Vidyavardhaka College of Engineering

ವಿದ್ಯಾವರ್ಧಕ ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ

Autonomous Institute affiliated to VTU,Belagavi

TEAM DETAILS:

College Name : JSS Science and Technology University

Team Name : The Divas

Team Leader :Diyana Khoisnam

Team Member Details :

1. **Jyothsna Sharma**
2. **Dishaka Y Bhat**
3. **Mridul Jaju**

HACK KSHETRA 2.0

24 HOURS NATIONAL LEVEL HACKATHON

PROBLEM STATEMENT AND EXISTING SOLUTION

PROBLEM STATEMENT:

- STUDENTS WITH LEARNING DISABILITIES LIKE DYSLEXIA AND ADHD FACE MAJOR BARRIERS IN TRADITIONAL LEARNING ENVIRONMENTS.
- LONG, DENSE TEXT AND LACK OF MULTI-SENSORY CUES MAKE COMPREHENSION DIFFICULT.
- CURRENT E-LEARNING TOOLS ARE BUILT FOR NEUROTYPICAL LEARNERS, IGNORING THE DIVERSE COGNITIVE NEEDS OF STUDENTS.
- THIS LEADS TO REDUCED CONFIDENCE, FRUSTRATION, AND SLOWER ACADEMIC PROGRESS.

EXISTING TOOL / APPROACH

- SPEECHIFY, NATURALREADER
- MICROSOFT IMMERSIVE READER
- GRAMMARLY / QUILLBOT SIMPLIFY
- SPECIAL FONTS (OPENDYSLEXIC)

KEY FEATURES

- HIGHLIGHTS WORDS, READS ALOUD, ADJUSTS SPACING
- REWRITES SENTENCES IN SIMPLER FORM
- CONVERTS TEXT TO SPEECH FOR AUDITORY LEARNING
- USES FONT DESIGN TO IMPROVE READABILITY

LIMITATIONS

- DOESN'T SIMPLIFY OR VISUALLY ADAPT THE TEXT
- LIMITED PERSONALISATION; LACKS ADVANCED NLP-BASED SIMPLIFICATION
- FOCUSED ON GRAMMAR & CLARITY, NOT ACCESSIBILITY FOR DYSLEXIA/ADHD

OUR VISION:

- WE'RE BUILDING AN AI-DRIVEN ACCESSIBILITY PLATFORM THAT TRANSFORMS ORDINARY TEXT INTO A PERSONALIZED, MULTI-SENSORY LEARNING EXPERIENCE.
- THROUGH SMART TEXT SIMPLIFICATION, COLOR-CODED STRUCTURE FOR FOCUS, AND NATURAL VOICE NARRATION, IT BRIDGES THE GAP BETWEEN HOW CONTENT IS TAUGHT AND HOW DIVERSE BRAINS ACTUALLY LEARN.

YOUR SOLUTION

CONCISE SUMMARY:

WE'RE DEVELOPING AN AI-POWERED ASSISTIVE LEARNING TOOL THAT AUTOMATICALLY REFORMATS ANY GIVEN TEXT TO MAKE IT EASIER TO READ, UNDERSTAND AND RETAIN – ESPECIALLY FOR STUDENTS WITH DYSLEXIA, ADHD, AND OTHER LEARNING DIFFERENCES.

HOW IT SOLVES THE PROBLEM:

- TRANSFORMS TRADITIONAL TEXT INTO AN ADAPTIVE LEARNING EXPERIENCE USING AI.
- REDUCES READING STRAIN AND DISTRACTION BY PRESENTING CONTENT VISUALLY, STRUCTURALLY, AND AUDIBLY IN LEARNER-FRIENDLY FORMATS.
- GIVES STUDENTS INDEPENDENCE – THEY CAN USE IT WITH ANY STUDY MATERIAL, WEBSITE, OR PDF WITHOUT NEEDING SPECIAL VERSIONS OF CONTENT.

