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Lasen

AI and Technology Implementation Case Study

A portfolio case study highlighting Rawan Alghashmari’s contribution to an Arabic speech-practice graduation project, focusing on technology evaluation and AI implementation.



RAWAN ALGHASHMARI

AI & Technology Implementation Contributor | System Analyst

Project at a Glance

CASE STUDY / AI & TECHNOLOGY IMPLEMENTATION

Lasen is a technology-assisted Arabic speech practice platform utilizing progressive scenarios, speech recognition, and interactive environments to provide performance feedback.

PROJECT TYPE

Graduation Project (Team Environment)

CASE STUDY FOCUS

AI & Technology Implementation

PRIMARY ROLE

AI Contributor & System Analyst

Core Experience Architecture

- **Progressive Scenarios**

  Structured communication practice through escalating difficulty levels.

- **Speech Recognition**

  Real-time Arabic speech processing for natural interaction flow.

- **Performance Feedback**

  Automated analysis translated into actionable user insights.

- **Interactive Context**

  Digital environments designed for immersive language practice.

Challenge and Product Direction

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Problem Framing

Translating a complex communication-practice challenge into a structured digital experience for learners.

Technical Direction

Evaluating technologies to establish a practical implementation path within the project constraints.

Validation Direction

Moving beyond documentation into functional prototype interaction and preliminary user feedback.

RESULTING PRODUCT CONCEPT CONNECTION

Guided Practice → Arabic Speech Recognition → Performance Analysis → Personalized Feedback → Progress Outcome

Connecting guided interactions with automated speech processing to deliver a progress-oriented learning outcome.

Contribution Overview

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Direct Contributions

AI & Speech Implementation

Contributed to speech-recognition and performance-analysis implementation, translating interactions into usable feedback.

Technology Evaluation

Compared speech, web, database, and virtual-environment alternatives to support selection based on project needs.

ERD & System Design

Designed the project ERD to structure core entities, relationships, and data integrity before technical implementation.

Methodology & Validation

Selected Agile for iterative execution and supported early user evaluation through platform interaction trials.

Team Collaboration

Active contributor within a shared graduation-project team environment, focusing on:

- Shared requirements gathering and business analysis.
- Collaborative documentation and project artifacts.
- Cross-functional implementation and integration testing.

Public-Safe Boundary: *No sole ownership is claimed for shared team activities. All proprietary credentials and internal scoring remain confidential.*

Technology Evaluation & Decision-Making

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Microsoft Azure Speech

SELECTED SOLUTION

ARABIC SUPPORT

Top-Tier Performance

Robust handling of Modern Standard Arabic with high accuracy for practice scenarios.

INTEGRATION EFFORT

Seamless & Scalable

Well-documented SDKs compatible with the planned web environment.

PROJECT-TIME FIT

Optimal Delivery

Reduced implementation complexity enabled focus on core experience design.

Generic Cloud APIs

CONSIDERED

ARABIC SUPPORT

Strong Accuracy

Competitive recognition rates for standard communication patterns.

INTEGRATION EFFORT

Moderate Complexity

Required additional middleware or specific environment configurations.

PROJECT-TIME FIT

Variable Risk

Potential for overhead during iterative Agile sprints.

Open-Source Engines

CONSIDERED

ARABIC SUPPORT

Customizable Accuracy

Highly dependent on training data quality and specific model tuning.

INTEGRATION EFFORT

High Resource Need

Required significant infrastructure setup and ongoing maintenance.

PROJECT-TIME FIT

High Risk

Implementation effort exceeded graduation project timeframe.

Decision Rationale: Selected Microsoft Azure Speech for its superior balance of **Arabic support**, **usability**, and **implementation fit**, enabling a stable foundation for speech-practice interactions.

ERD and System-Design Approach

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01

Identify Core Concepts

Determine major business and system concepts requiring persistent representation to ensure architectural robustness.

02

Define Relationships

Map how core concepts relate to one another and clarify high-level cardinality for data integrity.

03

Review Integrity

Audit for duplication and missing relationships while ensuring total consistency with system requirements.

04

Prepare for Implementation

Use the validated conceptual model as a rigorous foundation for subsequent database and application work.

