incompatibility

Immediate Concern

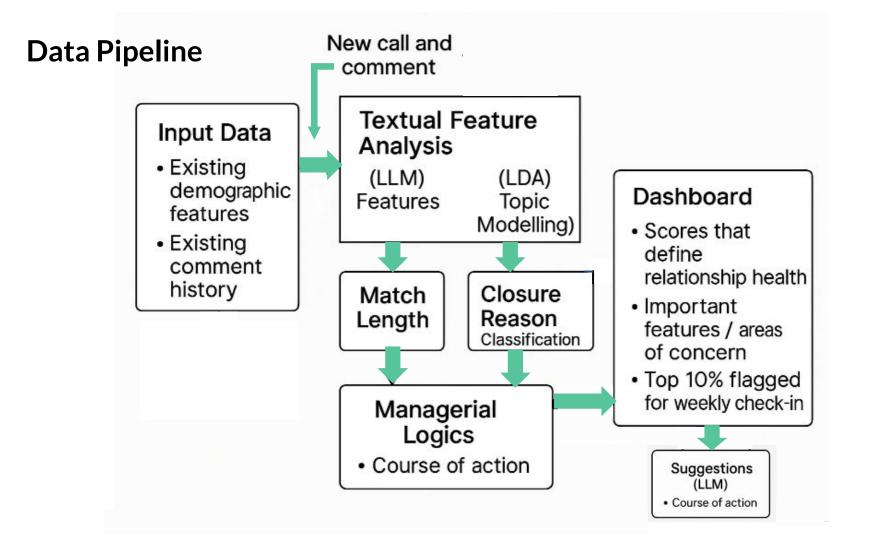
#### Match Health Dashboard in Real-Time

An example of early intervention - HOW to design a data driven personalized intervention?



# Recommendations

Goal	Initiatives	Actions
Timing Intervention	Closure Intervention Strategy	Implement a monitoring system: <b>Real-Time Dashboard</b> using match health score for timely interventions
Improve Monitoring Metrics	Data Integrity	Consolidate all data sources into single pipeline for seamless integration



## Recommendations

Goal	Initiatives	Actions
Timing Intervention	Closure Intervention Strategy	Implement a monitoring systematch health score for timely
Improve Monitoring Metrics	Data Integrity	Consolidate all data sources i integration
	Support Call Framework	Create survey questions for t
		Risk and Conflict:  1) How well do yo  2) Have you notice expresses them
		Relationship Quality:  1) How do you enj
		2) Do plans with b

tem: Real-Time Dashboard using ly interventions

into single pipeline for seamless

future support calls

- ou get along well with your Big/Little?
- ced any changes in how your Little mselves or handles situations lately?
- njoy your time with your big?
- big/little include things you enjoy?
- **Engagement:** 
  - How have you supported this relationship?

# Thanks for your time!

Feel free to reach out if you have any questions or thoughts



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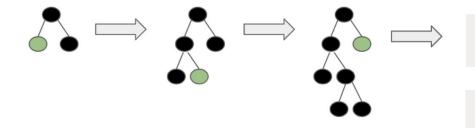
# Thank You!



# Appendix

# Model Strategies for Match Length Prediction - LightGBM Model

#### **LightGBM leaf-wise**



# LightGBM Model

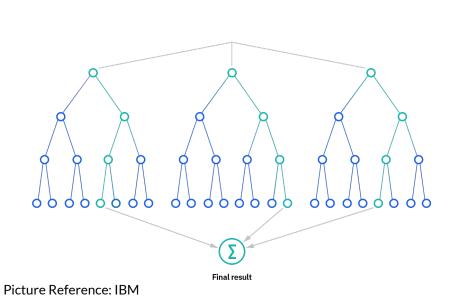
Faster training speed and better efficiency

Compatibility with Large Datasets

Capability of processing high-dimensional data

Generate feature importance automatically

# **Model Strategies for Closure Reason Prediction - Random Forest**



#### **Random Forest**

High Accuracy

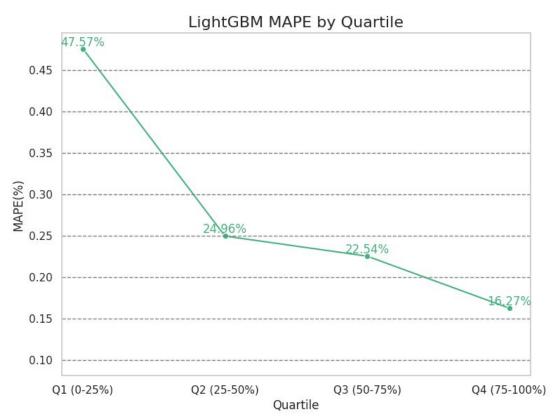
Handles Missing Values & Outliers

Feature Importance & Interpretability

Works Well with Large Datasets

# Match Length Prediction - LightGBM Model MAPE

MAPE indicates that model shows best performance on longer match length.



Category	Feature	Definition	
Engagement	Check-in cadence	days between calls	
Engagement	Check-in frequency	count of calls	
	Child safety concern	drug or substance abuse by child or parent, violence, assault, or threats, rehab, hospitalization, or trauma events	
Risk &	Unresponsiveness	either candidate is difficult to get a hold of, or doesn't show to scheduled events	
Conflict	External stressors	family matters, school obligations, mental health, relocations, etc.	
	Conflict Language	disagreement, tension, arguments, or interpersonal friction	
	Engagement Consistency	how often the match meets and whether they plan or look forward to future interactions	
	Mental health growth	support for mental health and signs of personal/emotional development	
Relationship	Mutual sense of growth	positive growth or behavior mentioned.	
Quality	Relationship quality	emotional closeness, shared activities, and a positive dynamic	
<b>Quanty</b>	Future oriented	mention future plans, goals, long term investments	
	Shared Interest	any hobbies or interests were mentioned and the speaker expresses positive emotion	
	Communication support	communication consistently and empathetically	24