MAIN COMPONENTS / FEATURES:

- TEXT SIMPLIFICATION : BREAKS DOWN COMPLEX SENTENCES, REPLACES TOUGH WORDS, AND RESTRUCTURES PARAGRAPHS FOR CLARITY.
- VISUAL AID & COLOUR CODING: USES CUSTOMISED COLOUR SCHEMES, SPACING, AND HIGHLIGHTS TO GUIDE READING FLOW AND MAINTAIN ATTENTION.
- TEXT-TO-SPEECH : READS ALOUD IN A NATURAL, CUSTOMISABLE VOICE – HELPING AUDITORY LEARNERS AND REDUCING READING FATIGUE.
- PERSONALISATION ENGINE: LEARNERS CAN ADJUST DIFFICULTY, COLOUR MODES, READING SPEED, AND VOICE TONE TO SUIT THEIR COMFORT.
- CROSS-PLATFORM INTEGRATION: WORKS AS A BROWSER EXTENSION OR APP, SO IT CAN BE USED ON ANY WEBSITE, DOCUMENT, OR E-LEARNING. PORTAL.

WHAT MAKES IT UNIQUE:

- COMBINES NLP + TTS + ACCESSIBILITY DESIGN IN ONE UNIFIED TOOL
- PROVIDES REAL-TIME REFORMATTING – NO NEED TO UPLOAD OR REWRITE TEXT MANUALLY.
- BUILT WITH PERSONALISATION-FIRST DESIGN, ENSURING THE EXPERIENCE ADAPTS TO EACH LEARNER, NOT THE OTHER WAY AROUND.
- PROMOTES INCLUSIVE EDUCATION, BRIDGING THE GAP BETWEEN TECHNOLOGY AND NEURODIVERSITY.

TECH STACK

TECH STACK & IMPLEMENTATION

🧠 ARTIFICIAL INTELLIGENCE / NLP

- PYTHON – CORE PROGRAMMING LANGUAGE
- SPACY / NLTK – TOKENISATION, POS TAGGING,LINGUISTIC ANALYSIS
- TRANSFORMERS (HUGGING FACE) – TEXT SIMPLIFICATION AND SEMANTIC UNDERSTANDING

🎤 SPEECH & AUDIO PROCESSING

- GTTS / PYTTSX3 / AZURE SPEECH API – CONVERTS TEXT TO NATURAL-SOUNDING VOICE
- AUDIO PLAYBACK INTEGRATION FOR REAL-TIME NARRATION

🎨 FRONTEND / UI

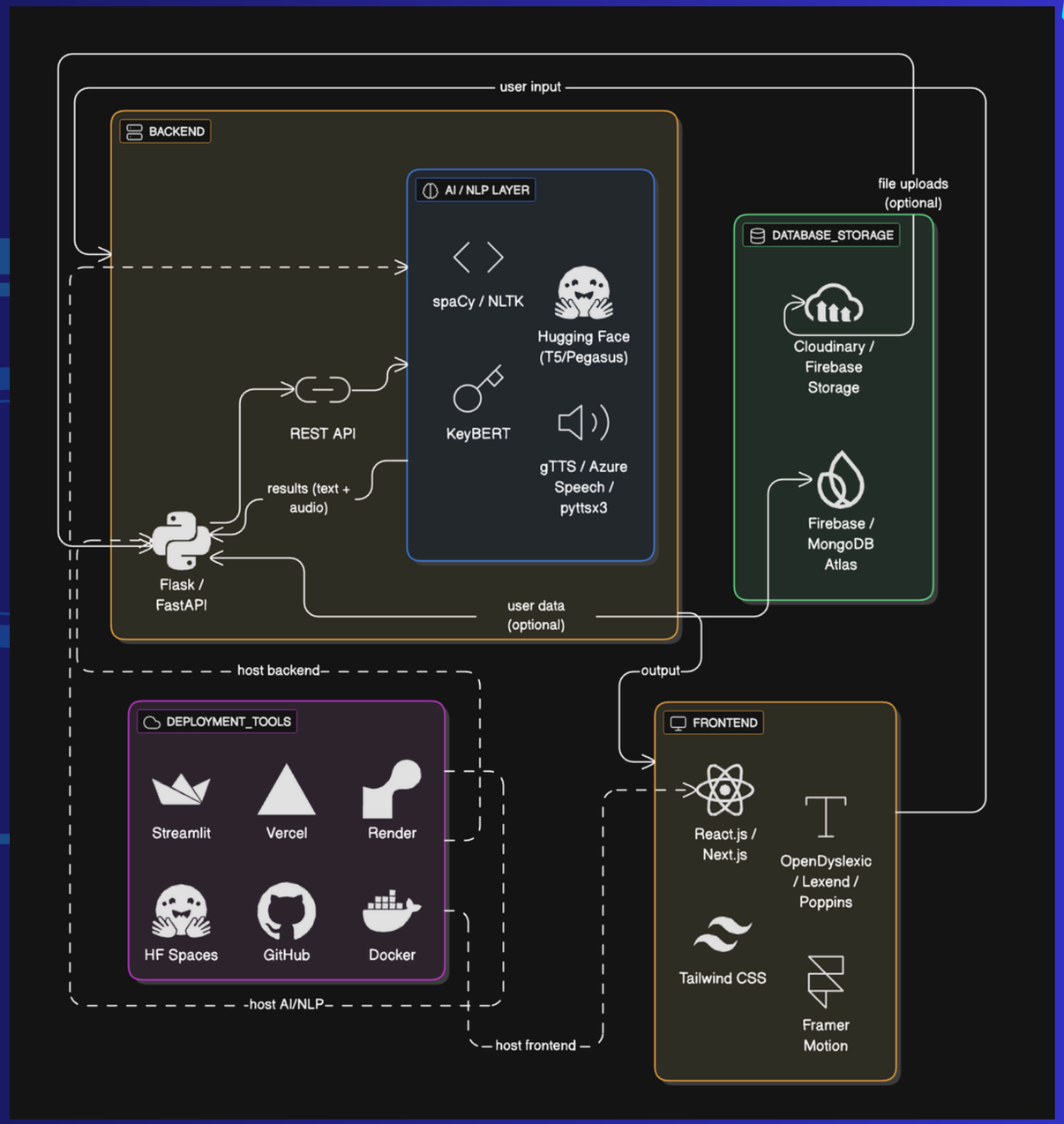
- STREAMLIT / REACT – INTERACTIVE AND MINIMAL INTERFACE
- TAILWIND CSS – CLEAN, ACCESSIBLE DESIGN
- COLOR-CODED HIGHLIGHTING ENGINE FOR VISUAL LEARNING AID

