FYP
Proposal

Emotion-Aware Emergency Dispatch System

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Summary

- Introduction of the Project
- Problem Statement
- Project Scope
- Tentative Project methodology
- Tentative Project Schedule (Time lines)
- Project tools (S/W or H/W required)
- FYP Deliverables
- References

1- Introduction of the Project

- An AI-powered system that supports emergency dispatch operations.
- Converts live voice calls into real-time text using speech recognition.
- Detects caller's emotional state using voice and text analysis.
- Recommends appropriate actions using a fine-tuned language model.
- Designed to assist human operators, not replace them.
- Helps address the issue of understaffed and overloaded 911 call centers.

2- Problem Statement

Emergency response centers face critical overload during crises. Limited human operators, high call volumes, and delayed decisions reduce the effectiveness of emergency services.

Keywords: Smart systems, AI, Automation, Technology progression, Real-time prediction.

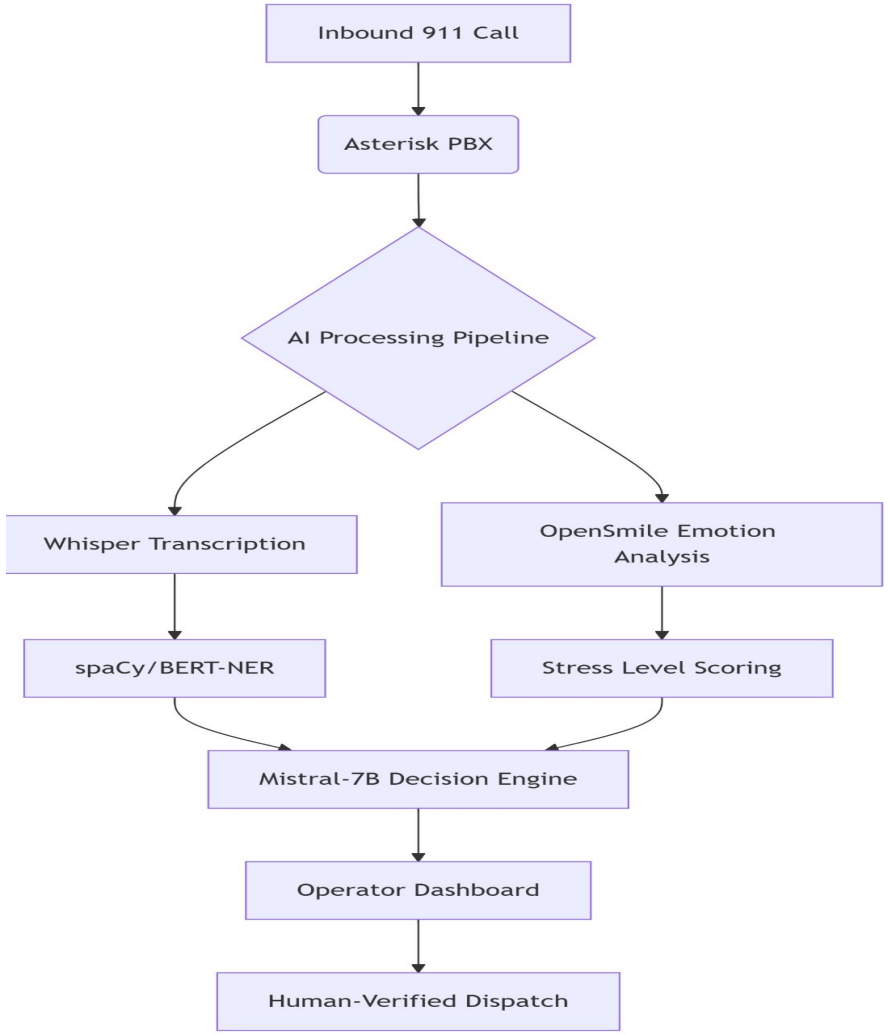
3- Project Scope

Scope Includes:

- Real-time call transcription (Whisper)
- Emotion detection using text & voice (BERT + OpenSMILE)
- Response generation using LLM (Mistral)
- Dispatcher dashboard with map and live chat
- Free open-source deployment (no paid APIs)

Scope Excludes:

- No real ambulance dispatch
- No Multilingual support
- No integration with real 911 systems (due to government control, cost, API limitations)



4-Tentative Project Methodology

- We adopted Agile methodology for flexibility and low risk.
- Project divided into modules: transcription, emotion detection, LLM, and dashboard.
- Weekly progress and testing handled in sprints across 30 weeks.
- Team Roles:
  - Abdullah Shaikh – Fine Tuning LLM & BERT
  - Murtaza Hassan – Backend(Fast API Server)
  - Muhammad Baqar – Frontend Dashboard & UI
  - Tahir Mehdi – Voice Pipeline & TTS Integration

5- Tentative Project Schedule

Phase	Weeks	Key Activities
1. Planning & Setup	1–5	Tool research, requirements gathering, dataset review
2. Data & Preprocessing	6–11	Collect 911 call audio/text, preprocess for Whisper & OpenSMILE
3. Speech & Emotion Modules	12–17	Integrate Whisper STT; develop text (BERT) & audio (OpenSMILE) emotion detection
4. LLM Fine-Tuning	18–22	Fine-tune Mistral LLM on emergency dataset via Intel DevCloud
5. Dashboard & Integration	23–27	Build React/Next.js UI, map integration, hook up AI modules
6. Testing & Finalization	28–30	System testing, supervisor feedback, report writing & defense prep

6- Project tools

Area	Tools Used
Programming	Python, JavaScript
AI Libraries	Hugging Face Transformers, DistilBERT, OpenSMILE , faster-whisper
Frontend	React, Next.js, Tailwind CSS
Backend/API	FastAPI
Dataset	RAVDESS , Go Emotions , 911 calls
TTS Engine	Mozilla TTS
Live Calling	Asterisk
Mapping	Leaflet.js
Hardware	Intel DevCloud (GPU/CPU)

7- FYP Deliverables

- Whisper speech-to-text module
- Emotion detection engine (BERT + OpenSMILE)
- Fine-tuned LLM for emergency context
- Dispatcher dashboard (with transcript & map)
- Dataset documentation
- Final code + report

8- Reference

- Reddy, S., & Kompalli, S. (2022). Emotion Detection using Multimodal Analysis. Journal of AI & Ethics.
- Rajput, D., & Singh, H. (2023). BERT for Emotion Classification. Procedia Computer Science.
- Huang, J., et al. (2020). Whisper and ASR Systems. arXiv preprint.
- OpenSMILE documentation. AudEERING GmbH (2020).