PORTFOLIO VALUE

- Structured Analysis
- Relationship Modeling
- Requirements Alignment
- Implementation Readiness

AI and Speech Implementation Flow

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STEP 01

Practice Input

The user initiates a structured Arabic speech-practice interaction within a progressive scenario environment.

STEP 02

Speech Recognition

Spoken Arabic input is processed and interpreted through the integrated Microsoft Azure Speech capability.

STEP 03

Performance Analysis

Key communication indicators are evaluated against the specific requirements of the practice interaction.

STEP 04

Feedback Output

Technical analysis results are translated into actionable and understandable performance feedback for the user.

STEP 05

Progress View

The user receives a clear outcome that visualizes their performance and supports continued developmental practice.

Public-Safe Implementation: No source code, credentials, proprietary database records, or sensitive scenario content are included in this functional overview.

Value Created through Implementation

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USER FEEDBACK LOOP

Bridging the gap between technical capability and human-centric experience.

Implementation Value

Connected speech-recognition capability with a usable practice flow, transforming AI from an isolated technical feature into a core product value.

Analysis Value

Translated complex technical outputs and speech metrics into understandable, actionable performance feedback for the end-user.

Delivery Value

Successfully transitioned the project from theoretical technology selection into a working implementation ready for user-facing evaluation.

> *"The contribution demonstrates a clear relationship between structured analysis, technical decisions, and the resulting user experience."*

Informal User Evaluation

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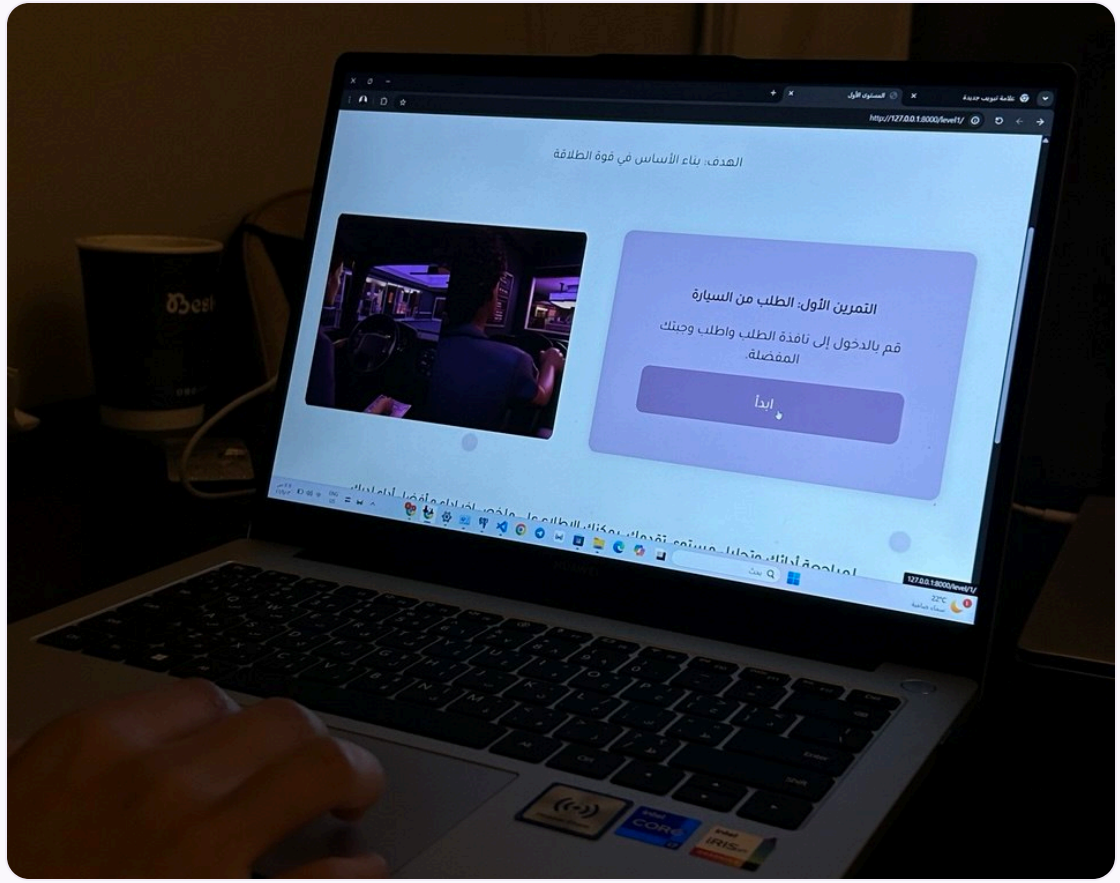
Validation of Implementation

- Demonstrated project progression from documentation to functional prototype interaction.
- Confirmed that the speech-practice experience was sufficiently implemented for user testing.
- Enabled stakeholders to view and discuss performance outputs during preliminary interactions.

