**Product Requirements Document (PRD)**

**Module 1: Call Handling and Speech Processing (with Spam Filtering)**

**1. Overview**

This module automates call reception, transcription, and spam detection. It processes incoming audio, converts speech to text, filters spam calls, and logs structured data for analysis by later modules. It ensures secure and efficient preprocessing for AI-based lead qualification.

**2. Objectives**

* Automatically receive and manage incoming calls.
* Transcribe speech accurately with minimal delay.
* Detect and block spam or irrelevant calls.
* Log and archive call data securely.

**3. Functional Requirements**

| **ID** | **Requirement Description** |
| --- | --- |
| FR1 | System shall automatically receive and process incoming calls. |
| FR2 | System shall transcribe speech to text and store it for downstream analysis. |
| FR3 | System shall detect and filter spam or irrelevant calls using a trained model. |
| FR4 | System shall tag filtered calls with a spam\_flag and prevent them from entering later stages. |
| FR5 | System shall log and archive audio, metadata, and transcription for audit and retraining. |

**4. Non-Functional Requirements**

| **Category** | **Requirement** |
| --- | --- |
| Reliability | ≥ 95 % uptime; automatic recovery < 30 s after failure. |
| Performance | Speech-to-text latency < 2 s; spam detection accuracy ≥ 90 %. |
| Security | Input validation, sanitization, and encrypted storage. |
| Usability | Dashboard allows review of flagged calls within three clicks. |

**5. Spam Filtering Workflow**

1. Receive audio input from telephony interface.
2. Extract features (MFCCs, duration, metadata).
3. Run spam-classification model.
4. If spam → mark and store in spam repository.
5. If valid → continue to transcription and logging.

**6. System Components**

* **Telephony Handler:** Accepts and routes incoming calls.
* **ASR Engine:** Converts speech to text.
* **Spam Filter:** Detects unwanted or malicious calls.
* **Logger / Storage Manager:** Archives call data and model outputs.
* **Security Module:** Validates and secures inputs.

**8. Dependencies**

* Telephony API (SIP/VoIP).
* Pre-trained ASR and spam models.
* Database for logs and transcripts.

**9. Risks and Mitigations**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **Risk** | **Mitigation** | | --- | --- | | False positives in spam detection | Regular retraining and manual review. | | Audio quality degradation | Adaptive noise filtering and silence trimming. | | Data exposure | Use encryption and access control. | |

**10. Deliverables**

* Integrated call handling + ASR pipeline.
* Functional spam filter.
* Database schema for calls and spam logs.