

## **SOFTWARE REQUIREMENTS SPECIFICATION (SRS)**

**Project Title:** English to Hindi Neural Machine Translation Web Application

### **1. Introduction**

**Purpose:** Develop a web-based language translation system translating English text into Hindi using Helsinki-NLP/opus-mt-en-hi model. Built using Python, Flask, and deployed on Render.

**Scope:**

- Accept English text
- Process using NLP model
- Generate Hindi translation
- Display instantly

**Definitions:**

NLP: Natural Language Processing

NMT: Neural Machine Translation

API: Application Programming Interface

### **2. Overall Description**

Standalone AI web application.

**Architecture:** User → Browser → Flask → NLP Model → Translation → Browser

**Users:**

- General users
- Students
- Content creators

**Environment:**

Browser: Chrome/Firefox/Edge

Backend: Python + Flask

Libraries: transformers, torch

**Constraints:**

Internet required, initial model loading delay.

### **3. System Features**

**Translation Feature:**

Input English → Tokenization → Model → Hindi Output

**Functional Requirements:**

FR1 Accept English input

FR2 Translate into Hindi

FR3 Display result

FR4 Handle empty input

FR5 Multiple requests

FR6 Error handling

**UI Features:**

Textbox, Translate button, Output display, Loading indicator

### **4. Interfaces**

Frontend: HTML/CSS/JS

Backend: Flask API

AI: HuggingFace model

Deployment: Render

### **5. Non Functional Requirements**

Performance: <3 sec response

Reliability: 95% uptime

Usability: Simple interface

Security: Input validation

Scalability: Multi language future

## 6. Future Enhancements

Speech translation

Multi language support

Mobile app

## 7. Acceptance Criteria

User inputs English

System outputs Hindi

Accessible via deployed URL