Scope & Privacy Boundaries

> *This trial was conducted as an informal project milestone and is not presented as formal clinical validation or a statistically supported research study.*

- Strict confidentiality maintained: No participant PII or raw survey responses are published.
- Focus remains on functional capability evidence rather than individual user performance.



EVIDENCE: PARTICIPANT INTERACTION WITH THE ARABIC SPEECH-PRACTICE PLATFORM

Delivery Approach & Team Environment

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Agile Iterative Framework

Iterative Execution

Work broken down into manageable increments to allow for rapid prototyping and refinement.

Analysis Refinement

Continuous updating of requirements and system design as technical implementation evolved.

Early Validation

Incorporating participant interaction trials to inform the next development cycle.

Team & System Coordination

Integrated Lifecycle

Synchronized requirements, system design, technical development, and documentation efforts.

Strategic Transition

Moving from initial technology evaluation into a fully functional Arabic speech-practice experience.

Resource Optimization

Balancing individual technical contributions with collective team goals within project timelines.

Collaborative Boundary: Direct ownership is claimed for AI implementation and ERD design; broader delivery activities were shared team efforts managed through Agile coordination.

Capability Evidence

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AI & Technology Implementation

- **Arabic Speech Integration**
  Successful implementation of Azure Speech for localized practice.
- **Trade-off Analysis**
  Selection based on integration fit, usability, and timeframe.
- **Technical Translation**
  Converting raw AI outputs into user-facing performance feedback.

TECHNICAL DOMAIN

Analysis & System Design

- **ERD Modeling**
  Structured relationship mapping and data integrity reviews.
- **System-Level Thinking**
  Aligning complex technical decisions with product requirements.
- **Requirements Analysis**
  Translating business concepts into persistent system representations.

STRUCTURAL DOMAIN

Delivery & Validation

- **Agile Methodology**
  Iterative execution and coordination within a team environment.
- **Public-Safe Documentation**
  Reporting with confidentiality discipline and clear limitations.
- **Evidence-Led Communication**
  Validating progress through informal user interaction trials.

OPERATIONAL DOMAIN

Professional Reflection

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01

AI Selection & User Value Integration

AI technology should be selected through use-case-specific trade-offs rather than technical preference. A capability only gains professional value when it is seamlessly connected to a structured user flow and translates raw data into understandable feedback.

PRACTICAL TRADE-OFFS

02

System Modeling & Evidence Discipline

Structured system modeling, such as ERD design, serves as a critical foundation for implementation by clarifying complex relationships early. Furthermore, evaluation claims must strictly reflect the actual strength of evidence to maintain professional integrity.

STRUCTURED ANALYSIS

03

Ownership & Confidentiality Management

Effective portfolio communication requires a clear distinction between direct individual ownership and shared team contributions. Public presentations can demonstrate high-level capability and system-thinking without exposing confidential project artifacts.

RESPONSIBLE DISCLOSURE

Closing Statement

CASE STUDY / AI & TECHNOLOGY IMPLEMENTATION

> **"Lasen demonstrates the ability to connect business and system analysis with practical technology evaluation, AI implementation, and team delivery."**

This case study serves as evidence of implementation-oriented analysis while maintaining appropriate confidentiality and claim discipline, bridging the gap between theoretical requirements and functional technical solutions.

AI INTEGRATION

Translating complex speech-recognition capabilities into usable performance feedback within a structured practice flow.

SYSTEM DESIGN

Utilizing structured ERD modeling and methodology selection to bridge the gap between analysis and application work.

RESPONSIBLE VALIDATION

Managing informal user trials and technical evaluation with a high degree of privacy awareness and professional integrity.

Portfolio Case Study — Rawan Alghashmari