🔧 BACKEND / INTEGRATION

- FLASK / FASTAPI – CONNECT NLP + TTS MODELS WITH FRONTEND
- REST API ENDPOINTS - TEXT I/O PROCESSING
- DOCKER – PORTABILITY DURING DEPLOYMENT

☁ DEPLOYMENT / HOSTING

- AWS / RENDER / HUGGING FACE SPACES – HOSTING THE AI APP
- GITHUB – VERSION CONTROL & COLLABORATION



FEASIBILITY & CONCLUSION

⚙ PRACTICALITY AND FEASIBILITY

- BUILT USING OPEN-SOURCE, EASY-TO-INTEGRATE TOOLS THAT ALLOW RAPID PROTOTYPING.
- ALL COMPONENTS ARE LIGHTWEIGHT, WELL-DOCUMENTED,AND DEPLOYABLE ON FREE PLATFORMS LIKE VERCEL OR STREAMLIT CLOUD.
- HUGGING FACE (T5 / PEGASUS) SIMPLIFIES TEXT, WHILE SPACY HANDLES LINGUISTIC TAGGING.
- GTTS / AZURE COGNITIVE SPEECH PROVIDES REAL-TIME TEXT-TO-SPEECH CONVERSION.
- PYTHON (FLASK / FASTAPI) FOR BACKEND AND REACT.JS / STREAMLIT FOR FRONTEND ENSURE QUICK DEVELOPMENT.

🌍 EXPECTED IMPACT

- ENHANCES READING COMPREHENSION AND FOCUS FOR STUDENTS WITH DYSLEXIA OR ADHD.
- PROMOTES INCLUSIVE AND ACCESSIBLE LEARNING ENVIRONMENTS IN SCHOOLS AND E-LEARNING PLATFORMS.
- BOOSTS LEARNER CONFIDENCE THROUGH PERSONALIZED READING SUPPORT.
- AIMS TO EMPOWER EVERY LEARNER, SHOWING HOW TECHNOLOGY CAN MAKE EDUCATION TRULY INCLUSIVE

💡 CONCLUSION

- COMBINES AI INNOVATION WITH SOCIAL IMPACT, MAKING IT BOTH MEANINGFUL AND FEASIBLE.
- DEMONSTRATES A BALANCE BETWEEN TECHNICAL CAPABILITY AND ACCESSIBILITY DESIGN.

HACK KSHETRA 2.0

THANK YOU!