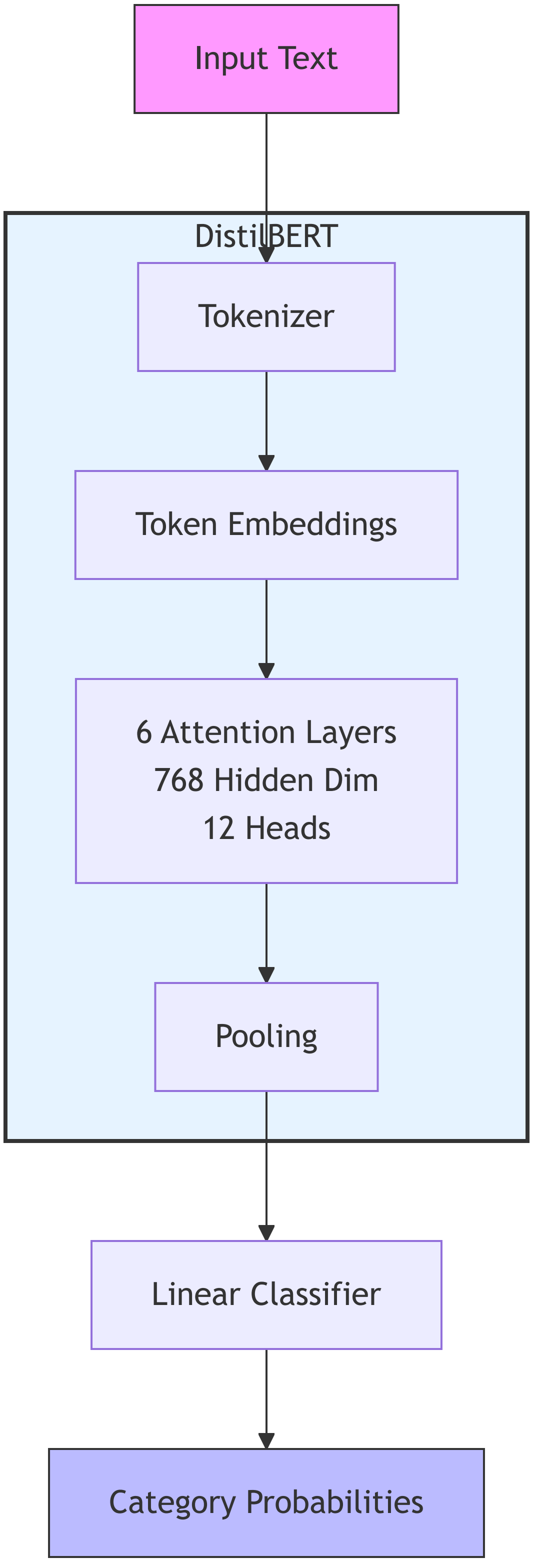
Child Protection Case Classification

Model

Model Architecture



1. Overview

Model Purpose

Automated classification of child protection case narratives into standardized categories for:

- Case prioritization
- Resource allocation
- Trend analysis

Version Information

Component	Version
Model Weights	1.0.0
Tokenizer	1.0.0
Training Data	v2024-06

2. Data Generation

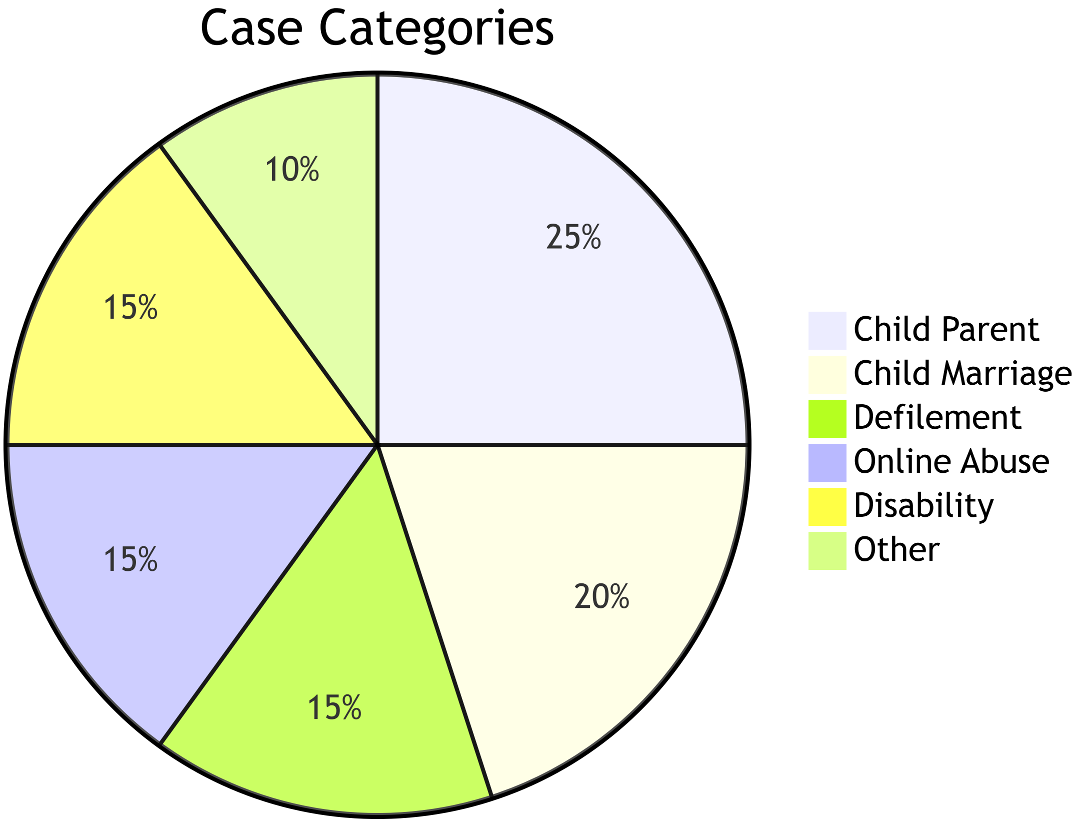
Synthetic Data Pipeline

```
# Data generation pseudocode
1. Load Mistral-7B LLM
2. For each case:
   - Select random demographic profile
   - Generate narrative using category-specific prompt
   - Apply quality filters
3. Export to CSV
```

Dataset Statistics

Metric	Value
Total Cases	1,000
Avg. Narrative Length	120 tokens

Metric	Value
Categories	6
Category Distribution:	



3. Model Development

Training Configuration

```
model: distilbert-base-uncased
max_length: 256
batch_size: 16
epochs: 4
learning_rate: 2e-5
optimizer: AdamW
```

Training Progress

Epoch	Loss	Grad Norm	LR
1	2.70	1.80	1.89e-5
2	1.76	3.75	9.15e-6
4	1.30	3.60	6.10e-7

Key Metrics:

- Final Loss: 1.30
- Training Time: 4m28s
- Throughput: 9.6 samples/sec

4. Evaluation

Test Set Performance

Metric	Score
Accuracy	0.88
Precision	0.86
Recall	0.85
F1 Score	0.85

Confusion Matrix:

```
                Predicted
             A     B     C     D
 Actual A [[85    5     3     7]
      B   2    78     4     1]
      C   1     4    82     3]
      D   3     2     5    80]]
```

5. Usage

Inference Example

```
from transformers import pipeline

classifier = pipeline(
    "text-classification",
    model="./case_category_model",
    tokenizer="distilbert-base-uncased"
)

case_text = "15yo female coerced into sending explicit images..."
result = classifier(case_text)
# Output: {'label': 'Online Abuse', 'score': 0.92}
```

API Specification

Endpoint: /classify-case

Input:

```
{
    "text": "case narrative...",
    "threshold": 0.7
}
```

Output:

```
{
    "prediction": "Child Marriage",
    "confidence": 0.91,
    "warning": "Requires urgent attention"
}
```

6. Limitations

Performance Boundaries

- Minimum text length: 50 characters
- Accuracy by category:
    - High (>90%): Defilement, Child Marriage
    - Medium (80-90%): Online Abuse
    - Lower (<80%): Complex multi-issue cases

Ethical Guidelines

- Always maintain human oversight
- Audit predictions for bias monthly
- Do not use for:
    - Legal determinations
    - Automatic service denial
    - Unverified reporting

7. Maintenance

Version History

Version	Date	Changes
1.0.0	2024-06-01	Initial release

Retraining Protocol

Monthly:

- Generate new synthetic cases
- Fine-tune with 10% new data

Quarterly:

- Full retraining
- Bias assessment

8. Appendices

Requirements

```
transformers==4.30.2
torch==2.0.1
datasets==2.13.1
```

Training Log Sample

```
Epoch  Loss       LR
---------------------------------
1      2.7003    1.89e-5
2      1.7621    9.15e-6
4      1.3005    6.10e-7
```